MSP in NAM

MARINE SPATIAL PLANNING IN NAMIBIA

CURRENT STATUS REPORT

KNOWLEDGE BASELINE FOR MARINE SPATIAL PLANNING IN NAMIBIA

2nd Edition

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Benguela Current Convention

MARISMA Benguela Current Marine Spacial Management and Governance Project

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

On behalf of:
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
of the Federal Republic of Germany

OVERVIEW OF MARINE SPATIAL PLANNING PRODUCTS IN NAMIBIA

It is expected that the process of Marine Spatial Planning (MSP) will be anchored in **legislation** to ensure a legal basis for MSP that establishes it as a binding and statutory process.

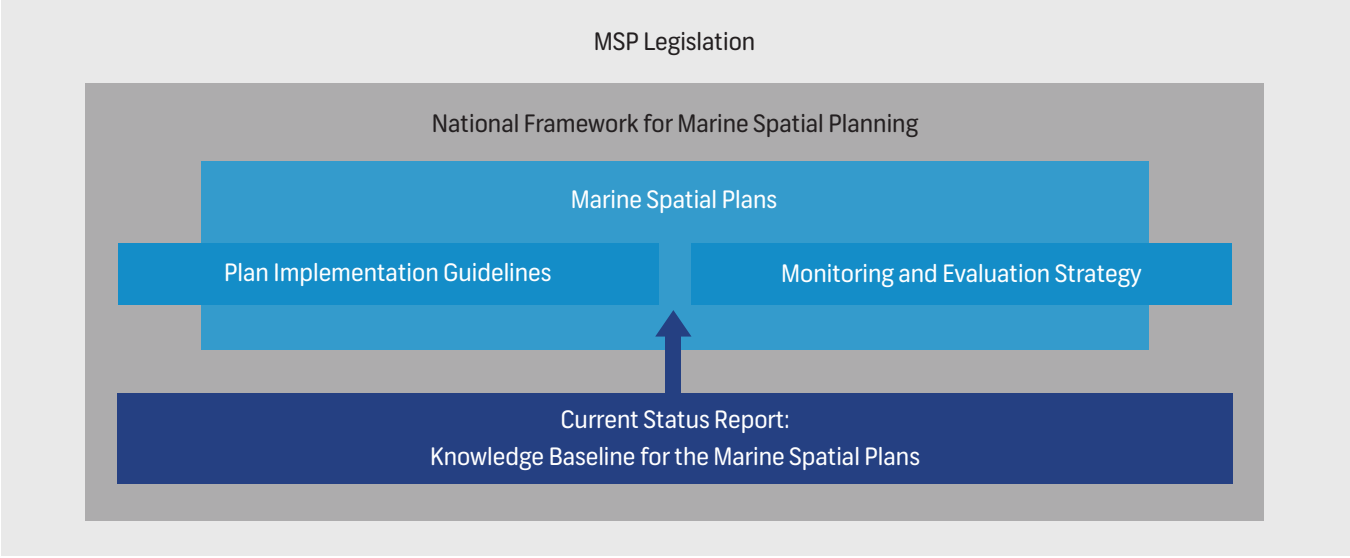
MSP in Namibia is guided by the **National Framework for Marine Spatial Planning**. It provides high-level direction to ensure consistent and coherent plan development, implementation and review across Namibia's marine space and its three planning areas. The National MSP Framework also describes the background to MSP and its overarching objectives in Namibia and identifies relevant institutional structures, roles and responsibilities.

The **Current Status Report** is the country's baseline report for MSP. It outlines the status quo of marine activities in Namibia and in each of the three MSP areas and identifies the issues which MSP needs to address in the ocean generally and in each of the planning areas. The report is considered a living document which will be updated before each plan revision. Drawing on ecological and socio-economic monitoring data and an expanding information base, it will therefore reflect the growing knowledge of the ocean, how we use it, what makes it unique, how it reacts to our impacts, and how it improves as a result of management.

The **Marine Spatial Plans** are the spatial articulation of Namibia's overarching policy and vision for the ocean. In each of the three planning areas, they translate the National Framework for MSP into integrated and strategic sustainable development plans that guide users, developers and regulators in their decision-making. Their role is to set out which activities should take place where, when and under what conditions in the MSP area. The marine spatial plans are regulatory plans which must be used by government and marine users as a basis for decision-making. Any licensing decisions must be in line with the provisions set out in the respective plans. The Central Marine Spatial Plan is the first of the three plans to be developed.

The **Plan Implementation Guidelines** serve as a day-to-day practical operational handbook for those implementing the marine spatial plans in Namibia. They explain how the various regulations set out in a marine spatial plan should be used in different licensing and permitting processes and what the various authorities need to do at what stage of the process. The document also identifies relevant structures and their roles and responsibilities in plan implementation. Overall, it supports the effective implementation of the marine spatial plans.

The **Monitoring and Evaluation Strategy** supports the continued development of MSP as an adaptive practice. It sets out the approach that will be taken to track the success of Namibia's marine spatial plans and planning process. The strategy explains the different elements of MSP that will be evaluated and sets out monitoring requirements; it also provides selected evaluation criteria. It represents the minimum requirements for evaluating all marine spatial plans in Namibia.



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FOREWORD

The ocean is one of Namibia's greatest assets. It is a critical socio-economic resource that feeds people, provides income, sustains livelihoods, and enables seaborne trade. The Namibian marine area provides numerous ecosystem services that many industries such as fisheries, tourism, mining or mariculture depend on. Its unique biodiversity is a source of joy and recreation and plays a critical role in sustaining the functioning of the ecosystem as a whole. Clearly, we need to manage it well so that it can continue to deliver the benefits and profits to our people.

The territorial waters and the exclusive economic zone of Namibia are utilized by several industries. Although levels of use of both territorial waters and exclusive economic zone in Namibia are currently relatively low compared to other areas worldwide, it has become clear that increasing and new conflicts with the environment and between users are occurring and are likely to increase in years to come. In order to avoid such conflicts and a degraded ecosystem that undermines the socio-economic potential of our ocean, Namibia has introduced Marine Spatial Planning (MSP).

Our aim with MSP is to guide, in a coordinated way across sectors, where and when human activities should occur in the Namibian marine space. This is so simply because planning the way we use the marine area under Namibian jurisdiction and the resources it contains across sectors is the best – and only – way to proactively plan for sustainable ocean development. As such, we need to integrate the various spatial claims in order to balance economic, social and ecological interests and needs. Doing so will provide a framework for a sustainable growing Blue Economy, in line with the 5th National Development Plan and globally agreed targets within the Agenda 2030 framework. Put plainly, MSP is the process we need in order to deliver on these goals.

Moving from little to no coordination across sectors to an integrated approach for planning and management is not new to Namibia – we are and have been practising it successfully on land for decades through our land use planning system. With MSP, the Namibian government is now extending this integrated planning approach to the sea. In order to ensure that this is successful a cooperative governance model that brings all government authorities with marine sector mandates and responsibilities together is required to enable the parties to work hand in hand. It was for this reason, that an inter-ministerial working group on MSP was formed in 2016 comprising of eight Ministries, the National Planning Commission and three research institutions. This technical committee, chaired by the Ministry of Fisheries and Marine Resources, is responsible for leading the practical implementation of MSP in the country.

In order to enable planning, the working group, together with technical experts, has compiled this Current Status Report as an evidence base for the development of the marine plans. This knowledge baseline captures the best available data, information, and expert views on the current activities in the marine environment, the future needs of different sectors, and the key issues to be addressed through MSP. The Current Status Report was developed with wide and inclusive consultations and direct engagement with relevant and interested sectors and stakeholders. It is the necessary foundation that allows us to proceed with the elaboration of the marine plans of which the first one is focusing on the central area of Namibia's ocean space. As a living document – which will be regularly updated to include new knowledge as it becomes available– the Current Status Report will remain an important source of data and information for the MSP process. Namibia's marine plans will be adapted on a regular basis to accommodate changes in environmental patterns, human activities and government priorities.

Implementing MSP and developing meaningful marine plans that provide an added value to government, users and interest groups is complex and requires integrated thinking.

I am of the view that, as a country, we will be able to achieve this noble ambition of introducing sustainable ocean development pathways through MSP if we develop marine plans that:

- Balance socio-economic development and ecological sustainability through an ecosystem-based and precautionary approach
- Provide security for public and private sector investment
- Encourage and attract innovation
- Increase coordination and integration between sectors to reduce conflicts and enhance synergies and
- Contribute to greater food security

I am therefore delighted in knowing that Namibia is one of the first countries in Africa to introduce MSP, a step in the right direction from which we should draw immense pride.

I therefore look forward to the continued participation and engagement of my colleagues, all sectors and stakeholders in the MSP process in Namibia. I would like to emphasise that only if we work together, will we be able to transform the ways in which we manage our ocean – for a healthy marine environment that supports socio-economic development: a sustainable Blue Economy for the benefit of all Namibians and for our country to be a forebearer and a role model in the region, in Africa and beyond.

HON. DEREK KLAZEN

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ADZ	Aquaculture Development Zone
ATF	Albatross Task Force
BCC	Benguela Current Convention
BCLME	Benguela Current Large Marine Ecosystem
CBD	Convention on Biological Diversity
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CETN	Coastal Environmental Trust of Namibia
DEA	Department of Environmental Affairs
DMA	Directorate of Maritime Affairs
DNRM	Department of Natural Resources Management
DO	Dissolved Oxygen
DSS	Directorate of Scientific Services
DTPA	Department of Tourism, Planning and Administration
DWA	Department of Water Affairs
EBSA	Ecologically or Biologically Significant Marine Area
ECC	Environmental Clearance Certificate
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EL	Exploration Licence
EPL	Exclusive Prospecting Licence
ESA	Ecological Support Area
FAO	Food and Agriculture Organisation
GDP	Gross Domestic Product
HAB	Harmful Algal Bloom
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICM	Integrated Coastal Management
IMO	International Maritime Organization
IUU	Illegal, Unreported and Unregulated (Fishing)
MDA	Maritime Domain Awareness
MARISMA	Benguela Current Marine Spatial Management and Governance Project
MARPOL	International Convention for the Prevention of Pollution from Ships
MAWLR	Ministry of Agriculture, Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MFMR	Ministry of Fisheries and Marine Resources
MIT	Ministry of Industrialisation and Trade
ML	Mining Licence
MME	Ministry of Mines and Energy
MODVA	Ministry of Defence and Veteran Affairs
MSP	Marine Spatial Planning

MSP-NWG	Marine Spatial Planning National Working Group
MSS	Maritime Security Strategy
MSY	Maximum Sustainable Yield
MT	Metric Ton
MURD	Ministry of Urban and Rural Development
MWT	Ministry of Works and Transport
NACOMA	Namibian Coast Conservation and Management Project
NAMPORT	Namibian Ports Authority
NatMIRC	National Marine Information and Research Centre
NBSAP2	National Biodiversity Strategy and Action Plan 2 (2013 – 2022)
NCAGS	Naval Control and Guidance of Shipping
NCRST	National Commission on Research, Science and Technology
NDF	Namibian Defence Force
NDP5	National Development Plan 5
NGO	Non-Governmental Organisation
NIMPA	Namibian Islands' Marine Protected Area
NIPPS	National Tourism Investment Profile & Promotion Strategy
NMPCP	National Marine Pollution Contingency Plan
NNF	Namibia Nature Foundation
NOX	Nitrous Oxide
NPC	National Planning Commission
NSDI	National Spatial Data Infrastructure
NSTGDS	National Sustainable Tourism Growth & Development Strategy
NTB	Namibia Tourism Board
NUST	Namibia University of Science and Technology
PL	Production Licence
OIE	World Organisation for Animal Health
SADC	Southern Africa Development Community
SAR	Maritime Search and Rescue
SDG	Sustainable Development Goal
SEAFO	South East Atlantic Fisheries Organisation
SEMP	Strategic Environmental Management Plan
SPS	Sanitary and Phytosanitary Standards
TAC	Total Allowable Catch
TDS	Total Dissolved Solids
TSS	Traffic Separation Scheme
UNAM	University of Namibia
UNCCD	United Nations Convention to Combat Desertification
UNCLOS	United Nations Convention on the Law of the Sea
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax
WACS	West Africa Cable System

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THE STRUCTURE OF THE REPORT

THIS DOCUMENT IS STRUCTURED AS FOLLOWS:

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2. SECTION 2 INTRODUCES MSP IN NAMIBIA AND THE CURRENT STATUS REPORT
3. SECTION 3 DEFINES THE PLANNING CONTEXT
4. SECTION 4 DESCRIBES THE CURRENT CONDITIONS AND HUMAN USES (BOTH NATIONALLY AND IN THE PLANNING AREAS), LIKELY FUTURE DEVELOPMENTS AND CONSIDERATIONS FOR MSP
5. SECTION 5 IDENTIFIES THE ISSUES WHICH MSP AND EACH OF THE MARINE SPATIAL PLANS NEEDS TO (AND CAN) ADDRESS
6. SECTION 6 OUTLINES THE RESULTS OF AN ANALYSIS OF THE EVIDENCE PROVIDED IN ALL THE SECTIONS PARTICULARLY SECTION 4 AND 5
7. SECTION 7 PROVIDES AN OVERVIEW OF THE NEXT STEPS OF THE PLANNING EXERCISE
8. SECTION 8 PROVIDES THREE ANNEXES: SECTION 8.1 DETAILS THE STAKEHOLDER ENGAGEMENT STRATEGY. THE REPORT USES SPATIAL DATA IN THE FORM OF MAPS TO THE LARGEST EXTENT POSSIBLE FOR WHICH SECTION 8.2 PROVIDES INFORMATION ON THE METADATA. SECTION 8.3 LISTS THE COMMENTS RECEIVED ON THE DRAFT REPORT BY STAKEHOLDERS AND EXPLAINS HOW THEY WERE INCORPORATED IN THE FINAL VERSION.
9. SECTION 9 LISTS THE REFERENCES USED THROUGHOUT THE REPORT.

THE CURRENT STATUS REPORT – A LIVING DOCUMENT

MSP in Namibia has begun with a focus on the central Namibian sea as the planning area for the country's first marine spatial plan. The northern MSP area will be the second focus area for which the next marine spatial plan will be developed, followed by the southern section. As such, the first version of the CSR provided a critical input and baseline for the drafting of the Central Marine Spatial Plan. With new data and over time as the planning process for the central section progressed, the CSR was updated and extended to cover the northern planning area in terms of analysis as well. This CSR version is the present 2nd edition. Once the development process for the Southern Marine Spatial Plan is initiated, the CSR will again be updated as new edition so that it can serve as the best evidence base for this third plan.

The CSR is therefore considered a living document which will mature over time as the MSP process continues, our knowledge of the ocean, how we use it, what makes it unique, and how it reacts to our impacts, improves. The present 2nd edition of the CSR and future updated versions serve as the basis for developing the first sets of marine spatial plans, which will be revised regularly to accommodate for social, economic and ecological changes and new policy directions in the years to come – and so will the CSR evolve over time to mirror the ever developing knowledge and information available and forthcoming.

THE PROCESS FOR THE DEVELOPMENT OF THIS REPORT VERSION

This Current Status Report has been developed with extensive stakeholder engagement across all marine sectors within civil society, industry and government between 2017 and 2018. This includes civil society groups, non-governmental organisations and academia, industry (companies and associations) as well as government/statutory agencies (local authorities, regional councils, state owned enterprises, and ministries).

The Inter-Ministerial National Working Group on MSP has compiled initial data and information for all the various uses (sections 4 and 5) and engaged with key stakeholders from the main sectors in single sector workshops in 2017 in order to incorporate stakeholder views. In addition, the Working Group developed sections 2 and 3 and analysed the data and information gathered.

The Current Status Report was then validated and verified on the 19th of April 2018 at Namibia's 1st multi-sector stakeholder workshop on MSP in Swakopmund. 16 stakeholders from civil society groups and NGOs, 25 from industry, and 48 from a wide range of government/statutory agencies participated in the meeting and provided their views and input on the draft report. These three broad stakeholder groups represented 10 different sectors: conservation, fisheries, mariculture, transport and ports, tourism, mining, heritage, wastewater disposal, environmental protection and defence.

Following the multi-sector stakeholder workshop, the Current Status Report was updated on the basis of the stakeholder views gathered. The final draft of the report was then circulated to all stakeholders who were given the opportunity to provide their written comments within 30 days between the 24th of June and the 23rd of July 2018. The report was then finalized.

All comments and inputs collected during the multi-sector stakeholder workshop and in writing during the formal commenting period are incorporated in the document and included in the table of annex 8.3.

New data was sourced and became available until end-2020 (e.g. undersea cable location and important spawning areas of fisheries resources). In addition, the scope of the report was widened to provide a knowledge baseline for MSP from a national point of view in that it also establishes the evidence base for the northern and southern MSP areas. This means that the knowledge collated now covers data and information concerning all human activities for the entire marine area under Namibian jurisdiction. In addition, the issues and conflicts analysis is now framed to enable a focus on all three planning areas, beginning with the central and northern MSP areas. Overall, these developments led to this second edition of the Current Status Report. Updated contents are marked as such throughout the report.

1. EXECUTIVE SUMMARY

Namibia has chosen Marine Spatial Planning (MSP) as an approach to implement a sustainable ocean development path as part of the country's development priorities identified in the National Development Plan 5 (NDP5).

Namibia defines MSP as "a participative decision-making process that guides where and when human activities occur in marine space".

The Namibian Cabinet has tasked the Ministry of Fisheries and Marine Resources (MFMR) to coordinate the process of MSP in Namibia. In this capacity, MFMR collaborates with all relevant national authorities that have a mandate relating to marine planning and management. MSP also engages all other stakeholders concerned (marine users and regulators) to ensure and enable a cooperative process in working towards agreed Marine Plan(s).

MSP supports the country's shared vision for its ocean which is: "A healthy, safe and well understood marine and coastal environment that is sustainably and transparently governed and delivers optimised social and economic benefits to Namibia."

AS DESCRIBED IN THE NATIONAL MSP FRAMEWORK, THE OVERALL MSP GOALS ARE:

- ECOSYSTEM HEALTH:
  - A healthy and robust coastal and marine ecosystem in the long term.
- SOCIAL AND ECONOMIC BENEFITS:
  - A safe marine and coastal environment that provides for the well-being of people.
  - A productive marine and coastal environment that enables for blue economy growth, and leads to empowerment and equality for people.
- RESPONSIBLE RESEARCH AND MONITORING:
  - Responsible research and monitoring of resources and ecosystems that provide accessible marine spatial data and information to facilitate decision-making.
- GOOD SPATIAL GOVERNANCE:
  - Effective legislation, policies and guidelines that will ensure transparent coordination and integration of interests, enabling equitable access and sustainable management of marine and coastal resources.

In order to implement MSP in a manageable and meaningful way, the waters under Namibian jurisdiction have been divided into three sub-national planning units: the northern, central and southern ocean space. These planning areas are based on administrative considerations, the distribution of ecosystem types and key biodiversity areas, as well as the distribution of existing uses and emerging interests. The central Namibian sea has been chosen as the planning area for the country's first marine spatial plan. The planning area is bound northwards by Cape Cross and southwards by Conception Bay. The northern and southern MSP areas cover the remaining marine areas under Namibian jurisdiction whereby the northern Namibian sea has been identified as the planning area for the second marine spatial plan to be developed. The inward planning boundary is the high-water mark. The outward boundary of the area is the outer limit of Namibia's marine area, as determined by the limit of its Exclusive Economic Zone (200 nautical miles) (EEZ).

This document responds to the requirement of the National MSP Framework to produce a knowledge baseline report (so called Current Status Report, CSR). This document serves that purpose in that it outlines the status quo of maritime activities in Namibia and each of the MSP areas. It also identifies the issues which MSP needs to address in the ocean generally and in each of the planning areas. It thus represents the knowledge base upon which Namibia's marine spatial plans will be developed.

Namibia's ocean space is part of a unique natural marine environment: the Benguela Current Large Marine Ecosystem (BCLME), one of the most productive marine regions of the world's oceans. Although the Namibian marine environment can be considered largely clean and healthy, its living and non-living marine resources are increasingly exposed to significant human use and climate change.

Humans have been active along the coastline of Namibia, particularly in the central area, for hundreds of thousands of years. Socio-economic development and human use of marine and coastal resources began to increase in the 15th century and has intensified significantly in the last 100 years. Today, approximately 200,000 people live and work on the coast of Namibia, mainly in Walvis Bay, where Namibia's key harbour is located, as well as in Swakopmund and Henties Bay but also Lüderitz and Oranjemund in the south.

The Namibian sea is fundamental for the well-being of many Namibians. Seals, guano, fishing, minerals, maritime trade, nature-based tourism and recreation provide valuable benefits to people. A high proportion of the national income is generated in the coastal area, particularly its central section.

The governance of the Namibian ocean is regulated and guided by the Namibian Constitution, comprehensive sectoral legislation, key policy initiatives and goals, for example in the context of Vision 2030 and the NDP5, as well as through marine-related strategies such as the 2nd National Biodiversity Strategy and Action Plan (NBSAP2).

Diverse interests result in a variety of human uses of the Namibian ocean and coasts, comprising fisheries, naval defence, environmental protection, geological resource mapping and exploitation, mariculture, heritage, maritime transport and ports, coastal infrastructure, tourism, and sea water abstraction. These sectors and activities make use of the marine environment, and in particular the central and southern MSP areas, by using marine resources directly (e.g. extraction) or indirectly (e.g. for tourism), and by using marine space (e.g. military use, transport).

In addition to the activities that directly use marine resources and/or space, there are others with important supporting functions. They are important for MSP to consider as they play a key enabling role for other sectors and activities, partly ensuring that these can take place at all. These activities include wastewater treatment and disposal as well as surveys and research.

The report finds that all existing uses are expected to remain stable or grow, at least in the medium term. One of the most prominent driving forces is economic growth, leading to sectoral growth, coastal development and urbanisation.

Sustainability, supported by greater public awareness and political commitment, is identified as another trend. It results in the recognition that a healthy marine environment, with adequate protection, will contribute to optimising the benefits that can be obtained from the ocean. A clean and healthy marine environment, for example, is important for tourism and fisheries as two of the country's key industries.

Another key trend that will shape the future use of Namibia's ocean is climate change. Although the precise impacts and timescales are difficult to predict, it is likely there will be changes in species and habitat distribution, with direct impact on the fishing and conservation sector.

Generally, levels of use throughout the Namibian ocean space as a whole are relatively low. This is particularly true for the northern MSP area but also the case in the busiest of the three MSP areas, the central section. Nevertheless, the report identifies a number of current and possible future spatial conflicts between sectors. Hotspots of use surround the relatively small coastal area of the expanding Walvis Bay port, extending north to Swakopmund. Another hotspot of use is in the Lüderitz area.

FROM THE ANALYSIS, THE FOLLOWING GENERAL POINTS EMERGE AS CENTRAL TASKS FOR MSP IN NAMIBIA AS A WHOLE:

1. To balance socio-economic benefits and ecological sustainability, and to do so both in the short and long term

2. To support the ability of sectors to make use of opportunities – in other words, make provisions for their sustainable expansion if and when such opportunities arise; and

3. To plan for those ocean uses that are only beginning to emerge, or may play a more significant role in the future (for example renewable energy generation).

The key spatial conflicts MSP in Namibia should address are between mining, conservation and fisheries.

In the Walvis Bay and Lüderitz areas, the specific conflicts the central and southern marine spatial plans should address are between tourism and the environment, as well as mariculture and transport (shipping and dredging). The areas are physically constrained, which limits the possibility for locating some of these activities elsewhere; at the same time both areas are of high natural value.

APART FROM DEALING WITH CONFLICTS, THE MARINE SPATIAL PLANS SHOULD ADDRESS THE FOLLOWING OPPORTUNITIES AND SYNERGIES, IN PARTICULAR:

- Enabling the development of Walvis Bay and Lüderitz ports by supporting maritime transport;
- Designating (a) military training area(s);
- Enhancing the synergies between fisheries management and biodiversity conservation by exploring opportunities for strengthening the protection of areas that are of particular biological or ecological importance for both uses;
- Allocating space for future uses, such as renewable energy development; and
- Highlighting opportunities for tourism development, e.g. in conjunction with marine heritage.

ON THE BASIS OF THE REPORT FINDINGS, THE NEXT STEPS OF THE MSP PROCESS WILL FOCUS ON:

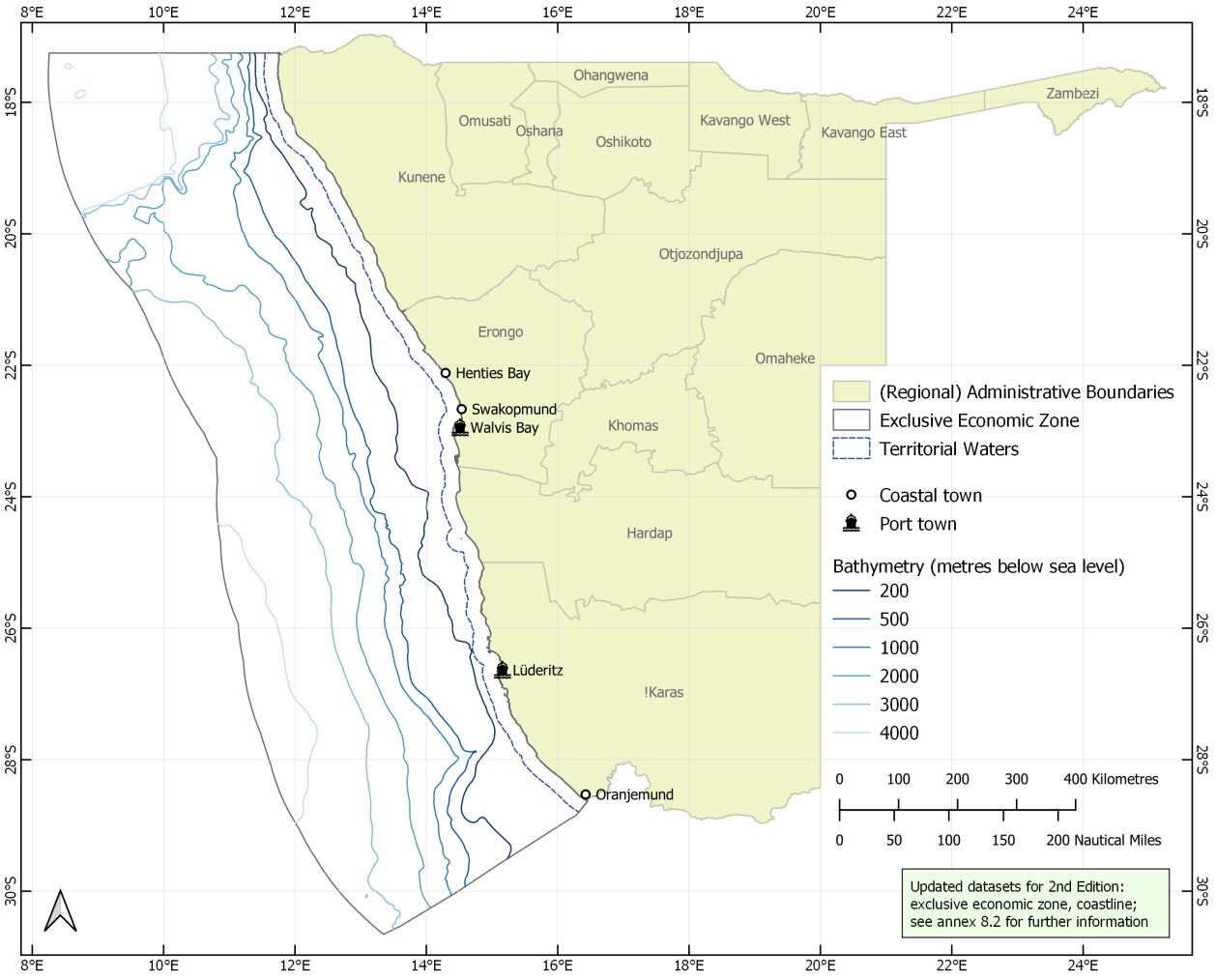
1. Validating the assessment through stakeholder input;

2. Developing SMART sector objectives in line with conflicts and opportunities identified and the overall MSP goals

3. Drafting the three marine spatial plans, beginning with the central plan and followed by the northern plan and then the southern plan, including through stakeholder inputs.

2. INTRODUCTION

Namibia is a maritime nation whose rich ocean wealth is shaped by one of the most productive ocean systems in the world: the Benguela Current Upwelling System. Namibia's marine area is approximately 2/3 the size of its land area with a coastline of 1,572km (map 1).



MAP 1:
NAMIBIAN MARINE AREA IN RELATION TO THE TERRESTRIAL TERRITORY[I] (UPDATED FOR 2ND EDITION)

[I] Disclaimer for all maps contained in this document: The Ministry of Fisheries and Marine Resources and relevant data custodians will not incur any legal liability or responsibility arising from the use of this map/ maps or data in a manner not intended by the Ministry. The maps may not be used for navigational purposes.

Namibia is now pursuing Marine Spatial Planning (MSP), which it understands as "a participative decision-making process that guides where and when human activities occur in marine space". MSP is implemented as a development planning approach to organize the use of the country's marine territory in such way that comprehensive, integrated and complementary planning and management across sectors and for all ocean uses is enabled.

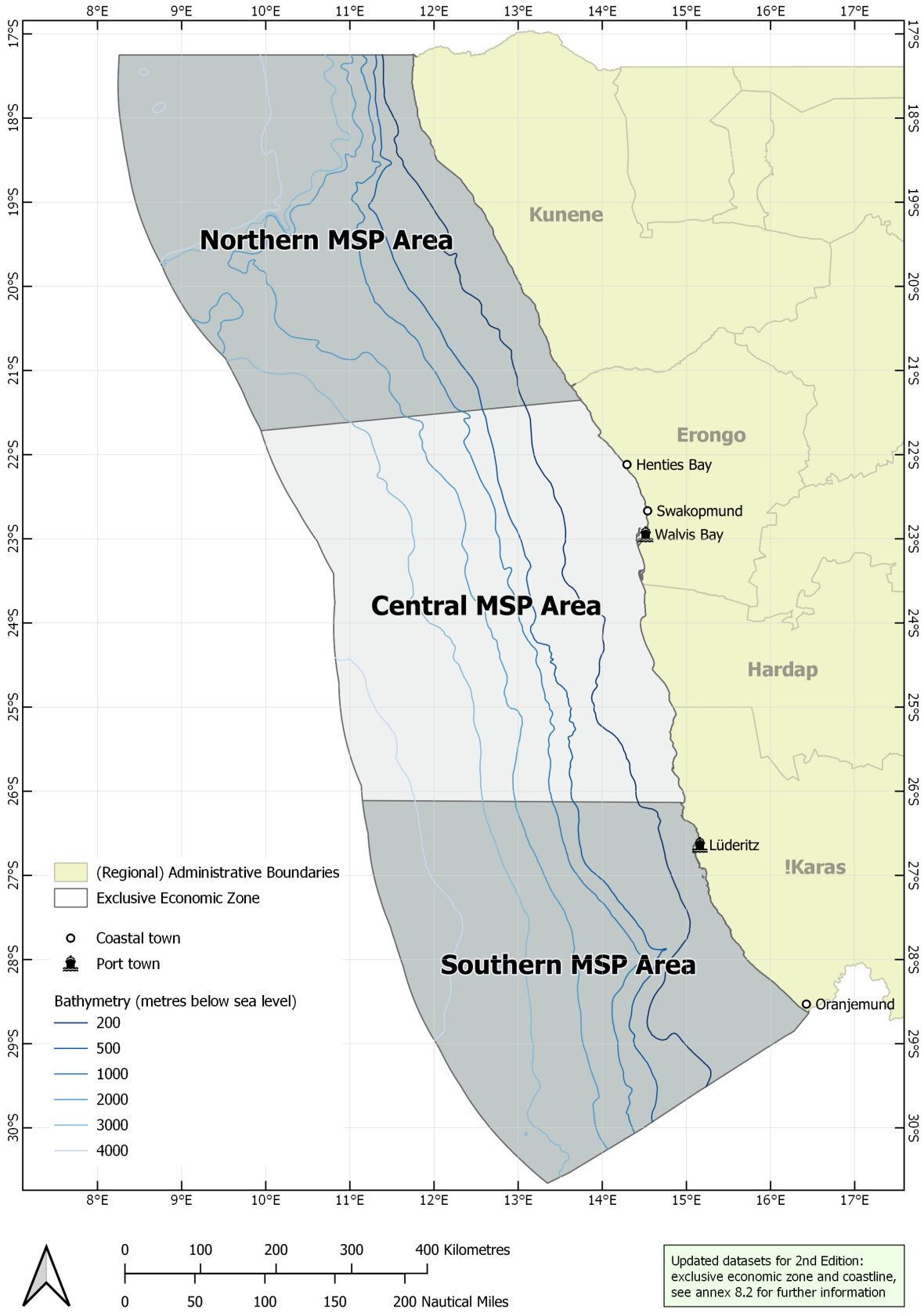
The aim of MSP in Namibia is to maintain a healthy marine environment, ensuring that the nations' valuable living and non-living marine resources and the services the ocean provides continue to deliver a wealth of benefits for the well-being and prosperity of all Namibians. Encouraging a culture of good ocean governance, the process of MSP in Namibia supports the integration among different objectives and economic sectors, management of competing demands for space in the ocean, and co-existence of compatible activities wherever possible.

The National MSP Framework[1] sets out the overall vision for the ocean along with the goals and principles for MSP, as well as the steps each planning process is expected to follow. It is a high-level policy statement that provides general guidance for sustainable ocean development in Namibia. It sets out the country's vision for the ocean, as well as broader goals and principles for MSP. It is a general framework that all Marine Plans in Namibia are expected to follow.

The National MSP Framework delineates three MSP areas: a northern, central and southern (see map 2). The central MSP area is bordered around the Ugab River Mouth in the north and Hottentots Bay in the south. The northern and southern MSP areas cover the remaining marine areas under Namibian jurisdiction. The EEZ is the seaward boundary and the landward limit is the high-water mark. Namibia's first marine spatial plan will be developed for the central MSP area, followed by the northern and the southern marine spatial plans. Growing economic interests and increasingly overlapping human uses, particularly in the central and southern MSP areas call for improved management. All three areas also have sites of high ecological sensitivity and importance.

The starting point of the Namibian MSP process is to develop a knowledge baseline report (so called Current Status Report, CSR). It is required by the National MSP Framework. This report serves that purpose.

The CSR sets out the evidence through which the key issues that need to be addressed in the MSP areas are identified. It is an assessment that outlines the current conditions and human uses in the MSP areas, likely future developments, and identifies the issues the Marine Plans should and can address. This then provides the knowledge base for developing the Marine Plans – based on the best available data, information and evidence, compiled and analysed by the National MSP Working Group together with technical experts and validated by stakeholders.



MAP 2:

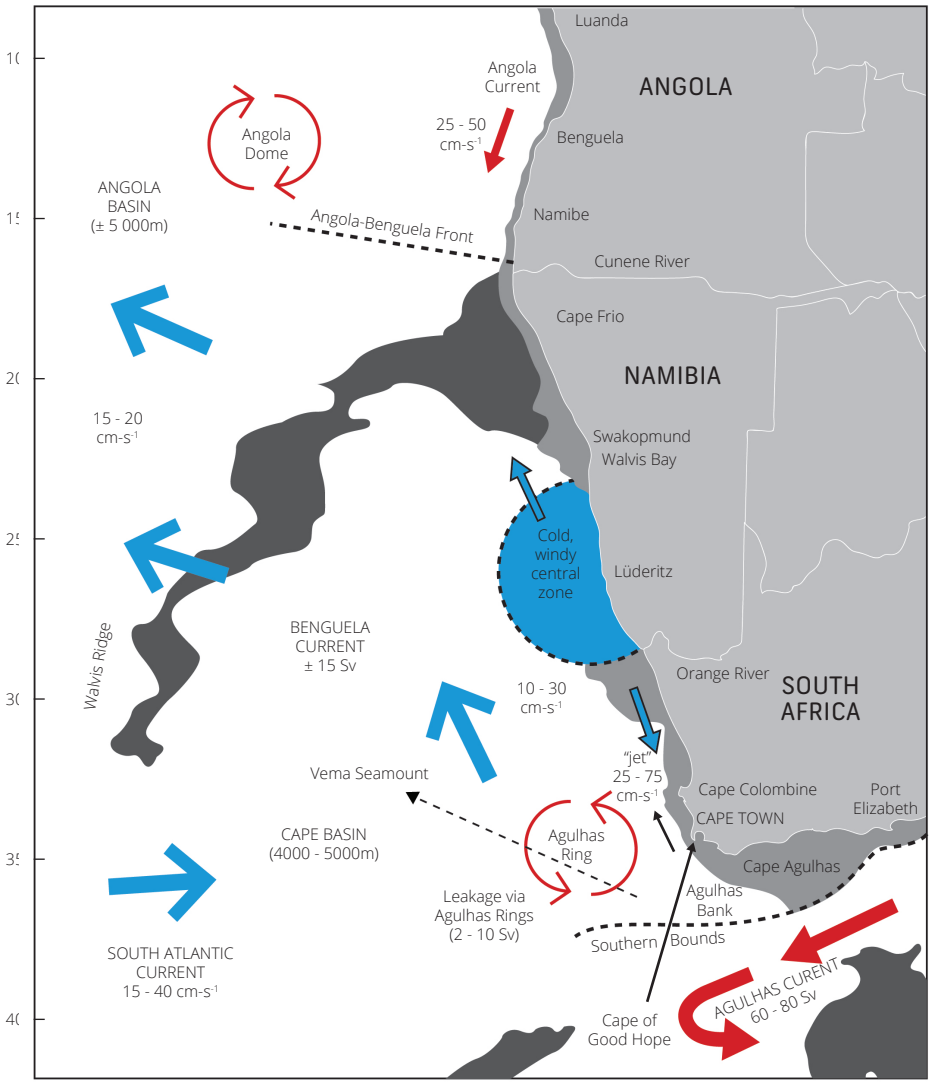
THE NAMIBIAN MSP AREAS (UPDATED FOR 2ND EDITION)

3. PLANNING CONTEXT

The Namibian MSP process aims to support the country's national development goals by enhancing sustainable ocean use. It is therefore necessary to take into account the overall status, trends and developments of the natural environment, the socio-economic context, and the relevant legislation, policy and strategic context when planning. On the one hand, this context influences and guides the planning process; on the other, it can be influenced by MSP.

3.1 THE NATURAL ENVIRONMENT: STATUS, TRENDS AND DEVELOPMENTS

The Namibian sea is part of the BCLME, which is characterized by wind-driven upwelling leading to high productivity. The BCLME extends along the south-western margin of Africa, from Cape Agulhas (34°S) in the south through Namibia up to the Angola-Benguela front at around 15°S in the north (map 3). It is unique as it is bordered by warm water currents in the north and in the south. The Angola-Benguela front moves seasonally, being further south in austral summer and further north in winter.[10]

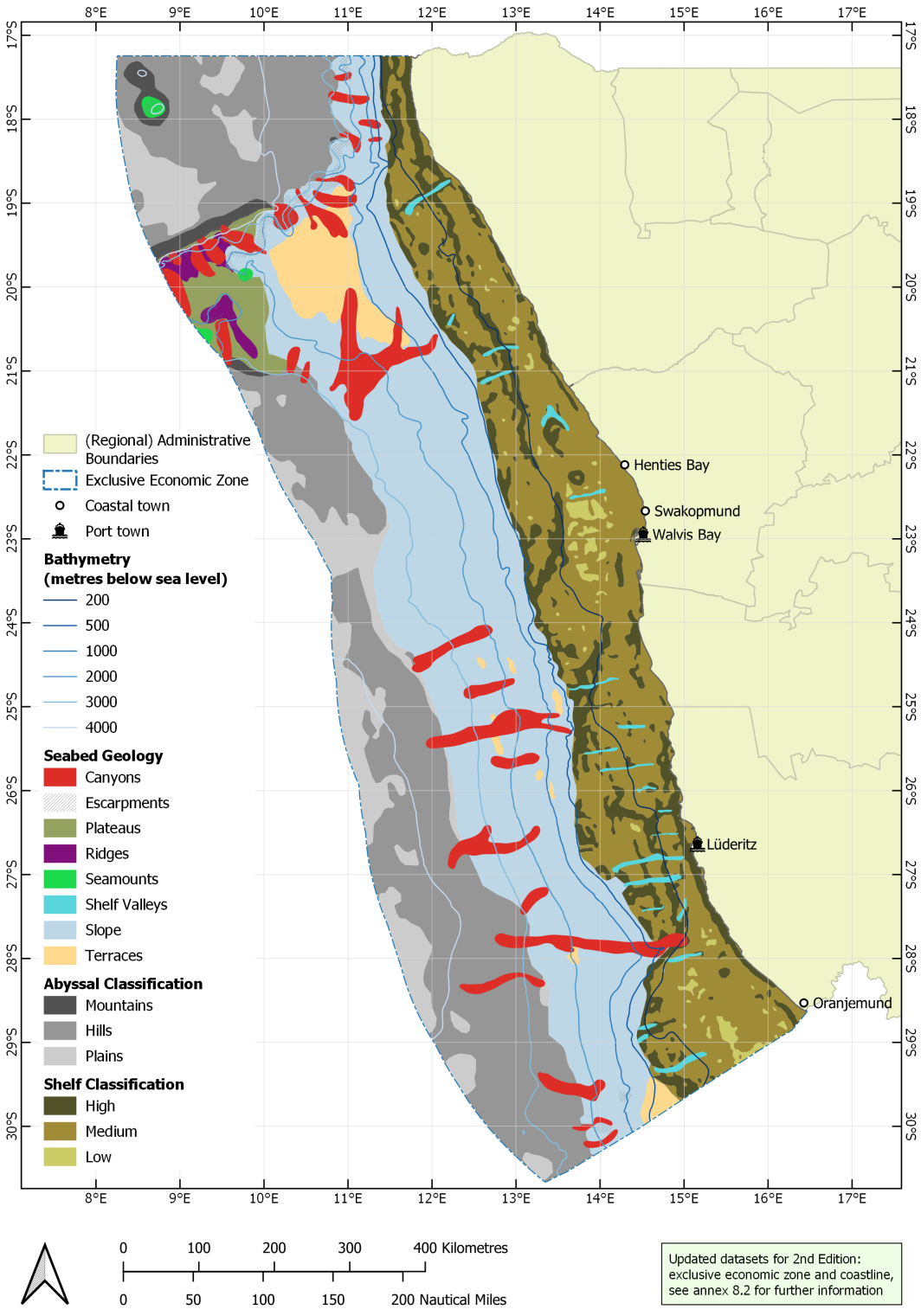


MAP 3:
THE BCLME'S OCEANOGRAPHY [II]

[II] Map redrawn from: Large Marine Ecosystems, Vol 14. 2006. V. Shannon, G. Hempel, P. Malanotte-Rizzoli, C. Moloney and J. Wood (Editors).

In oceanography, a Sverdrup (symbol: Sv) is a non-SI unit of flow, with 1 Sv equal to 1,000,000 cubic metres per second (264,000,000 US gal/s). It is used almost exclusively in oceanography to measure the volumetric rate of transport of ocean currents. It is named after Harald Sverdrup. Current speed is given in cm s^{-1}, while the volumetric rate of transport of ocean currents is given in Sv.

The most prominent bathymetry feature is the Namib Walvis Ridge, with few canyons and seamounts present throughout the entire Namibian EEZ (map 4). The Namibian coastline is relatively straight with only a few capes and bays such as Walvis Bay and Sandwich Harbour.



MAP 4:
SEAFLOOR GEOMORPHIC FEATURES (EEZ) (UPDATED FOR 2ND EDITION)

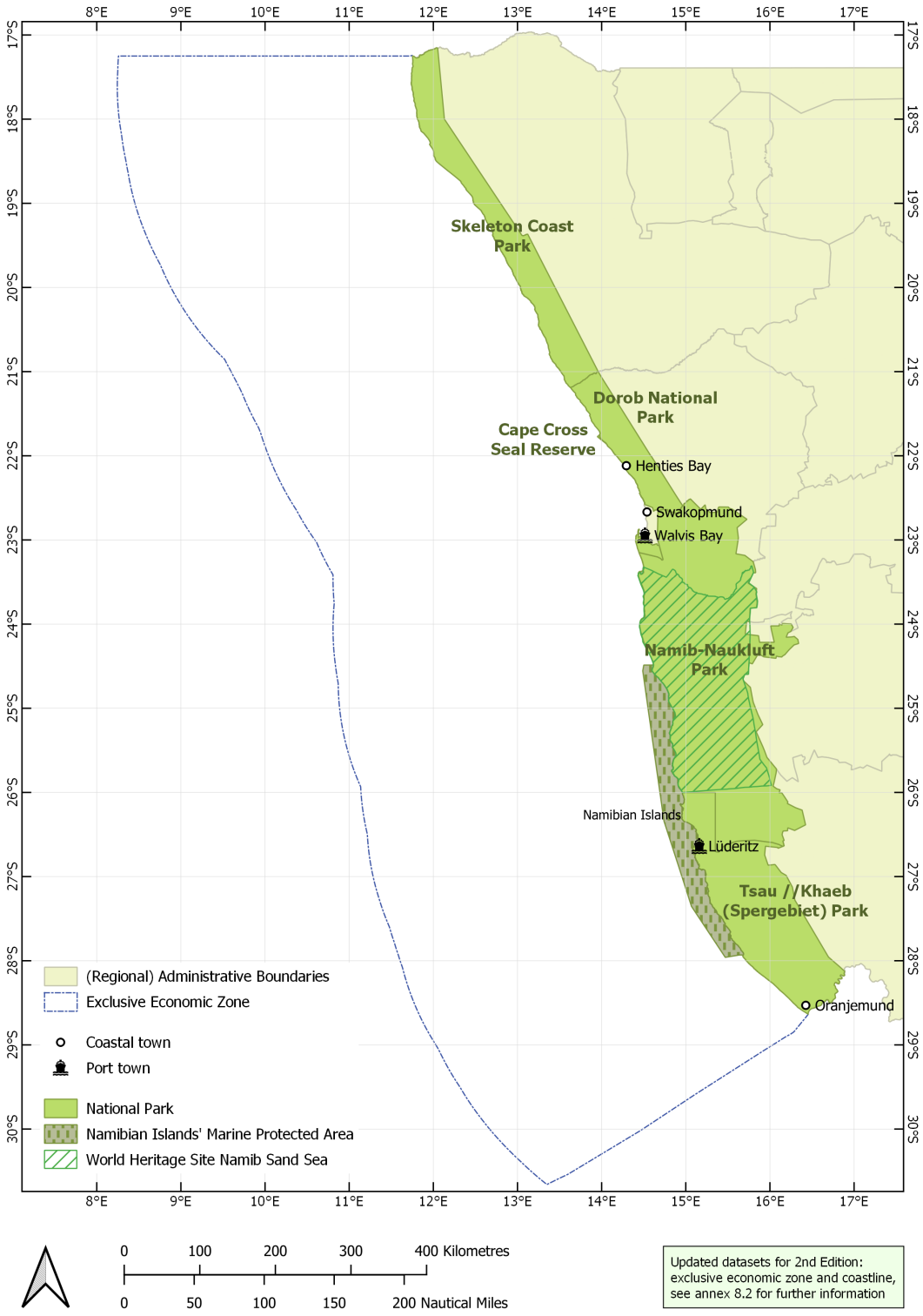
The only perennial river systems are on Namibia's boundaries, namely the Orange River bordering South Africa and the Kunene River bordering Angola. As a result of the arid nature of the climate, freshwater input to the ocean is not significant except in occasional times of late summer flooding in the interior of the Orange River catchment area.[11] The continental shelf is widest off Walvis Bay and narrows north and south widening again at the Orange River mouth and at its narrowest between Cape Fria and the Kunene River. The depth of the shelf edge varies, averaging about 350m. Two pronounced double shelf breaks occur at depths of 140m and 400m in the Walvis Bay area. A significant sediment feature is the presence of a 500km long mud belt of biogenic origin in the mid-shelf area stretching from Cape Fria to Conception Bay.

FIGURE 1:
DONKEY BAY, A WORLD FAMOUS SURFING LOCATION (© BERNT BRUNS)

Overall, Namibia's marine environment is clean and healthy.[12] Due to its high productivity, it supports some of the greatest concentrations of marine life found anywhere in the world.[13] Namibia's natural marine environment is unique and biologically diverse. It boasts a high variety of life consisting of a range of habitats and associated internationally important populations of some species such as African Penguins and Gannets.

The sparsely populated, relatively pristine coastline, is entirely under protected area management with four terrestrial national parks stretching to the low water mark covering the Namib Desert (map 5), linking to the Richtersveld National Park in South Africa and Iona National Park in Angola.

The number of unique islands with breeding seabirds and Cape fur seals has led to Namibia's only marine protected area stretching about 400km along the southern coastline and extending over 30km seawards from the high-water mark. This Namibian Islands' Marine Protected Area (NIMPA) includes 21 islands, rocks or islets and borders the two terrestrial national parks of the Namib-Naukluft and Tsau //Khaeb (Sperrgebiet).



MAP 5:
THE FOUR (4) TERRESTRIAL NATIONAL PARKS ALONG THE COASTLINE OF NAMIBIA AND THE NIMPA (UPDATED FOR 2ND EDITION)

In spite of the high biological productivity with abundant zooplankton, phytoplankton and healthy top predator populations such as the Cape fur seals, environmental anomalies can negatively affect this abundance. Benguela Niños, changes in oceanographic processes leading to hypoxia, sulphur eruptions and harmful algal blooms can impact productivity.[14]

Namibia's living marine resources have been largely plundered prior to independence with the resultant collapse of various commercial fisheries.[15] Following the introduction of new legislation after independence, Namibia has endeavoured to sustainably manage its fisheries resources. While the stocks of species like hake and horse mackerel have increased over the years, the sardine and rock lobster stocks remain low.

Exploited non-living marine resources include diamonds and salt. Salt mining is a renewable form of mining where seawater goes through different salt pans wherein evaporation takes place resulting in the production of crystallised salt and bitterns or brine. Mining of rock salt on ancient salt pans is less sustainable as it takes many years to form. From Walvis Bay salt can be exported in bulk by ship without excessive transport costs, while salt from Cape Cross and Swakopmund needs to be transported to the Walvis Bay harbour via rail or road.

The diamond resources have been largely depleted along the shoreline and although mining still takes place on land (e.g. at Elizabeth Bay), more intense diamond mining presently occurs in the sea on the seafloor.[16] The 100-year diamond mining legacy has left large tracts of coastline severely modified while other areas remained relatively pristine due to access restrictions.[17] Phosphate deposits exist and exploitation is being considered.[18] The Orange River Basin holds gas reserves.[19]

Nature-based tourism is Namibia's fastest growing industry with approximately 1.57 million tourists per year, spending time on the coast and benefitting from marine and coastal wildlife.[20] Poorly planned tourism development is a threat to the marine environment and the tourism sector itself.

There are different scenarios on how and where the changing climate might impact the entire marine area.[21] However, the detail and reliability of the existing scenarios varies enormously and does not merit mention at this stage. Climate change impacts on the status of the natural environment will have to be monitored and considered in the future as the quality and predictability of the scenarios improves.

3.2 THE SOCIO-ECONOMIC ENVIRONMENT: STATUS, TRENDS AND DEVELOPMENTS

From the archaeological remains, it is known that people have lived on the Namibian coast, and in particular around the Walvis Bay area, for at least 700,000 years.[22] Because of the lack of fresh water there were very few permanent settlements, as people were mainly nomadic. The towns developed when piped water became available in the mid-1800s.

It was with the discovery of diamonds near the coast close to Lüderitz in 1908 that economic development also increased along the southern coast.[23] The presence of radioactive minerals in areas close to the central coast was first discovered in 1910, with active exploitation that began in the 1970s and accelerated coastal development.

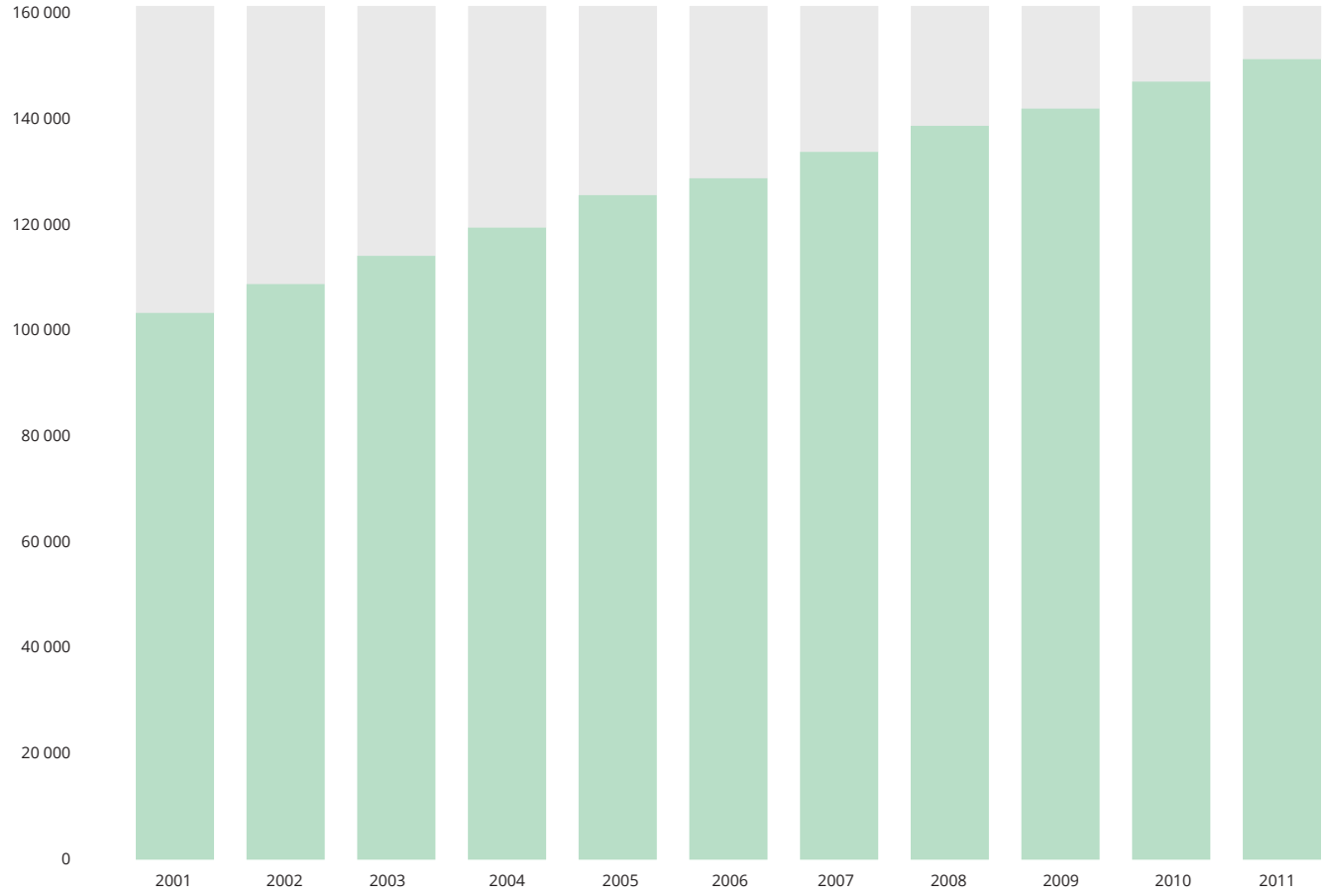
In summary, the following major economic and political events happened along the coast over the past 250 years, shaping the socio-economic and natural environment that the Namibian coast exhibits today:

TABLE 1:
SUMMARY OF MAJOR ECONOMIC AND POLITICAL EVENTS HAPPENED ALONG THE COAST OVER THE PAST 250 YEARS [24]

YEAR	YEAR EVENTS
LATE 1700	Whaling and sealing
1840s TO 1860s	The heyday of guano mining
1861 TO 1878	Britain claims guano islands and Walvis Bay
1884	Germany claims mainland Deutsch-Südwestafrika
1908	Diamond rush south of Lüderitz
1910	Walvis Bay and islands become part of the Union of South Africa
1915 TO 1920	South Africa takes over administration of Namibia
LATE 1920s	Diamond mining moves south to the Orange River area
1950s	Beginning of commercial fishing
1960s TO 1970s	Heyday of commercial fishing and collapse of stock
1960s	Rock lobster boom and collapse
1970s	Uranium mining begins at Rössing
1980s	Deep-sea Red Crab boom and collapse
1990	Namibian independence; 200 nautical mile exclusive economic zone established
1990s	Offshore diamond mining begins; uranium prices decline
1994	South Africa returns Walvis Bay and islands to Namibia
2000s	Renewed interest and rush on uranium

Ever since the 1970s, the population residing at the Namibian coast, and particularly along the central part, has grown significantly. The national census of Namibia estimated approximately 150,800 people that lived in the Erongo region in 2011.[25] Between 2001 and 2011, the population grew from 107,600 at an average rate of 3.4% annually (figure 5). However, an estimated 200,000 people currently live along the Namibian coastline, with approximately 170,000 in the central coastal area adjacent to the central MSP area.[26]

FIGURE 2:
COASTAL POPULATION GROWTH 2001-2011 IN THE ERONGO REGION



The population is concentrated in the towns of Walvis Bay, Swakopmund, Lüderitz, Oranjemund and Henties Bay, with smaller numbers of people found in the settlement of Wlotzkasbaken. Rural population is found in the Kuiseb River delta. According to the Namibian population projection 2011-2041 conducted by the Namibia Statistics Agency, the town of Walvis Bay has approximately 80,000 inhabitants, with Swakopmund and Henties Bay standing at approximately 60,000 and 5,500 respectively. The remaining settlements in the Kuiseb Delta and Wlotzkasbaken make up roughly 2,000 residents. In the south, Lüderitz has approximately 15,000 inhabitants and the mining town of Oranjemund 12,000. In the Kunene coastal region, the remaining settlements in the Erongo and Hardap coastal regions permanent residents are limited to employees of the Ministry of Environment, Forestry and Tourism, Namibia Wildlife Resorts and a few tourism and mining endeavours, numbering less than 100 people. The number of residents born on the coast is only one in five people who are presently living in the area. The majority of the current residents are males, who come from the northern regions of Namibia.[27] There is a shortage of housing for the new residents. Informal settlements close to Walvis Bay, Swakopmund, Lüderitz and Henties Bay end up a refuge for the poor and incoming residents who are looking for employment. The population also fluctuates seasonally with short periods of extreme influx of tourists during holiday seasons and long weekends.[28]

Water and power are the biggest limiting factors to economic development. At present water for the central coast comes from underground aquifers in the Kuiseb and Omaruru and in the southern MSP area in Lüderitz and Oranjemund from underground aquifers in the Koichab and Orange rivers. Some coastal residents, for example along the Swakop River, have boreholes, while others either rely on trucked water or small desalination plants. As the sustainable yield from the aquifers in the central coastal area is exceeded increasingly with the growing population and industries, a desalination plant at Wlotzkasbaken, originally built to supply a uranium mine, is providing the additional water for private consumption and the existing mines in the Erongo region. The plans to establish additional desalination capacity in the central coastal area continues, with the involvement of NAMWATER in a project becoming more and more defined. Various Uranium mines have shown interest in signing off-take agreements for the supply of desalinated sea water, due to the fact that the underground water sources have become depleted.[29] Namibia generates electricity at four power stations: Ruacana (hydropower), Windhoek (coal-fired) and Walvis Bay (two diesel powered stations) and is looking at wind, solar and gas to supplement power generation. In 2016 approximately 68% of the electricity was imported.[30] Continued development in the central coastal region is expected to further increase the demand on energy.

Economic activity has had a history of "boom and bust" ventures which have focused on whales, seals, guano, offshore fishing, diamonds, uranium, trade and tourism. The central coastal region is at the heart of the Namibian economy since a high proportion of the national income is derived from mining, seaborne trade through Walvis Bay, fishing and fish processing, and nature-based tourism. Land- and sea-based mining together contributes nearly 12% to the Namibian economy[31] mostly through uranium mining and diamonds that are now mainly extracted in the marine environment in the southern MSP area. In addition, other minerals that are currently being exploited include salt, guano, dimension stone, gypsum, rose quartz and amethyst.

Tourism contributes about 10% to the Gross Domestic Product (GDP).[32] Marine and coastal tourism in the central coast of Namibia makes up a significant part of this because, unlike most of the remaining coastline, it is easily accessible. It is, however, overlapping with and concentrated in areas of high biodiversity. Tourism has been the fastest growing sector of the coastal and national economy over the past 30 years.[33] Much of the growth has been in numbers of foreign visitors who visit the coast's attractions, contributing to the income for the region and Namibia as a whole. Additionally, the central coast as a holiday destination for wealthier Namibians has grown rapidly, with large investments into real estates.

Fisheries contributes over 4.5% to the economy.[34] Fishery is a cornerstone of the Namibian economy. The country has a good reputation internationally as an exporter of quality fish and fish products: 97% of all the fisheries products being exported.[35] A key objective for sustainability is the ecosystem approach to fishery resource management.[36] The fishing industry is the largest employer providing 14 900 direct jobs on Namibia's coast with 21 fish processing factories in Walvis Bay and Lüderitz.[37] The combined workforce of the fishing sector (direct and indirect employment) is estimated to be about 42,000.[38] In addition to taxes on their profits, the fishing industry contributes significantly to the economy by paying indirect taxes such as value added tax (VAT) and municipal taxes.

Recreational angling is important for locals and is attracting tourists mainly to the central coastal area. The estimated value of recreational fishing was N$ 56 million in 2006.[39] Mariculture is currently worth ±N$ 30 million per year, regardless of some setbacks related to periodic production loss due to the extreme natural conditions and environmental phenomena such as harmful algal blooms.[40] Seals are harvested for leather, fashionable garments, aphrodisiacs, bone meal and pet food.

Walvis Bay is set to expand as a regional hub for imports and exports, through the port's development of a new container terminal which is expected to contribute to trebling the handling capacity.[41] Growing economic activities at the central and southern Namibian coast are creating greater demands on infrastructure and services such as the supply of water, electricity, education and housing. Lüderitz is expected to expand with the completion of the rail link to Aus. According to NAMPORT a possibility exists to develop a new deep water harbour on the Lüderitz peninsula to accommodate the present constraint of the 8.75 metre chart datum because of the bedrock in the present harbour.

4. HUMAN USES OF THE SEA: CURRENT CONDITIONS AND INTERESTS

All interested parties making demands of marine resources are connected in some way with MSP. This chapter outlines the current status of those sectors and activities that make direct use of the marine environment by using marine resources directly (e.g. extraction) or indirectly (e.g. for tourism), and by using marine space (e.g. military use, transport).

Each section begins with a brief definition of the use, followed by an overview of its current status in Namibia and the MSP areas. This considers legal mandates and responsibilities, the spatial distribution of the resource and/or use, its socio-economic importance as well as its environmental impact. The second part of each section looks towards the future, considering key trends in the sector, strategic objectives and conflicts and synergies with other activities. Each section concludes with a brief overview of the key issues MSP should consider from the perspective of each sector/use.

4.1 FISHERIES

GENERAL DESCRIPTION AND DEFINITIONS

Namibia's 1,572km of coastline falls within the BCLME, in which nutrient upwelling allows for high productivity and large numbers of pelagic and demersal fish. This has allowed Namibia to become one of the leading capture fisheries nations in the world. Annual marine landings of about 550,000 Metric Tons (MTs) at about N$ 7 billion ranks Namibia as the third largest African capture fisheries nation after Morocco and South Africa, and 30th worldwide. Fisheries in Namibia is the third largest income earner after mining and tourism, contributing about 15% of total exports and about 4.5% of the national GDP[48].

FIGURE 3:
FISHING VESSEL (© MFMR)

FIGURE 4:
HORSE MACKEREL (© MFMR)

Overfishing was common in Namibia in the 1960s and 1970s and has led to the collapse of stocks of several economically important fish species. Following independence, the Namibian government has put in place a number of measures to reverse this trend and to ensure the long-term conservation, management and sustainable use of marine resources. Another focus has been the "Namibianisation" of fishing activities, ensuring that previously disadvantaged groups can benefit. Stock sustainability continues to be the top policy priority in Namibia's fisheries, but socio-economic contribution of fisheries to the country and a value addition approach that seeks to maximise value retention nationally have also come into increasing focus.

The Namibian marine fisheries sector includes commercial, recreational and subsistence fishery.

COMMERCIAL FISHERIES IS DEFINED AS HARVESTING MARINE RESOURCES:

WITH THE INTENTION OF SELLING, BARTERING, PLEDGING OR OTHERWISE DISPOSING OF, OR DELIVERING OR OFFERING TO DO ANY OF THE THINGS MENTIONED IN THIS PARAGRAPH IN RESPECT OF SUCH RESOURCE IN THE ORDINARY COURSE OF BUSINESS;[49]

USING PURSE SEINE, TRAWL OR LONG LINE, POLE-AND -LINE OR SUCH OTHER FISHING OR HARVESTING METHODS AS MAY BE PRESCRIBED; OR

EXCEEDING THE LIMITS PRESCRIBED FOR THE HARVESTING OF MARINE RESOURCES FOR OWN USE.[50]

Fishing for recreational purposes means fishing for the purpose of sport, leisure or subsistence.[51]

Fishing activities can be found across all three planning areas. Fishing grounds for hake and monkfish are found along the entire Namibian coast, while horse mackerel and sardine fishing grounds are found mainly north of 25°S. Most fish is landed and processed in Walvis Bay, with smaller amounts of especially hake landed and processed in Lüderitz. Most recreational fishing activities are concentrated in the central area as large parts of the northern and southern areas are closed for recreational fishing.

TYPES OF COMMERCIAL MARINE RESOURCES

There are 19 commercial fishery species in Namibia, of which eight are regulated by setting a Total Allowable Catch (TAC), with others regulated through effort control (e.g. controlling the number of vessels and right holders). The TAC controlled species are horse mackerel (fig 4), hake, monk, sardine, rock lobster, crab, orange roughy and seals. For the large pelagic species swordfish and albacore tuna a TAC and for Bigeye tuna a bycatch limit is set through the International Commission for the Conservation of Atlantic Tunas (ICCAT), while the number of boats is limited by Namibia. Effort controlled species are snoek, kob and mullets. Nontargeted (by-catch) commercial fishery species include sole, squid, panga/dentex, angel fish, other tunas and sharks, mackerel, anchovy, red eye, kingklip and jacopever.

Recreational fishing is pursued by rock-and-surf anglers and ski-boat fishers and occurs mainly in the central coast and south at Lüderitz and Oranjemund. Recreational fishing in the central coast operates primarily from Swakopmund and Henties Bay. Species targeted by recreational anglers include rock lobster, barbel, snoek, kob, blacktail, galjoen and West coast steenbras. Inshore sharks such as copper, cow, spotted gully and smooth-hound are caught and released for sport fishing.

Seals are commercially harvested and a three year rolling TAC is set for bulls and calves.

FIGURE 5:
SEAL COLONY AT CAPE CROSS (© NACOMA)

Guano from sea birds is another marine resource harvested commercially and regulated through effort control. However, guano scraping activities may no longer take place within Namibian Islands' Marine Reserve due to the expiry date of guano rights in 2016[53]. Since then guano may only be harvested from artificial platforms.

Some fishing is seasonal, either because of management measures implemented or due to temporal availability of some species. The fishing season for hake runs from 1 November to 30 September, with October being closed for all vessels harvesting hake[54]. Rock lobster may not be harvested during the period 1 May to 31 October[55]. The seasonal albacore tuna fishery by pole-and-line is active from October to March, when migrating albacore tuna pass through Namibian waters.

FIGURE 6:
BIRD ISLAND GUANO PLATFORM NEAR WALVIS BAY (© NACOMA)

Monkfish, large pelagic fishery (tunas, tuna like species, swordfish and large pelagic sharks) and midwater fishery is open throughout the year. The sardine fishery is open throughout the year, but due to the low TAC and availability of sardine purse seiners are most active between March and July only. A three year moratorium on sardine fishing has been implemented in December 2017.

THE CURRENT SITUATION

LEGAL AND POLICY FRAMEWORK

The Ministry of Fisheries and Marine Resources (MFMR) has a mandate to sustainably manage the living aquatic resources. The mandate of MFMR is derived from the Constitution of the Republic of Namibia, various policy, regulatory instruments and the cabinet directive that established the Ministry in 1991.

THE PRIMARY POLICY AND REGULATORY INSTRUMENTS FOR MFMR RELATED TO FISHERIES ARE:

THE MARINE RESOURCES ACT (NO. 27 OF 2000) AND ITS AMENDMENT (ACT NO. 9 OF 2015).

THE MARINE RESOURCES REGULATIONS (GOVERNMENT NOTICE NO. 241, REGULATIONS RELATING TO THE EXPLOITATION OF MARINE RESOURCES, 2001).

NAMIBIA'S MARINE RESOURCES POLICY: TOWARDS RESPONSIBLE DEVELOPMENT AND MANAGEMENT OF THE MARINE RESOURCES SECTOR (AUGUST 2004).

Namibia is party to a number of International and Regional Fisheries Organisations, Commissions, Conventions and Treaties (e.g. the BCC; SEAFO; ICCAT; and CCAMLR and has made provisions for these instruments in its policies, programmes and management measures to implement them at national level for the benefit of the Namibian people.

Supported by relevant legislation, the development of the fisheries sector is guided by general national development frameworks policy as well as a dedicated fisheries policy.

The Marine Resources Act (2000, amended in 2015)[56,57] provides for the conservation of the marine ecosystem and the responsible utilization, conservation, protection and promotion of marine resources on a sustainable basis; for that purpose, it provides for the exercise of control over marine resources and matters connected therewith. The minister may grant a right to harvest any marine resource for commercial purposes to any person who applies for such a right, subject to conditions set out in the Marine Resources Act. Fishing rights can be allocated for any living marine resource.

Namibia's NDP5 refers to fisheries as a key industry. The focus here is on improved processing facilities and maximising national value addition before export. Currently Namibia is importing fish such as small pelagic fish for canning and Patagonia squid for value addition and re-export. NDP5 seeks to encourage such fish importation in order to achieve the substantial volumes needed for economies of scale in value addition activities such as canning. Another challenge to be addressed during NDP 5 is the enhancement of fisheries' market access to lucrative export destinations by ensuring compliance to more stringent SPS (sanitary and phytosanitary) standards.

The NBSAP2 seeks to ensure that all living marine resources are conserved and utilized sustainably based on ecosystem approach to fisheries (EAF) principles.

Namibia's Fisheries Policy, currently available as a final draft (2015), aims to achieve sustainable utilisation of fisheries and equitable distribution of its wealth while facilitating trade in fisheries. In order to achieve this objective, the policy establishes controls with regards to marine resource harvesting and the processing and trade of fish. The principles of harvesting are based on an ecosystem approach to fisheries as contained in UNCLOS, the CBD, the 1995 FAO Code of Conduct for Responsible Fisheries (FAO CCRF) and the United Nations Sustainable Development Goals (SDGs). These policies are based on a precautionary approach to ensure conservation, management and exploitation of living aquatic resources whilst preserving the aquatic environment.

MFMR CONSISTS OF FOUR DIRECTORATES:

1. AQUACULTURE

2. OPERATIONS

3. POLICY, PLANNING AND ECONOMICS

4. RESOURCE MANAGEMENT

SPATIAL DISTRIBUTION OF KEY COMMERCIAL LIVING MARINE RESOURCES [III,58]

The following table and maps provide an overview of the key commercially utilized living marine resources' spatial distribution.

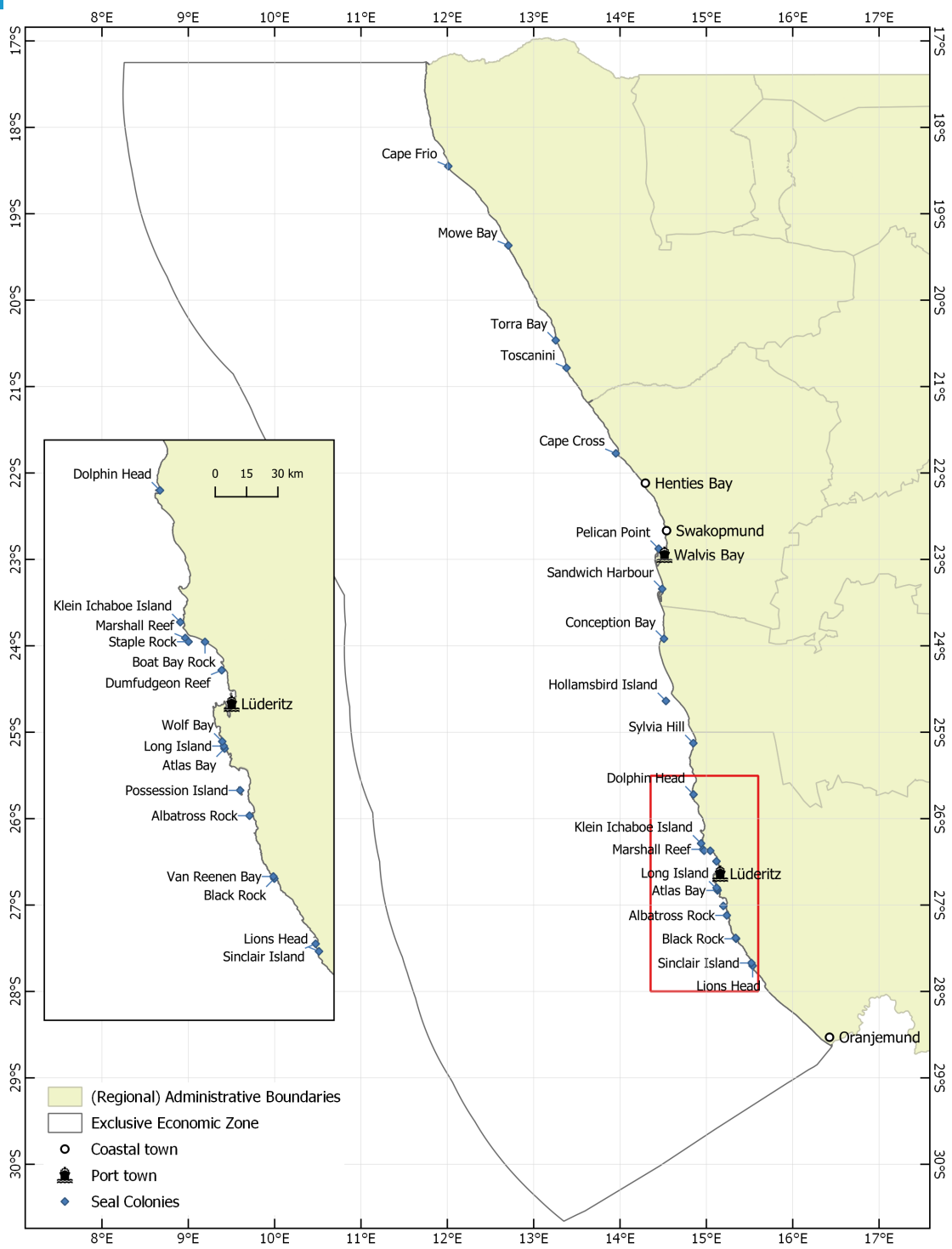
TABLE 2:
KEY COMMERCIALLY UTILIZED LIVING MARINE RESOURCES' SPATIAL DISTRIBUTION

HAKE *(Merluccius spp.)*	Shallow-water Cape hake, *M. capensis*, is found throughout Namibian waters, while deepwater Cape hake *M. paradoxus* is more abundant in the south of Namibia. Deepwater Cape hake are mainly found in waters 150 – 800m deep, mostly at temperatures of 4 – 8°C, whereas the shallow-water Cape hake occur from the coast to a water depth of about 380m in temperatures between 4 and 12°C. For both species, larger individuals are found at greater depths than smaller fish and there is little overlap in the distribution of mature fish. Shallow-water Cape hake is the most common and abundant hake species of Namibia, especially in the central region, although the abundance of deepwater Cape hake has increased and become more widely distributed in recent years. It has recently been confirmed that there is only one single genetic *M. paradoxus* stock in the Benguela, and two (possibly three) *M. capensis* stocks. Spawning of *M. paradoxus* takes place between the Agulhas Bank and Elands Bay while the nursery areas are between Hondeklip Bay and the Orange Banks, from where the stocks of *M. paradoxus* in Namibian waters and along the South coast of South Africa originate. The stocks of the two hake species are therefore shared between Namibia and South Africa. Research surveys and commercial catches of *M. paradoxus* suggest a gradual migration or expansion of the stock from South African waters. Hake spawn in midwater throughout the year. *M. capensis* spawn off central Namibia and the west coast of St. Helena Bay between 100m and 400m deep, with spawning starting earliest in the shallow waters. Nursery areas appear to be near Walvis Bay, off the Orange River and south to about Cape Columbine.The fishing industry does not differentiate between the two hake species and only one TAC is set for both species.
MONKFISH *(Lophius spp.)*	Two species of monkfish are found in southern African water, *Lophius vomerinus* and *Lophius vaillanti.* Monkfish are demersal fish that grow relatively slow and live comparatively long in areas from the tidal zone to depths of more than 600 m. The distribution of *L. vomerinus* extends from northern Namibia (21°S) to Durban, South Africa and that of *L. vaillanti* from north of Walvis Bay to the Gulf of Guinea. Biomass assessment of monkfish is mainly for *L. vomerinus*, due to the low occurrence of *L. vaillanti,* however, the industry does not differentiate between the two species and they are simply recorded as monkfish.Historical data that are available on the reproductive biology of *L. vomerinus* in Namibia are restricted to the geographical positions of recruitment areas i.e. areas with high abundance of 0-aged fish. Member countries of the International Commission for South East Atlantic Fisheries (ICSEAF)[59] and in particular Spanish researchers identified two separate areas, the first being off Walvis Bay (23° - 25°'S) at depths between 150 and 300m and the second, near the Orange River (28°35'S) at depths between 100 and 300 m. Recruitment takes place during the winter months. These observations are confirmed by independent data collected by the Norwegian research vessel *"Dr. Fridtjof Nansen"* during bottom trawl surveys in the 1990s. Data on gonadal recrudescence indicate that *L. vomerinus* spawns throughout the year with a slight increase in spawning intensity over the winter period. *L. vomerinus* spawn flat gelatinous egg mass, called veils, into the water, which float near the water surface. Female monkfish mature at both a larger size and at a greater age.

[III] The table provides information on most important none migrating fish species only

HORSE MACKEREL *(Trachurus capensis)*	Two stocks of horse mackerel exist off southern Africa's west coast, one off Namibia and southern Angola and one off South Africa's West Coast, extending into the extreme southern part of Namibia. The stocks are believed to originate from separate spawning stocks and are likely to be separated by the environmental barrier of the Lüderitz upwelling cell. Horse mackerel spawn along the central and northern Namibian coast (north of 23°) with the main spawning areas being north of 20°S. Nursery areas are found further south than the spawning areas with larvae being found as far south as 24°S[60]. Juvenile horse mackerel are most common in northern Namibia or southern Angola and generally live inshore of the 100m isobath, and are often found very close inshore, just behind the surf zone. Maturing fish move offshore and adult fishing are generally found north of 21°S, feeding deeper in the midwater. Few large horse mackerel are found in the south, just north and south of the Lüderitz upwelling, in the demersal zone. Horse mackerel were shown to perform vertical diel migration for feeding during the day and perhaps predator avoidance during night time. Juvenile horse mackerel are planktivorous, feeding mainly on copepods, while adult fish mainly consume ephausiids/krill.
SARDINE *(Sardinops sagax)*	Sardine live in temperate waters from southern Angola to KwaZulu-Natal in South Africa, with two quasi discrete stocks off northern/central Namibia and off South Africa's Western Cape. The degree of mixing between the two stocks is probably insignificant for management purposes, except in anomalous years. Catches in Angola, as well as research surveys, indicate that the stock extends into Angola and varies seasonally, being most abundant in Angola during winter months. The sardines of the northern stock spawn on the shelf north of 24°30'S. During warm years spawning occurs mainly in the central Namibian and MSP planning area (between 22°S and 23°S) while during cooler years spawning mainly occurs between 19° and 20°S.[61]
LINE FISH	Commercial line boat fishing mainly targets snoek *(Thyrsites atun),* a medium sized predator that inhabits the coastal and shelf waters of the temperate Southern hemisphere. Snoek is one of the major predators of anchovy and sardine in the Southern Benguela and it has been implicated in top-down effects on both prey and consequently zooplankton populations. Historical catch records suggest that snoek was considerably more abundant than at present. Data from ichthyoplankton surveys reveal that snoek eggs and larvae are present throughout the Benguela system in winter or spring, distributed as two disjunct bands separated by the Lüderitz upwelling cell.
ORANGE ROUGHY *(Hoplostethus atlanticus)*	Orange roughy form dense spawning aggregations during austral winter. These aggregations are often associated with bottom features such as pinnacles and canyons. Six aggregations of orange roughy have been found in the Namibian EEZ (see map 7) with reports of further aggregations outside the EEZ on the Walvis Ridge.
CAPE FUR SEALS *(Arctocephalus pusillus pusillus)*	In the world, Cape fur seals are only found in Namibia, Angola, and South Africa. Namibia has about 60% of the population on twenty–six colonies along the coastline. Cape fur seals breed on small rocky nearshore islands and in mainland colonies on the Namibian (see map 6) and Northern Cape coasts, and have a defined breeding season between mid-November to early January. In the past, the population mainly inhabited southern colonies, while recent studies have indicated a northward shift of the population. This shift is correlated with prey abundance following the distribution of pelagic resources which are more abundant in the northern region. Seals are generally known to roam over the continental shelf, but also in deeper waters of up to 200m depth mainly for feeding.

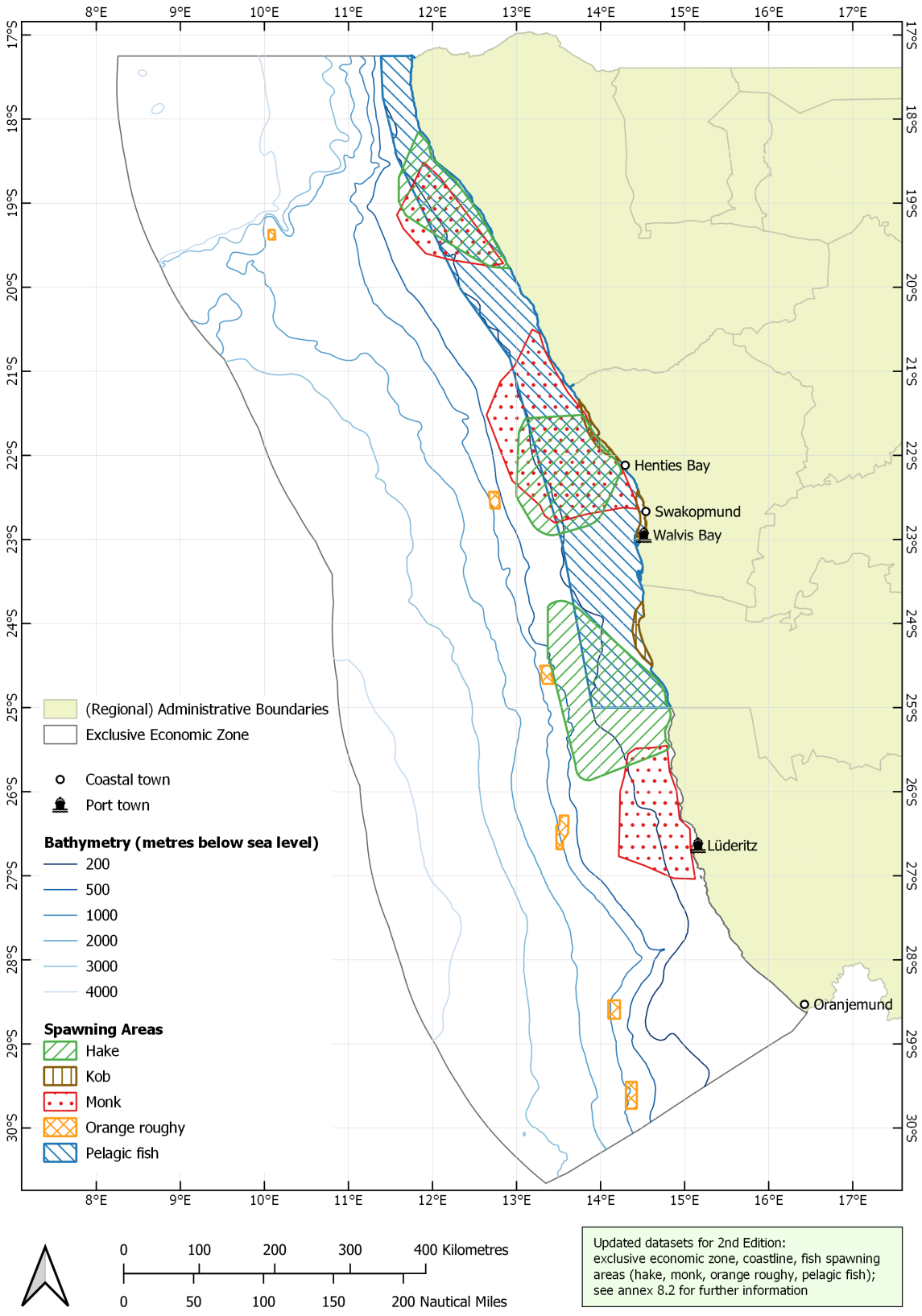
ROCK LOBSTER *(Jasus lalandii)*	The major crustacean fisheries along the Namibian coast are the rock lobster *Jasus lalandii. J. lalandii* is associated with the cool upwelled waters of the Benguela and occur in commercial exploitable densities inshore from the east of Cape Point to approximately 25°S, and at lower densities beyond their core distribution. Depth distribution of rock lobster varies seasonally in response to dissolved oxygen concentrations at the bottom. Rock lobster feed mainly in the rocky subtidal zone.
DEEP SEA RED CRAB *(Chaceon maritae)*	The deep sea red crab *Chaceon maritae* occur on the slope of the continental shelf from about 27°S off Namibia, northwards to Angola and beyond. They are found at depths of between 300 and 900 m. Adult females migrate from Namibia to Angola suggesting a single stock between Namibia and Angola. Adult females generally live in shallower water than males and virtually all egg production and larval release takes place on the shallower part of the continental shelf. As only females are migrating from Namibia to Angola, it is believed to be a spawning migration.



MAP 6:

SEAL COLONIES ALONG THE NAMIBIAN COAST (EEZ) (UPDATED FOR 2ND EDITION)

Pelagic species spawn mainly north of 25°S, while spawning areas of demersal species (hake and monk) are found along the entire Namibian coast with most spawning areas in waters shallower than 200m depth (map 7). Hake and monk are caught along the entire Namibian coast while horse mackerel and sardine are caught in the central and northern areas. Fish distribution and catchability for especially the pelagic species depend on environmental conditions and vary between years.



MAP 7:

APPROXIMATE LOCATIONS OF KNOWN MAIN SPAWNING AREAS OF IMPORTANT FISH SPECIES [62] (EEZ) (UPDATED FOR 2ND EDITION)

CURRENT UTILISATION OF THE RESOURCES

TYPES OF FISHING AND LOCATIONS[64]

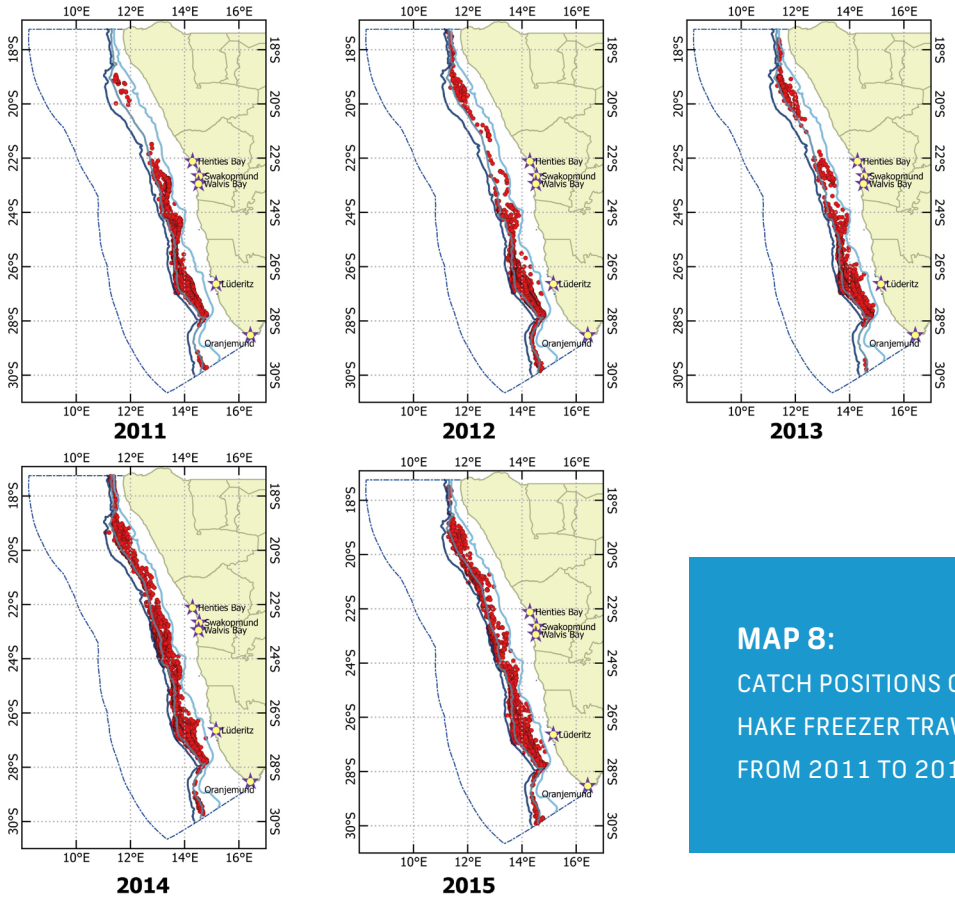
Different fishing methods are used to catch different species. The vast majority of vessels operating in Namibian waters are bottom trawlers targeting hake. Detailed numbers of fishing vessels operating in Namibian waters in 2017 are given in table 3.

TABLE 3:
NUMBER OF FISHING VESSELS OPERATING IN NAMIBIAN WATERS IN 2017

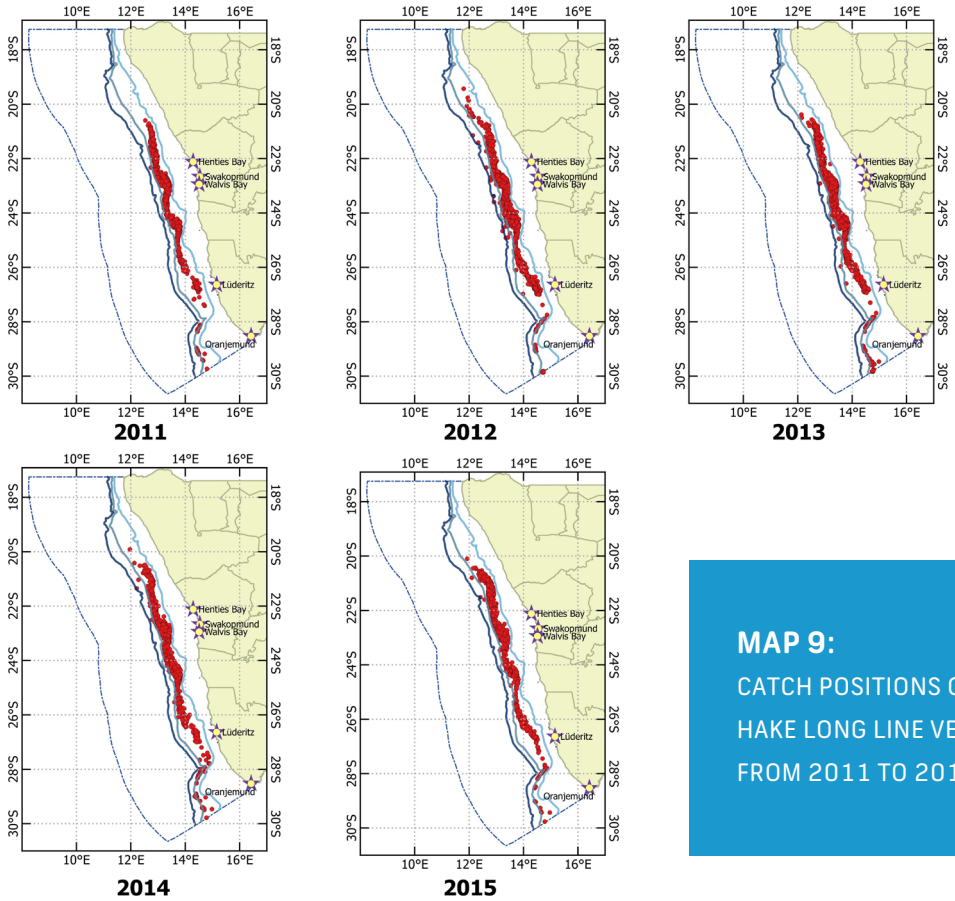
TARGET SPECIES	FISHING METHOD	NUMBER
Hake	Bottom trawl	53
Hake	Long Line	14
Monk full time	Bottom trawl	14
Hake/monk	Bottom trawl	4
Horse Mackerel	Midwater trawlers	11
Crab	Bottom trawl	2
Large Pelagics (Swordfish, Sharks)	Long Line	14
Albacore Tuna	Pole and line	4
Sardine/juvenile horse mackerel	Purse seine	4
Snoek	Pole and hook	23

Annual catch positions obtained from log sheets (maps 8-18) as well as the combined data for the years 2014 to 2017 obtained from the vessel monitoring system (VMS) (map 19) were plotted to identify the important fishing areas for different fisheries.

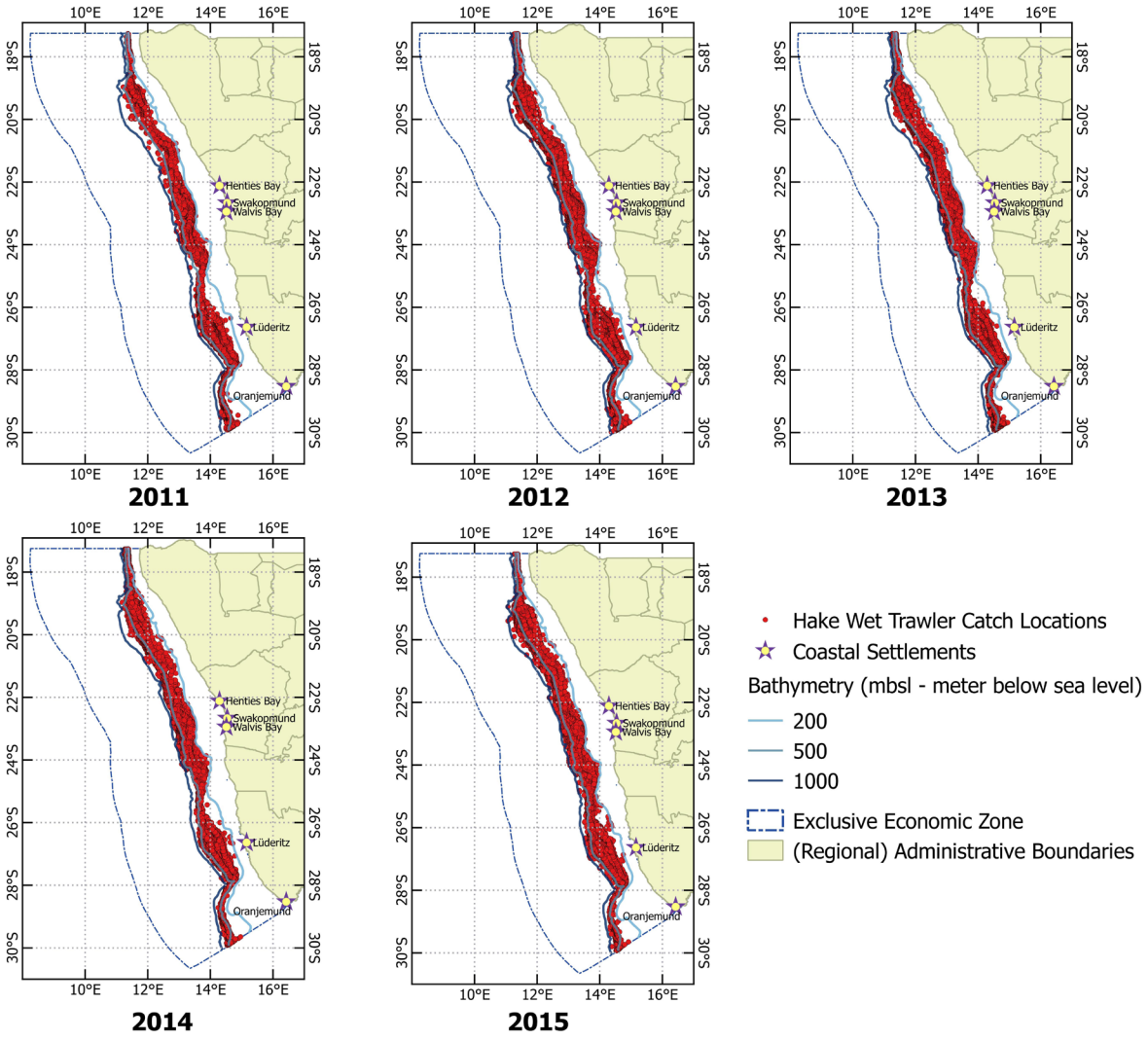
Hake trawlers (freezer) mainly catch in waters deeper than 300m between 24°S and 25°S and deeper than 350m between 25°S and 28°S (map 8), while long-liners catch most hake between 200m and 500m bottom depth between 20°30S and 25°S (map 9). Wet fish catches are more or less evenly distributed along the entire Namibian coast between 200m and 900m bottom depth (map 10). VMS data shows that hake trawlers (wet and freezer) are active along the entire Namibian coast between 200m and 900m bottom depth with varying intensities (map 19a)



MAP 8:
CATCH POSITIONS OF HAKE FREEZER TRAWLERS FROM 2011 TO 2015



MAP 9:
CATCH POSITIONS OF HAKE LONG LINE VESSELS FROM 2011 TO 2017

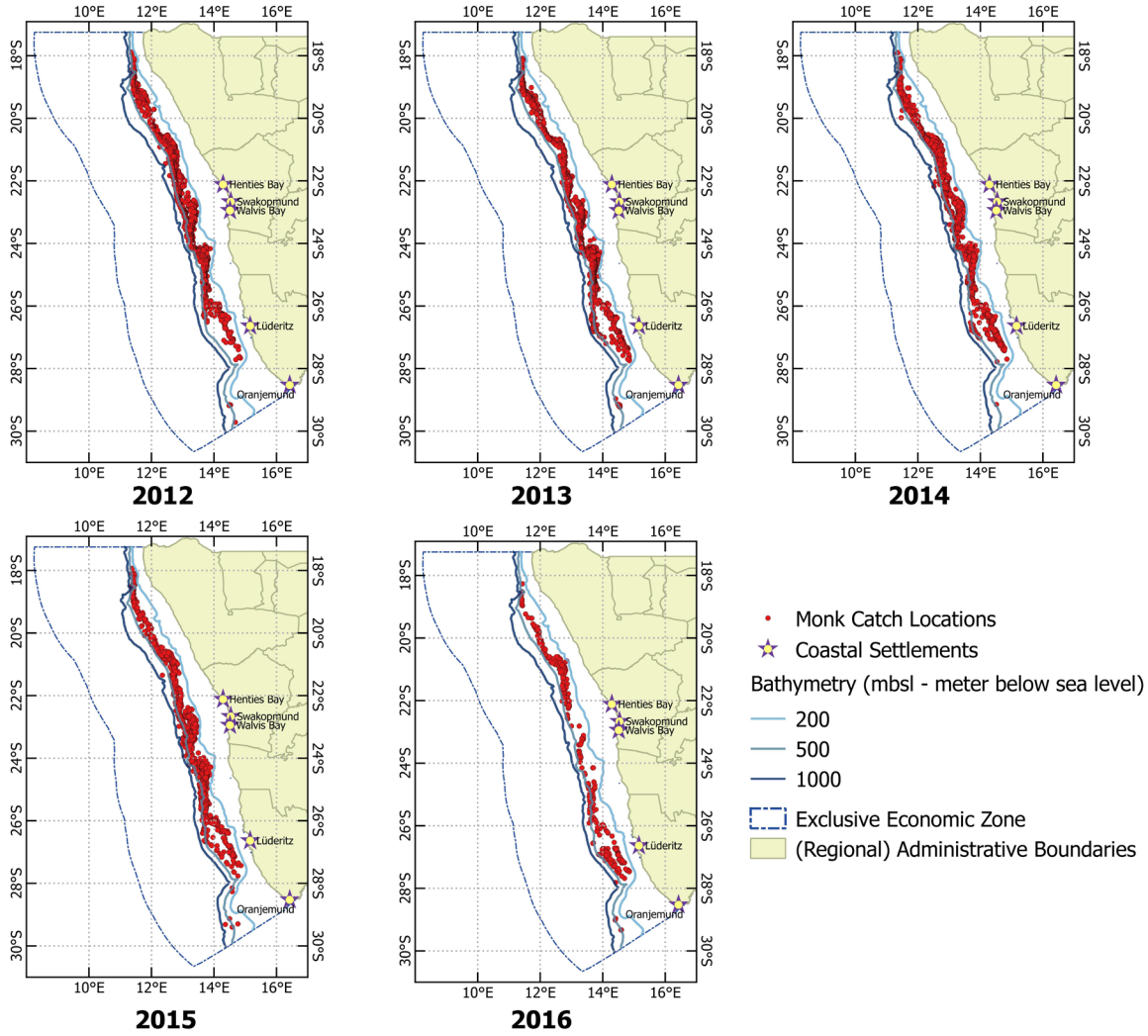


MAP 10:

CATCH POSITION OF HAKE WET FISH TRAWLERS FROM 2011 TO 2015

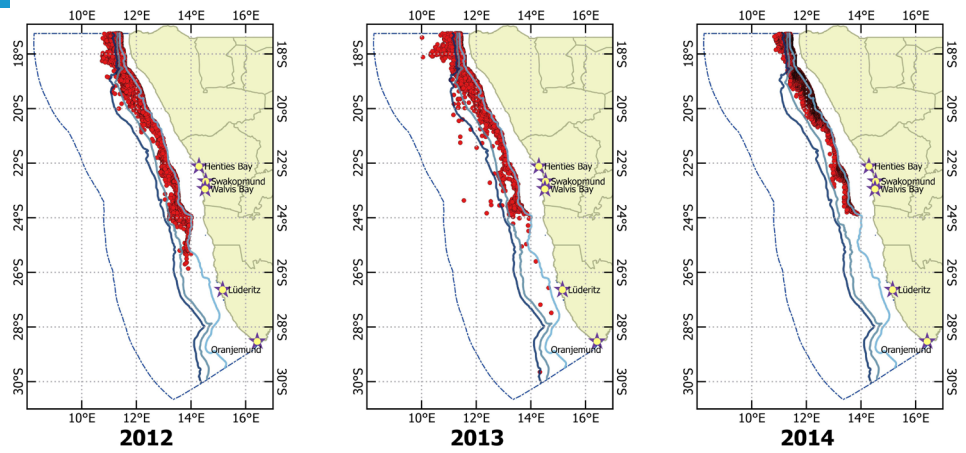
Monkfish vessels fish throughout the entire Namibian coastline with little or no fishing north of 18°S and south of 28°S. On average the fleet fishes between 320m and 440m bottom depth (map 11 and map 19b).

There is a clear pattern of a decreasing depth with increasing latitude. Trawling is affected by adverse weather conditions and unfavourable weather might force vessels to shift their area of operations at times.

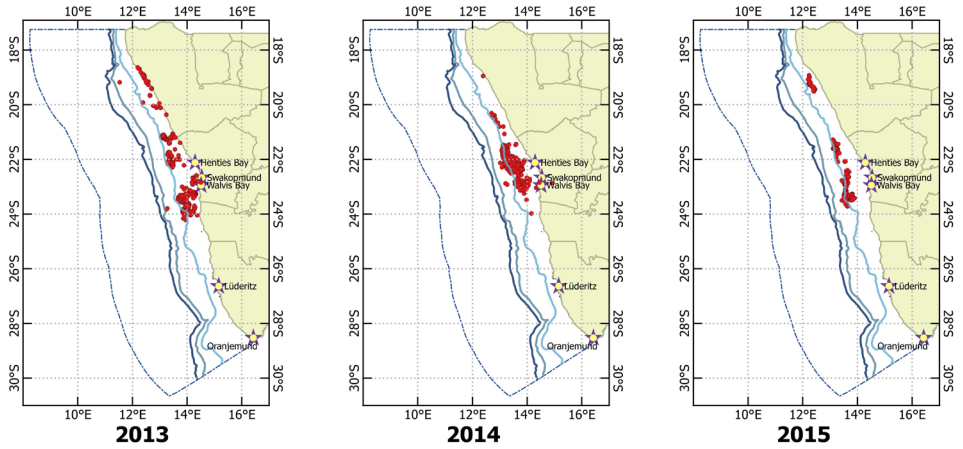


MAP 11:
CATCH POSITIONS OF MONKFISH FROM 2012 TO 2016

Horse mackerel catches are mainly distributed from 17°15'S in the north to about 26°S at bottom depths between 200m and 500m. During some years (e.g. 2014 and to a lesser extend 2013 and 2015) catches are limited to areas north of 24°S (map 12 and map 19c).



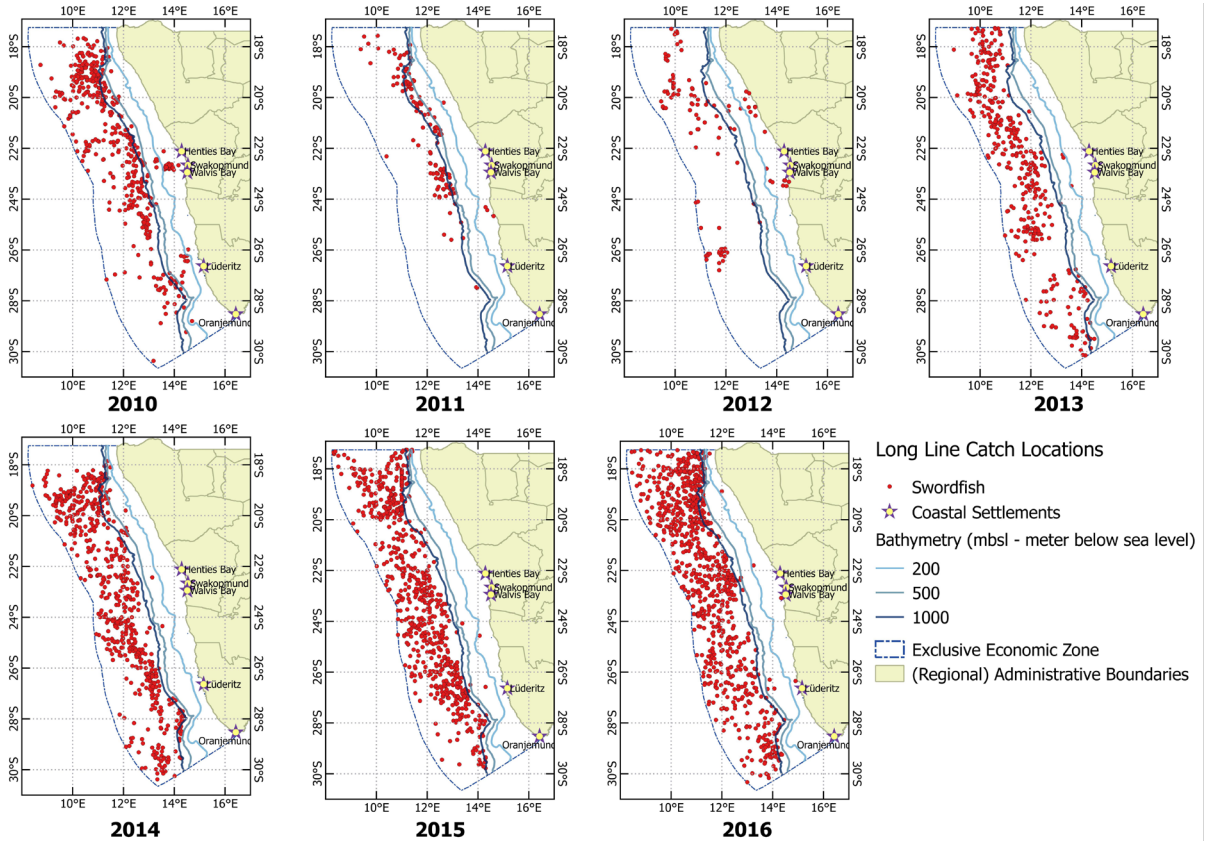
MAP 12:
CATCH POSITIONS OF HORSE MACKEREL FROM 2012 TO 2016



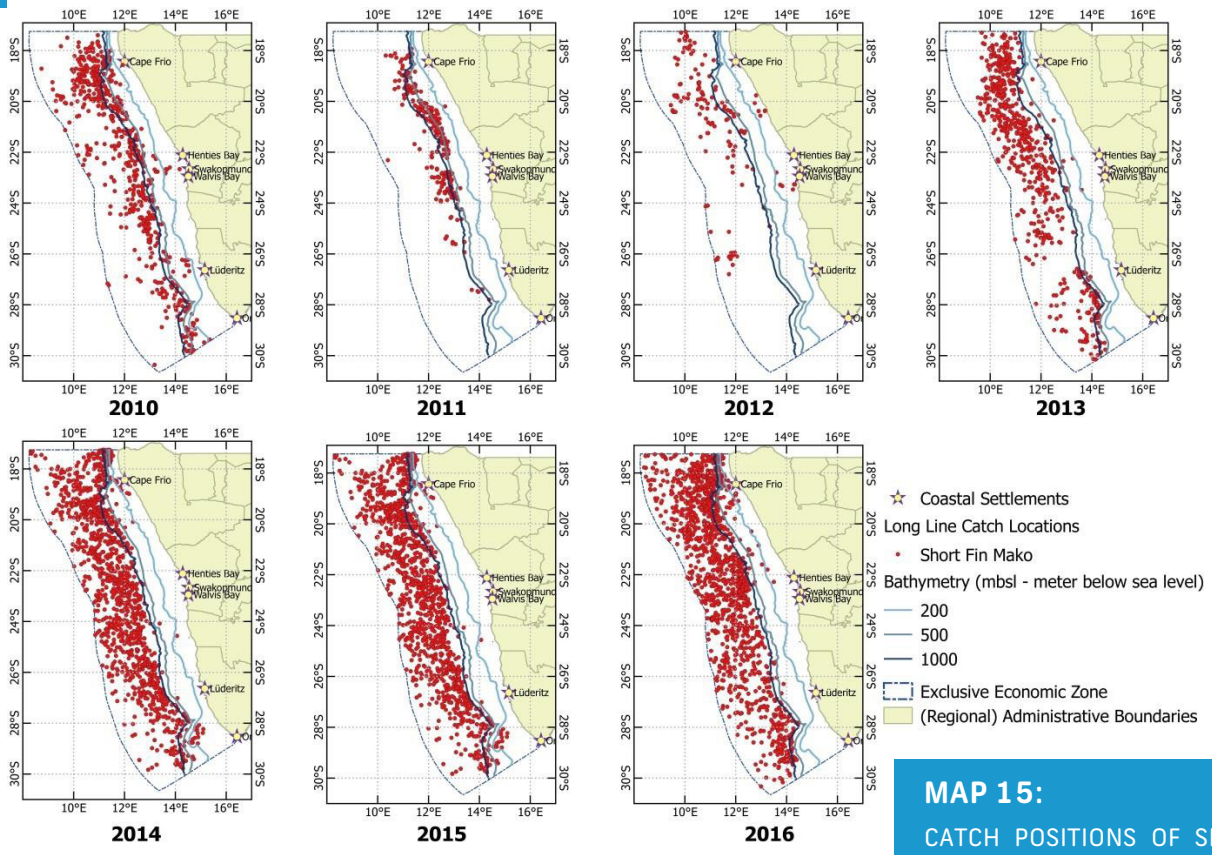
MAP 13:
CATCH POSITIONS OF SARDINE FROM 2013 TO 2017

Sardine are mainly caught between 19°S and 24°S in shallow waters close to the coast to 400m bottom depth, with the majority of catches being done in waters less than 200m depth. Due to the low size of the sardine stock and environmental variability leading to inter-annual changes in the distribution of the stock, catch positions vary from year to year (map 13 above).

Longline vessels are active along the entire Namibian coast and target swordfish (map 14) and large pelagic sharks (mainly shortfin mako and blue shark) (maps 15-17 and map 19d). During recent years more effort has been directed towards catching shark as tuna catches have decreased.

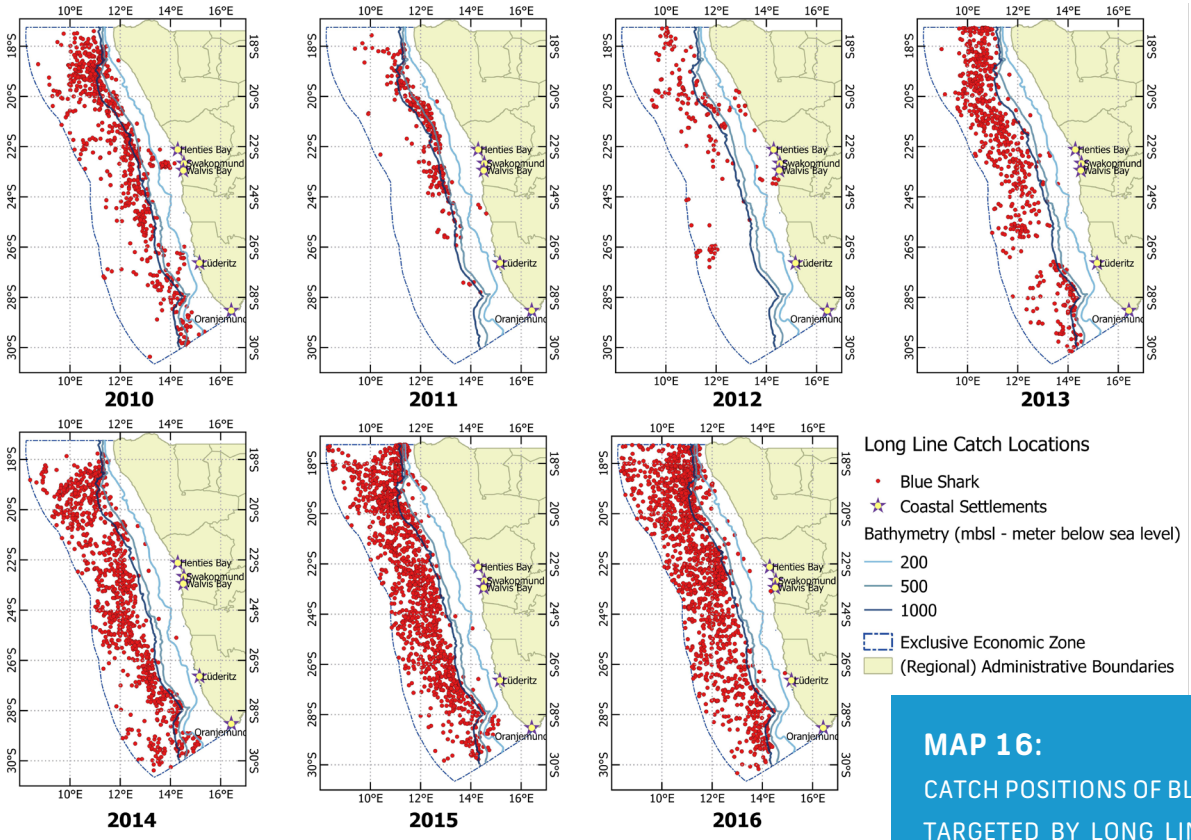


MAP 14:
CATCH POSITIONS OF SWORDFISH TARGETED BY LONG LINERS FROM 2010 TO 2016



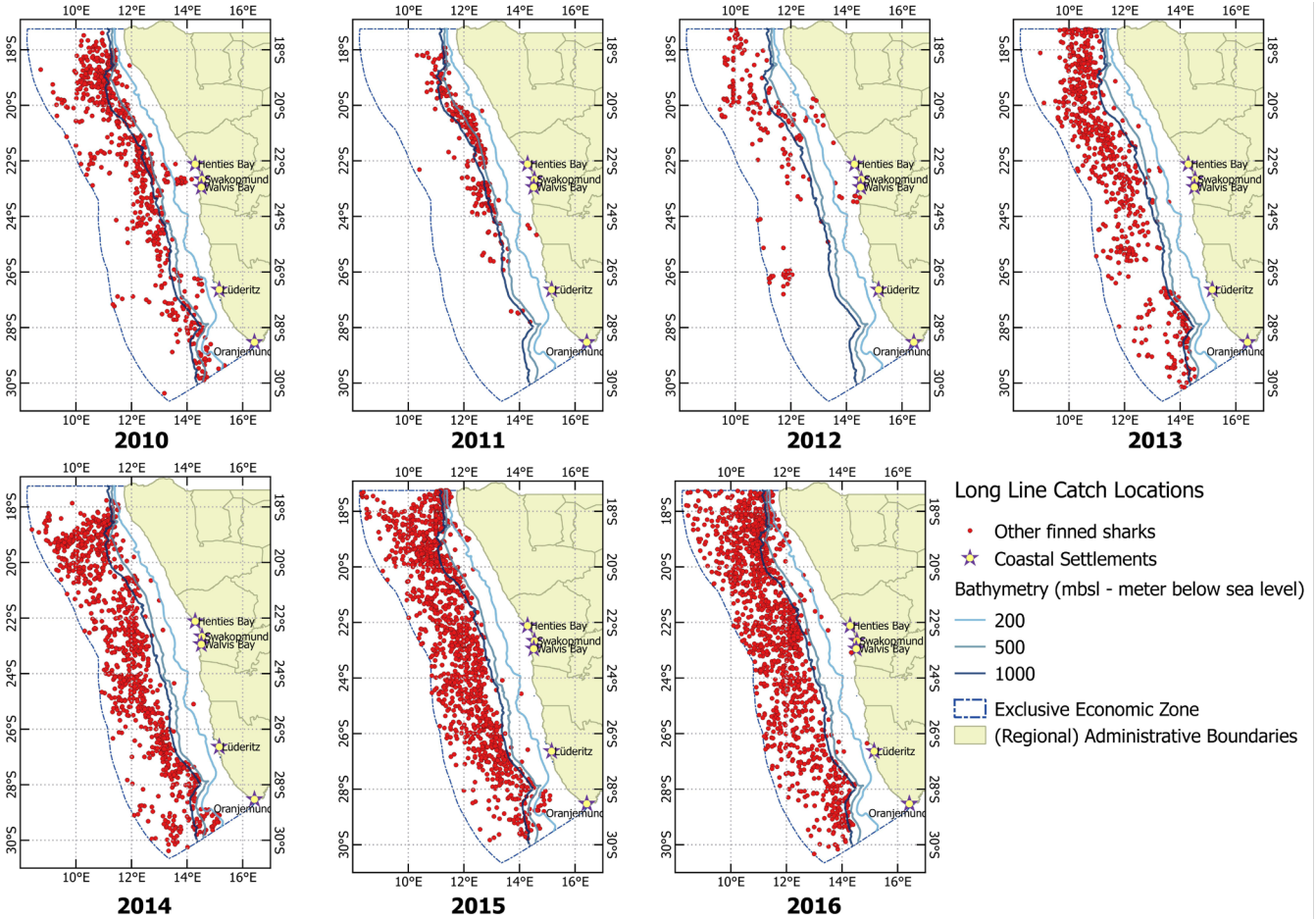
MAP 15:

CATCH POSITIONS OF SHORT FIN MAKO TARGETED BY LONG LINERS FROM 2010 TO 2016



MAP 16:

CATCH POSITIONS OF BLUE SHARKS TARGETED BY LONG LINERS FROM 2010 TO 2016



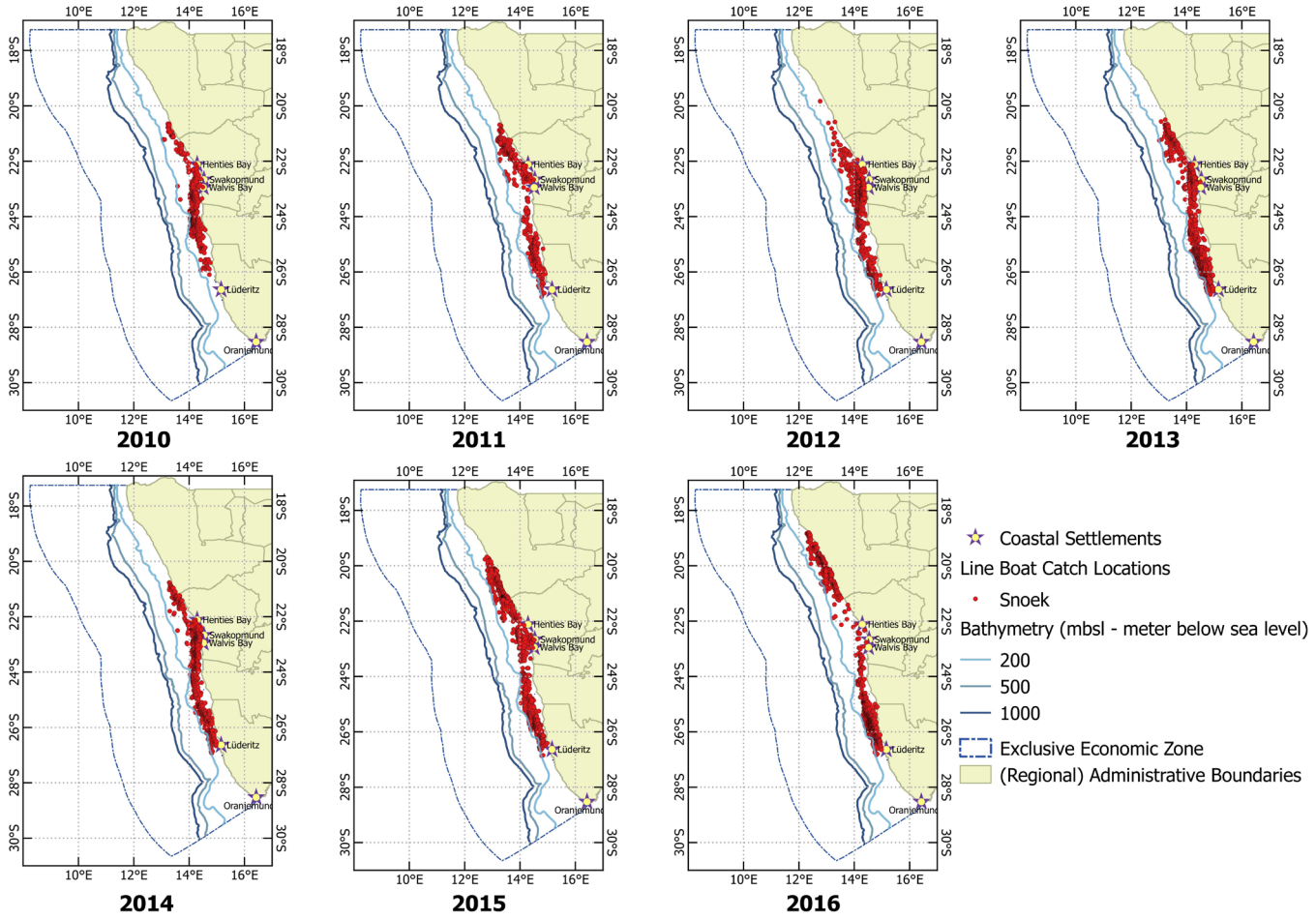
MAP 17:

CATCH POSITIONS OF OTHER SHARKS TARGETED BY LONG LINERS FROM 2010 TO 2016

Longline and pole-line vessels have fished most intense north of 23°S and around Tripp seamount in the south (map 19d). Pole-line vessels around Tripp seamount in southern Namibia target mainly albacore, yellowfin and bigeye tuna.

Snoek are targeted by line boats caught mainly between 20°S and 26°30'S in waters shallower than 200m (map 18).

Bycatch of line boats include yellowtail, steenbras, barbel and kob, caught mainly between 24°S and 25°30' and north of 22°S (maps 20).

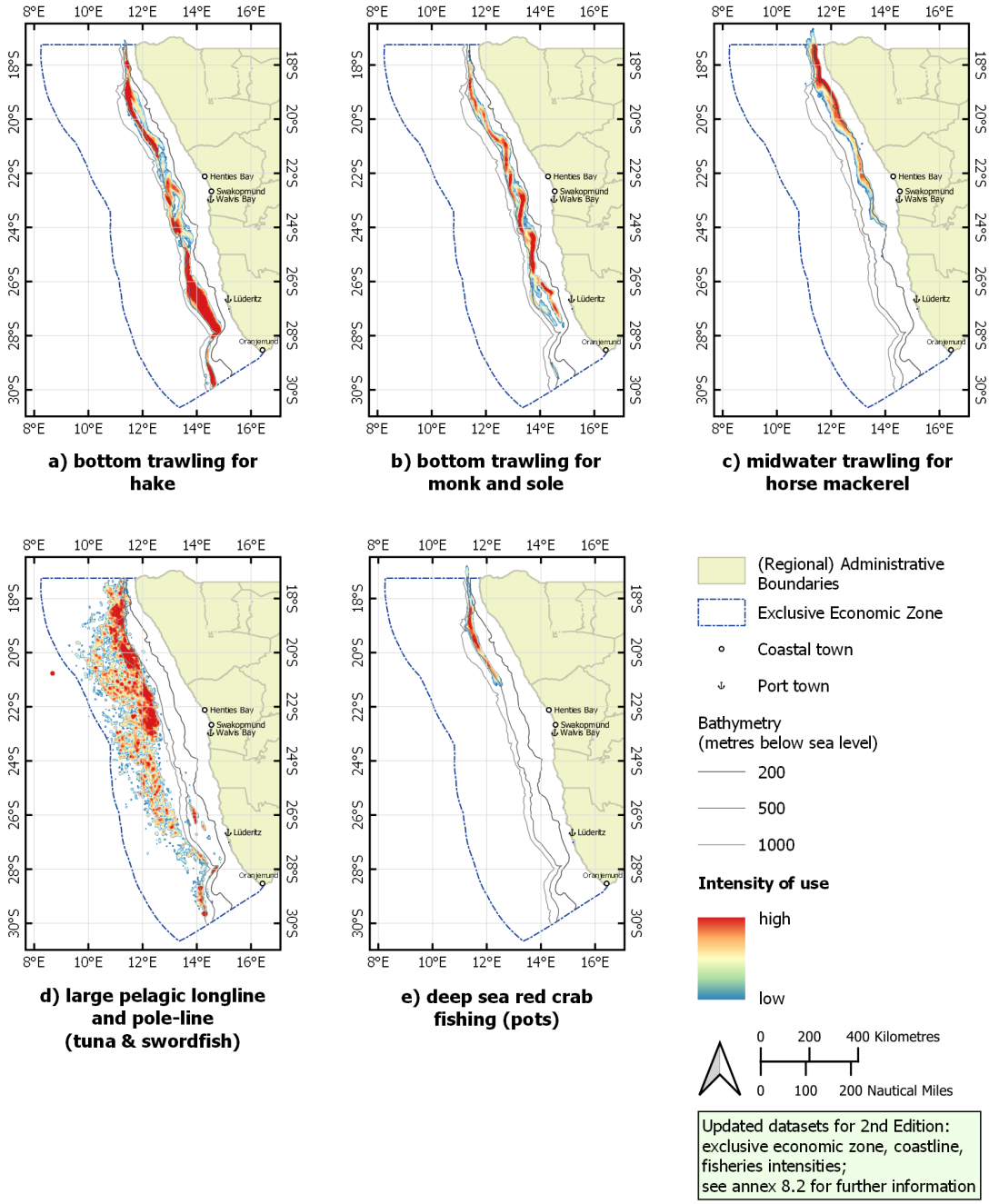


MAP 18:

CATCH POSITIONS OF SNOEK FROM 2010 TO 2016

Deep sea red crab in Namibian waters is caught north of 22°S degrees at bottom depths between 400m and 1000m (Map 19e)

Recreational fishing (shore angling) is taking place mainly between Walvis Bay and Terrace Bay (just north of 20°S) and to a lesser extend around the towns of Lüderitz and Oranjemund. Most angling takes place between Swakopmund and Henties Bay and then decreasing gradually towards the north. During peak holiday season in December/January a lot of anglers are active in the northern areas. Recreational harvesting of rock lobster takes place on the rocky shores of the central areas between 1 November and 30 April.

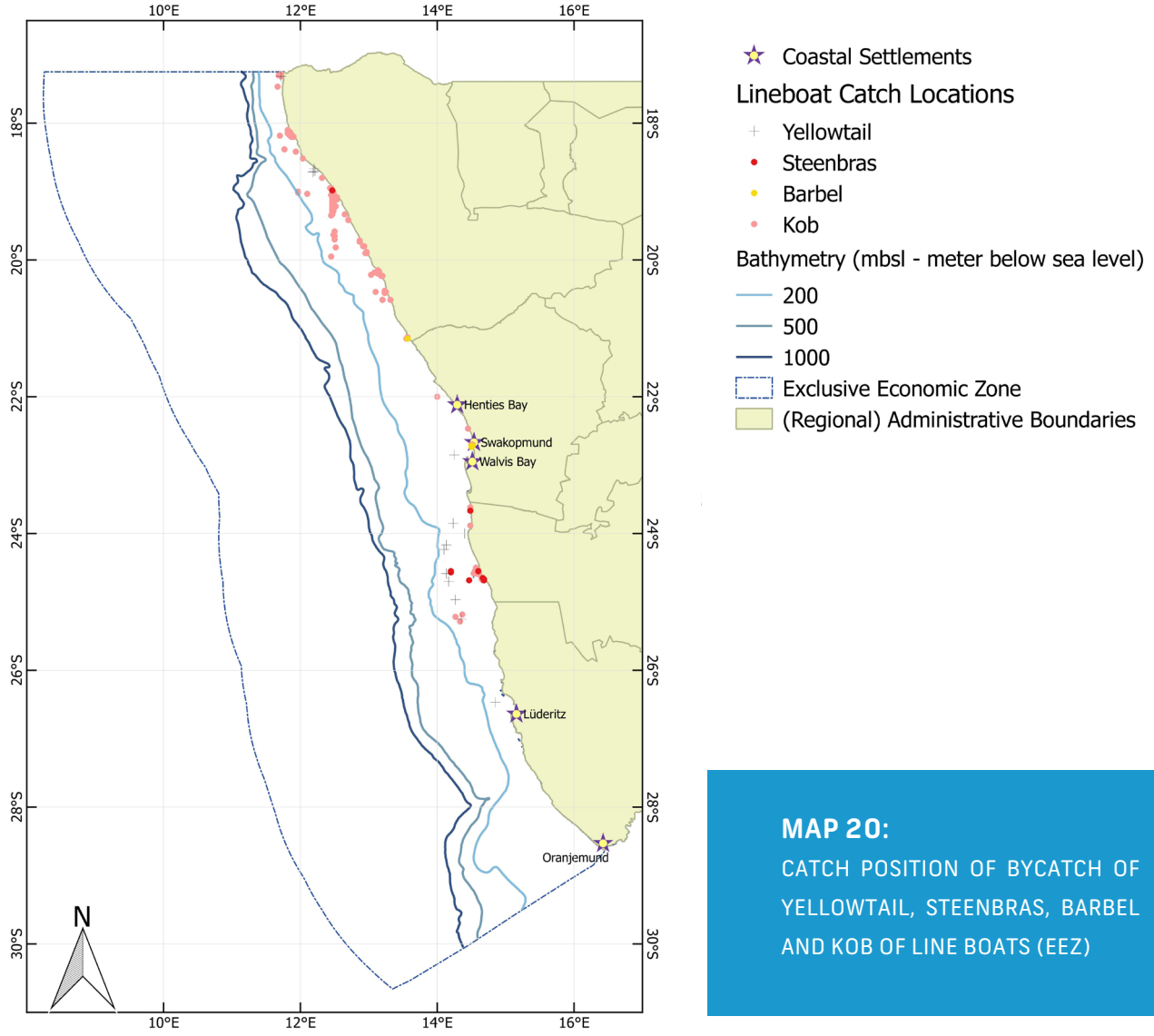


MAP 19:

FISHING INTENSITY OF DIFFERENT FISHING VESSELS DERIVED FROM VESSEL MONITORING SYSTEM (VMS) DATA FOR

A) BOTTOM TRAWLERS OF HAKE (WET AND FREEZER)
B) BOTTOM TRAWLING FOR MONK AND SOLE
C) MID-WATER TRAWLING FOR HORSE MACKEREL
D) LONGLINE AND POLE-LINE FISHING FOR TUNA AND SWORDFISH
E) DEEP SEA RED CRAB FISHING (POTS).

(UPDATED FOR 2ND EDITION)



MAP 20:
CATCH POSITION OF BYCATCH OF YELLOWTAIL, STEENBRAS, BARBEL AND KOB OF LINE BOATS (EEZ)

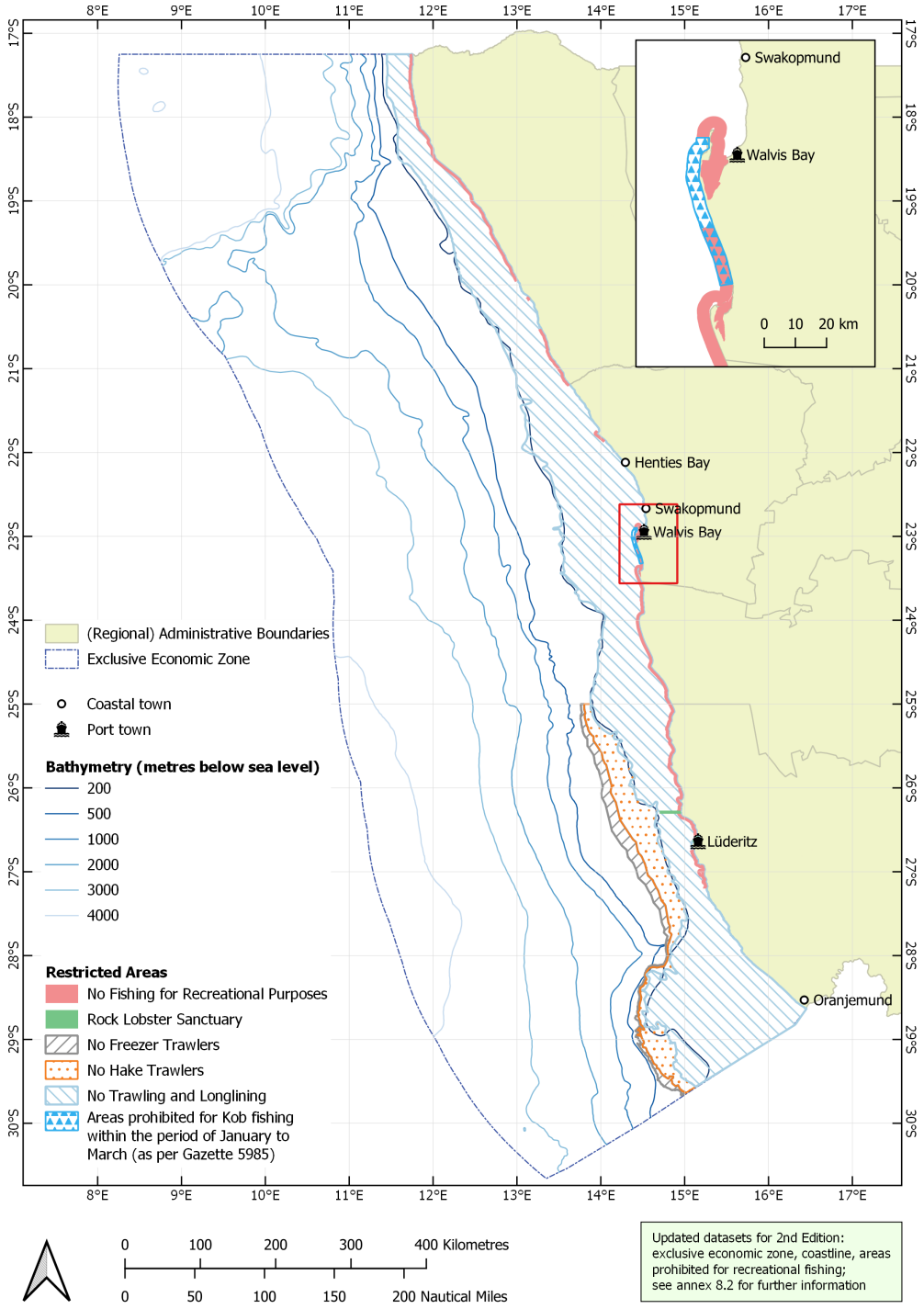
Ski-boats operate mainly from Swakopmund in the inshore areas between Patrysberg and Swakopmund, between Mile 6 and Mile 8 and Mile 14 to Wlotzkasbaken (map 22).

AREAS RESTRICTED TO FISHING

COMMERCIAL FISHING

The depth restriction for the casting of nets to harvest hake in the areas south of 25°S is 300m for wetfish trawlers and 350m for freezer trawlers, and north of 25° it is 200m for wetfish and freezer trawlers: fishing for hake is only allowed in greater depths[65] (maps 21).

Purse seining is allowed in the entire Namibian ocean space except within the buffer zones in the NIMPA. The NIMPA also provides for a line fish sanctuary and rock lobster sanctuaries along the southern Namibian coast.[66] The Marine Regulations define additional areas around Lüderitz where no rock lobster may be harvested[67].



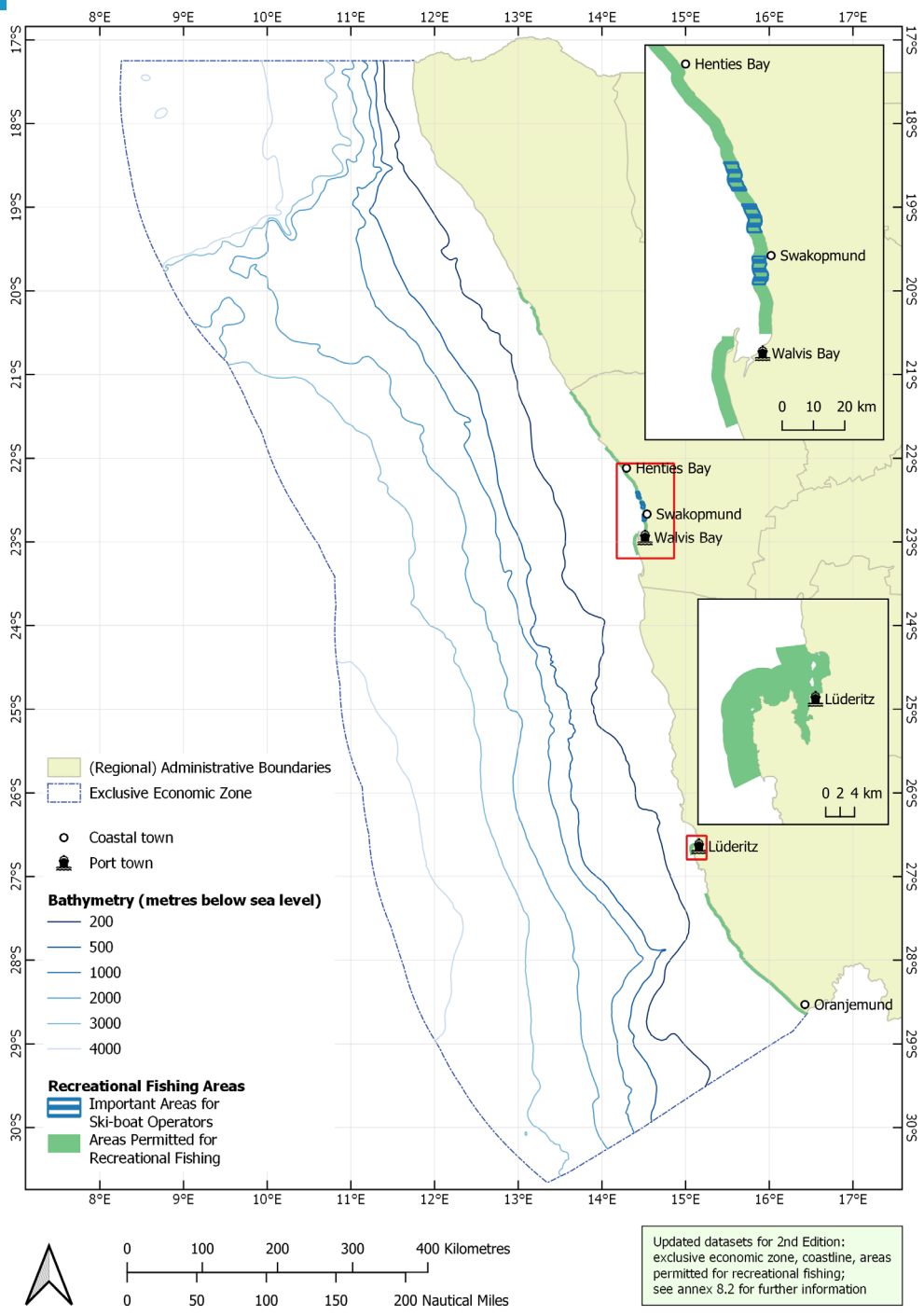
MAP 21: RESTRICTED AREAS FOR TRAWLING, LONG LINING OR RECREATIONAL FISHING ALONG THE NAMIBIAN COAST (EEZ) (UPDATED FOR 2ND EDITION)

RECREATIONAL FISHING

Nobody may harvest marine resources for recreational purposes within a distance of two nautical miles seaward from the high-water line in any of the areas as defined in the Marine Regulations[68] (map 21).

Nobody may harvest kob *(Agrysomus hinodorus* previously called *A. hololepidotus)* within the period from the 1st of January to the 31st of March in the Paaltjies area south of Walvis Bay from 22°53.934'S along the coastline to 23°19.216'S, extending to two nautical miles offshore from the high-water mark[69]. This closure was implemented in 2016 to protect the mature fish migrating from the north to Sandwich harbour to spawn.

Areas permitted for recreational fishing and areas important for skiboat operators are shown in map 22.



MAP 22:
AREAS PERMITTED FOR RECREATIONAL FISHING AND AREAS IMPORTANT FOR SKI-BOAT OPERATORS (EEZ) (UPDATED FOR 2ND EDITION)

FISHING HARBOURS AND LAND-SEA INTERACTIONS

To offload and process the catch, industry requires jetties in the harbour to offload and land for infrastructure (processing plants) in the ports of Walvis Bay and Lüderitz, where all commercial fish caught in Namibia is offloaded. The majority of processing plants are located in Walvis Bay.

Ski-boats mainly launch from the beaches of Swakopmund and Henties Bay where they also offload their catch. At times ski-boats land at the beach at Mile 8 to avoid inspection by the authorities.

The Marine Regulations[70] makes provision for harvesting seals. Seals are harvested at Atlas Bay and Wolf Bay (southern planning area), Cape Cross (central planning area) and Torra Bay (northern planning area). Seal processing factories are located in Henties Bay and Lüderitz.

An important objective of NDP5 is to improve value addition in natural resources, including fish processing. In order to ensure such value addition, and economies of scale for fish processing, more space may need to be allocated in Walvis Bay to accommodate facilities.

SOCIO-ECONOMIC IMPORTANCE

The fisheries sector is the third largest income earner after mining and tourism, and contributes about 15% of total exports. The annual marine landings of about 550,000 MTs are valued at an average of N$ 7 billion (about 800 million US$) and constitute about 4.5% of the national GDP[71]. The majority of fish is exported[72].

About 14,000 people are directly employed in the fishing sector, while about three times as many are indirectly employed in supporting industries like stevedoring services, fishery-related supplies and logistics. As many of the employees in the fishing industry stem from the northern regions, the economic importance of the fishing industry reaches far beyond the Erongo and !Karas regions, where the industry is located, as workers send money to their families residing in their home regions. In addition to direct taxes, indirect taxes paid by the fishing industry through, for example, VAT and municipal taxes, contribute vastly to the regional and national economy.

Fisheries also constitute a vital component of domestic food security by providing a source of protein[73].

ENVIRONMENTAL IMPACT

It is inevitable that fishing has an impact on the marine environment. Due to the widespread nature of fishing in the Namibian ocean space, fishing potentially has a significant environmental impact. However, the degree of environmental impact depends on the regulation of the sector, type of fishing gear used, and the nature and robustness of species and habitats exposed to fishing. Restrictions of bottom trawling in waters shallower than 200m (and deeper in some areas in the south) minimize impacts on bottom habitats. The heaviest impact on bottom habitats can be expected on the shelf edge as most bottom trawling activities are concentrated in this area. This correlates closely with the findings of a BCC project, which highlighted both the intensity of use of benthic habitats on the shelf edge, as well as the resultant dominance of poor and fair habitat condition in these areas.[74]

The most obvious impact is the direct impact on target species, reducing their biomass and therefore food sources of top predators. This can potentially impact on other species by disturbing the balance of processes in the food web, and hamper healthy ecosystem functioning – as seen with the decline in the sardine population with corresponding impacts on the ecosystem.[75]

Fishing also has impacts on non-target species through bycatch with species being caught unintentionally; the most common bycatch species include sole, squids, panga/dentex, angelfish, tunas, sharks, mackerel, anchovy, red eye kingklip and jacopever. Unintentional impacts on other species can be caused by fishing gear, including lost gear and ghost nets; the most common consequences of fishing include bird deaths[76] and the death of other species such as turtles or sea mammals that become entangled in the nets. Mitigation measures to reduce incidental by-catch of seabirds in the hake demersal trawl and longline vessels have been implemented in 2015.[77]

Fishing using mobile gear also has impacts on habitats, most notably sea floor (benthic) habitats on account of bottom trawling. This is a particular issue in or near the so called EBSAs (Ecologically or Biologically Significant areas) and Ecological Support Areas (ESAs)[78] with the impact depending on the intensity of trawling.

The fishing industry also affects the nearshore environment and water quality as a result of organically polluted sea- and freshwater discharges from fish processing plants.[79]

LOOKING TO THE FUTURE

STRATEGIC OBJECTIVES

The strategic policy objectives for fishery are aimed towards sustainable management of the resource and increased value addition from the industry.

Namibia's fishery policy aims to achieve sustainable utilisation of fisheries and marine resources, and equitable distribution of their wealth while facilitating trade in fisheries. Controls are therefore established with respect to marine resources harvesting, processing and trade of fish[80].

Namibia's Vision 2030, as articulated in 2004 as the country's guiding development purpose, foresees sustainable yields reached and managed effectively to prevent overexploitation, improved understanding of the dynamics of the Benguela system, and strict pollution control leading to increased exportation of high value fish. Namibia's NBSAP2 supports this, stating that by 2022, "all living marine and aquatic resources are managed sustainably and guided by the ecosystem approach"[81]. This strategic initiative aims at introducing MSP for informed and coordinated decision-making on the sustainable use of marine resources.

NDP5 also sets out environmental goals, stating that "the fisheries stocks will be re-built (with a dedicated focus on sardine) in line with the relevant specific fisheries management plans to ensure sustainability of stocks in marine and freshwater fisheries"[82]. There are added economic goals focusing on Walvis Bay in particular: "By 2022, Namibia is the key fisheries and processing hub in the South West Atlantic Ocean through increased volume of fish handled, canned or processed in Walvis Bay cumulatively by 40%".[83] Walvis Bay will be developed as a key logistical, stevedoring, processing and marketing hub for fisheries in the South Atlantic Ocean. Exports to lucrative export destinations are to be enhanced by ensuring compliance to stringent sanitary and phytosanitary standards.

EXTERNAL PRESSURES ON THE SECTOR AND CONSTRAINTS

A range of external pressures affect the fisheries sector in Namibia both now and in future, some with direct and some with indirect spatial relevance. Pressures with potential direct spatial implications include climate change and other natural phenomena, and the resulting shifts or changes this may cause in the distribution of commercial species and habitats[84, 85].

Spatial pressure also results from the activities of other sectors, including geological resource exploration and mining, leading to permanent and temporal closure of fishing areas. Seismic exploration can lead to avoidance behaviour of tuna and subsequent unavailability of tuna to the fisheries fleet. Oil drilling activities and connecting pipelines can potentially lead to permanent closure of some fishing areas. Mining of industrial minerals (e.g. phosphates) will lead to areas being closed to the fishing industries.

Pressures with more indirect spatial effects include the growing economic pressure on the sector. Companies require a minimum amount of fish to process in order to remain economically viable, therefore putting pressure on resources with low abundance (e.g. sardine). Political pressure to develop the economy can exacerbate this pressure, although there is emphasis on value addition rather than increasing fishing efforts.

Other indirect pressures include overlapping and contradictory legislations and jurisdictions (e.g. seabed mining) and the lack of legislation on transportation of dangerous goods and chemicals, which in case of spillages could have impacts on sensitive ecological areas and with this, important fish habitats.

SOCIO-ECONOMIC TRENDS

Horse mackerel, monkfish and crab are currently fished at around maximum sustainable yield (MSY) level and can thus be described as stable. Potential limited growth can be expected for the hake fishery while the sardine fishery currently faces a three year moratorium. The number of boats is likely to reduce as older vessels will be replaced with modern, more efficient vessels, resulting in better catches (measured in catch per unit effort, CPUE) and the need for fewer vessels.

Revenue and employment in the horse mackerel sector is likely to increase with more local shore processing of the catch being anticipated, with possible additional factories. No more factories processing hake are anticipated to become operational, but an increase in the hake stock and subsequent increase in TAC can lead to more employment being created.

The moratorium on sardine can lead to a reduction in employment if compensation measures are not taken. Currently canning factories are importing sardine from Morocco for canning to stay in operation. Additional measure might include increased quotas of horse mackerel for canning.

Due to the very low stock size of orange roughy scientific surveys have been discontinued in 2007 and the fishery has been closed since 2008. From 2016 to 2018 annual scientific surveys have again been conducted. Despite these three scientific surveys, a full assessment could not be performed as it requires input data from both the scientific surveys and commercial fishing. The lack of fishery dependent data since 2008, and the data gap of eight years between 2007-2015 limits a credible assessment; hence no full assessment has been conducted in the last three years.

EXISTING AND POSSIBLE (SPATIAL) CONFLICTS

Key environmental requirements for the sector include access to the shelf area for trawling, sustainably managed stocks (e.g. by protecting spawning and nursery areas and habitats and feeding areas), and the preservation of orange roughy hotspots outside the shelf area. Migratory routes also need to be accounted for. Good overall ecosystem health is a key requirement including water quality.

THE FOLLOWING EXISTING AND POSSIBLE (SPATIAL) CONFLICTS THEREFORE OCCUR WITH THE FOLLOWING HUMAN USES:

- Seismic surveys and exploration may lead to the temporal exclusion of fishing in these areas and disturb fish species; and
- Exploitation of geological resources in key fishing or recruitment areas may lead to adverse effects on fish stocks (especially in terms of potential phosphate mining).
- Closure of key fishing areas for nature conservation purposes that have no multiple objectives and are inappropriately designed from a spatial perspective, serving only biodiversity conservation interests. In addition, the establishment of marine protected areas may cause displacement of fishing activity resulting in increased fishing pressure in other areas if not well designed.
- Recreational fishing based on tourism concessions and in associated locations along the coast that takes place in restricted (closed) coastal fishing areas;
- Pollution (irrespective of its source) and port development associated environmental impacts.
- Spatial conflicts on land include limited space for land-based facilities and processing areas for the industry, as well as limited suitable port facilities (jetties); and
- Lack of consultation and communication between sectors with an interest in the same area is a nonspatial conflict in that it leads to incoherent decision-making and associated inter-sectorial conflicts.

EXISTING AND POSSIBLE (SPATIAL) SYNERGIES

THE FOLLOWING EXISTING AND POSSIBLE SPATIAL SYNERGIES EXIST BETWEEN:

- Fisheries management and biodiversity conservation: well and appropriately designed risk aversion measures for biodiversity in the EBSAs and ESAs may contribute to maintaining a healthy marine environment, and ensuring conservation and sustainable use of habitats and species that are important both from a fisheries sector and biodiversity interest point of view.

- Recreational fisheries and tourism: maintaining and promoting a healthy marine environment enables and supports habitats and species that are targeted by recreational anglers, which is a prerequisite for both the tourism and recreational fisheries sector.

FIGURE 7:
FISHERIES PATROL VESSEL (© MFMR)

Non-spatial synergies potentially exist with many other sectors with regards to data collection and monitoring. Particular synergies with respect to monitoring control and surveillance exist with the MoDVA and MEFT. In addition, marine tourism and recreational fishing provides an opportunity for raising environmental awareness and understanding.

KEY ISSUES FOR MSP TO CONSIDER

THE FOLLOWING KEY ISSUES SHOULD BE CONSIDERED BY MSP FROM A FISHERIES POINT OF VIEW:

- The fishing industry needs continued access to the areas where the fish stocks are located that they are exploiting; and

- Key habitats and associated species for the fisheries sector (e.g. orange roughy hotspots and dispersal areas, spawning and nursery areas for all commercial species, feeding areas, and migratory routes for large pelagics) should be protected from adverse effects. The MSP process should therefore also examine in how far the identified EBSAs and ESAs with the associated biodiversity conservation interests can be aligned with fisheries management and integrated with other human uses in the wider surrounding area.

- MSP should also seek to contribute to good overall ecosystem health and coastal water quality, especially also to meet high phytosanitary standards for fish processing

4.2 DEFENCE

BRIEF DESCRIPTION AND DEFINITION

"We have a healthy maritime economy, which is vulnerable and requires protection. Taking this into consideration, this is why it is important to invest in our navy. If not, others can just come in and do what they want in our waters, international trade partners also find comfort in knowing that Namibia has a navy that protects their interests"

Rear Admiral Peter H Vilho, former Minister of Defence and Veteran Affairs, former Navy Commander of the Namibian Navy

The Navy provides the maritime component of the Namibian Defence Force (NDF). It is the principal seagoing agency and operates jointly with the Army and Air Force. The history of the Namibian Navy started in 1994, when the agreement on naval cooperation between the Federative Republic of Brazil and the Republic of Namibia was signed in support of the development of the Namibian Navy.

The Namibian Navy has made great strides to become a stronger and more effective force, gaining the ability to monitor and control its EEZ, as the country derives significant revenue from its natural marine living and non-living resources.

The mission of the Namibian Navy is to prepare for and, when so ordered, conduct naval operations in defence of the Republic of Namibia, its citizens and national interests; and to conduct operations other than war in support of national interests, regional and international peace and security.[86]

THE NAVY'S PRIMARY TASKS ARE:

- The defence of the territorial sea;
- Control of the maritime zones;
- Use of sea denial;
- Power projection over land; and
- Deterrence.

ITS SECONDARY OPERATIONAL TASKS ARE:

- Conducting of search and rescue to contribute to the safety of life at sea;
- Monitoring of shipping in the maritime zones with view to reducing the risk of pollution and preventing of the dumping of toxic wastes at sea;
- Preserving of maritime resources within the EEZ;
- Curbing of transnational crimes and drug and human trafficking over the ocean; and
- Combating of maritime terrorism and piracy.

Namibia's Navy seeks to guarantee the use of the sea – and its territorial waters in particular – for the benefit of the country. In addition, it seeks to allow for the passage of goods and people, for the exploitation of the resources of the maritime environment, and ultimately the safe passage of military forces.

FROM A NATIONAL SECURITY PERSPECTIVE, THREE STRATEGIC ELEMENTS REFLECT THE MAIN OBJECTIVES OF NAMIBIA'S MARITIME STRATEGY:

- Protecting basic maritime interests;
- Securing of a lifeline over the oceans; and
- Enhancing national prestige on the oceans.

In pursuance of these objectives, the Navy executes its mission through military, diplomatic, policing and benign options. These range from the possible destruction of enemy combat forces to the use of coercive diplomacy. The Navy is also a powerful instrument that can be used for enhancing international cooperation, conflict resolution and for providing a competitive edge to the country's maritime economic activity.

FIGURE 8:
NAVY OFFSHORE PATROL VESSEL (© MOD)

THE CURRENT SITUATION

LEGAL AND POLICY FRAMEWORK

The Ministry of Defence and Veteran Affairs (MoDVA) is mandated to provide political and administrative guidance in the development of a cost-effective, efficient, professional and highly mobile national defence system that safeguards Namibia`s national interests and contributes to national development and world peace.

The Defence Act (No. 1 of 2002), under section 2, makes provision for the composition and organization of the NDF's three Arms of Services namely, the Army, Air Force and Navy. The purpose of the NDF is "to defend the territorial integrity and national interests of Namibia" as stipulated in Chapter 15, Article 115 of the Namibian Constitution.

SPATIAL DISTRIBUTION OF THE RESOURCE/USE AND CURRENT UTILISATION

In terms of the Defence Policy, the Navy, in principle, uses all of the Namibian maritime zones to conduct naval operations in support of the NDF's mission, which is to defend the territorial integrity and national interests.

In peacetime, the Navy has the role of augmenting civil offshore patrol forces, particularly providing the means and the expertise to execute enforcement action effectively. Specific tasks include assisting civil authorities to combat illegal immigration, smuggling (of arms or drugs for example) and threats to the environment, as well as assisting the MFMR with the enforcement of the fisheries and marine resources protection regime.

THIS MEANS THE NAVY CARRIES OUT PATROLS IN CONDUCT OF:

- Surveillance and security of the country's entire coastline; and
- Search and rescue operations, including casualty evacuation.

IN CASE OF WAR, THE NAVY WOULD CARRY OUT THE FOLLOWING ACTIVITIES AT SEA:

- Naval combat engagements;
- Naval blockades; and
- Landward combat operations by maritime airborne and seaborne forces.

There are four military training areas in the entire Namibian EEZ, one ammunition dumping area (central planning area) and one naval base located in Walvis Bay (see map 23).

The Navy operates a fleet of vessels ranging from Riverine Patrol Boats, Inshore Patrol Boats, Offshore Patrol Vessel and Logistic Support Vessel. Through this fleet, the Navy is a small and highly mobile naval force, capable of conducting successful maritime operations.

THERE ARE TWO NAVAL PORTS:

A

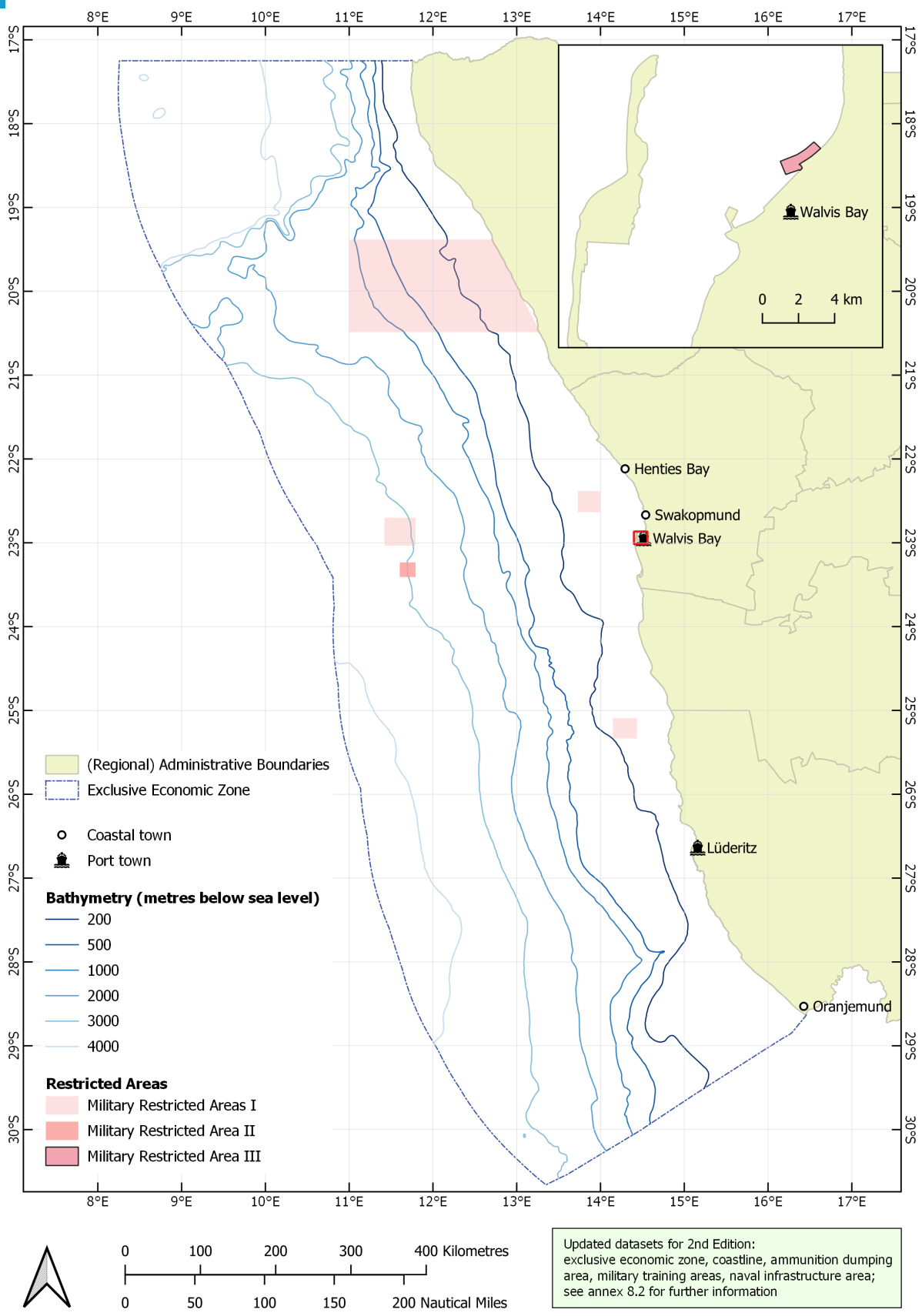
NAVAL BASE CAPT. (N) PN SACHARIA WALVIS BAY

Walvis Bay Naval jetty serves as the home port of all the major vessels. The current jetty is however very much confined and has no adequate space for expansion for future operations.

B

NAVAL CALLING STATION LÜDERITZ

Lüderitz serves as a Naval Calling Station for supplies and shelter to the vessels that find themselves in the southern part of the country. The current base is however not ideal for operations. Efforts are being made to acquire a suitable area for expansion.



Updated datasets for 2nd Edition:
exclusive economic zone, coastline, ammunition dumping area, military training areas, naval infrastructure area; see annex 8.2 for further information

MAP 23:

RESTRICTED AREAS FOR NAVAL DEFENCE (EEZ) (UPDATED FOR 2ND EDITION)

SOCIO-ECONOMIC IMPORTANCE

The Navy employs a highly-trained force of sailors and a Marine Corps unit.

The Navy also supports socio-economic development indirectly through supporting local municipalities and businesses, for example through the use of services provided by ports-based private industries e.g. for maintenance of vessels and equipment.

On the basis of its mandate and operations, the Navy enables socio-economic development by ensuring peace and stability for the economic use of the sea and its resources.

ENVIRONMENTAL IMPACTS

The main objective of defence is the protection of the country's territorial integrity and its national interests under the provisions of the constitution. The degree of protection is influenced by the country's national and foreign policies. The Defence Policy aims to pursue the policy objectives that include protection of the marine environment to the largest extent possible.

As a primary user of the ocean, the Navy needs dedicated and charted offshore areas in which to train and conduct exercises, to prepare for war, thwart possible terrorist activities, and prevent other threats against the country. Navy operations in the ocean are critical to maintaining operational readiness. In order to maintain proficiency and national security, there is also need to ensure safety and sustainability of the ocean as a vital resource of the country.

The Namibian Navy views the protection, conservation and ecologically sustainable use of the environment as a high priority and pursues linked policies. Environmental understanding is also critical to the success of naval operations. This capability also depends upon the ability to access and rapidly analyse environmental knowledge.

FIGURE 9:
NAVY OFFSHORE PATROL VESSEL (© MODVA)

Where possible the Navy will minimize the impact of its activities on the environment. Environmental damage could however be caused through the Navy's operations:

TABLE 4:
POSSIBLE ENVIRONMENTAL IMPACTS THROUGH NAVAL OPERATIONS [87]

PRESSURE THEME	PRESSURE	IMPACT
Pollution and other chemical pressures	Introduction of non-synthetic substances and compounds	Release of oil and other hazardous substances (from accidental and incidental discharge of cargo or fuel, munitions, discharges from port facilities and shipbuilding/ship repair yards) may result in contamination of water and sediments and ecological impacts on wildlife, Mari culture and tourism.
	Introduction of radionuclides	Radionuclide contamination through ballast water
Other physical pressures	Litter	Ships rarely dispose of fired shell cases at sea due to tight regulations.
	Noise impacts	Noise from construction, ship movements, sonar activity and use of live explosives for training purposes. Use of live explosives and other exclusive activities may restrict other users which could have an overall positive effect on an area. Noise from training exercises might negatively impact wildlife, especially marine mammals.
Habitat changes	Habitat damage, loss and / or abrasion	Infrastructure associated with military activity, such as ports, replaces natural coastline (habitat loss) with man-made structures. Capital and maintenance dredging associated with shipping can damage marine benthic habitats.
Biological pressures	Microbial Pathogens	Release of sewage introduces pathogens and nutrients into the water, affecting water quality and potentially passing on diseases to humans through contact with contaminated water or consumption of contaminated shellfish.
	Introduction or spread of non-native species	Non-native species may be translocated or spread in ballast water and as fouling organisms on ships' hulls. These may cause habitat modification and competition with native species.

Peace and stability are essential pre-requisites for socio-economic progress and prosperity. This means however that national security interests will always – if need be and decisions have to be made in the interest of peace and security of the Republic – supersede environmental protection.

LOOKING TO THE FUTURE

STRATEGIC POLICY OBJECTIVES

Namibia, like any other maritime nation, has a maritime-dependent economy and significant interests which must be defended and protected through the formation and maintenance of a flexible and credible maritime capability both nearshore close to the coast and offshore in the deep ocean. An effective Maritime Domain Awareness (MDA) is also critical.

The Constitution of Namibia mandates the NDF to protect and defend the Republic, its sovereignty, territorial integrity, national interests and people – in accordance with other Constitutional principles. The Navy therefore has the responsibility to safeguard the Namibian maritime zones and all natural resources within such zones.

Namibia's Navy has a strong maritime capability and an enduring presence in Namibia's areas of maritime interest. The creation of the conditions needed for economic growth, investment and job creation depend on the Government ensuring a safe, secure and protected marine environment. This means Namibia must have in place effective and efficient security and surveillance arrangements and quality maritime regulatory regimes that meet best practice standards within which the country's ocean wealth can prosper.

In order to ensure a safe environment for investors and meet our international obligations, Namibia must continually improve national capabilities in the area of security, safety, surveillance and eco-protection of the maritime domain. This will be achieved through effective enforcement of maritime safety standards, improved information sharing and increased cooperation and innovation among all actors, at both national and international level, together with the effective deployment of air and sea surveillance, monitoring and enforcement capacity. In turn, this requires the need for training space in the sea to be able to effectively and efficiently carry out the above functions.

The Navy is in the process of finalising its Maritime Security Strategy (MSS) which is derived from the combination of the country's national security, military strategies and the MSS of the Southern Africa Development Community (SADC) adopted in 2011. The Namibian Navy has adopted and assumed the responsibility and accountability for the implementation of the MSS within the NDF.

THE FOLLOWING NAVAL TASKS AND RELATED STRATEGIC OBJECTIVES ARE ENHANCED THROUGH A COMPREHENSIVE MDA CENTRE THAT IS FULLY OPERATIONAL:

- Protection of maritime resources and the marine environment;
- Co-ordination of search and rescue efforts;
- Comprehensive MDA;
- Intelligence data for Naval Control and Guidance of Shipping (NCAGS); and
- Crime Prevention at Sea.

When the Navy deploys its vessels at sea to conduct training or operations, no intentional damage to the country's marine environment will be done.

EXTERNAL PRESSURES AND/OR CONSTRAINTS

THE EXTERNAL PRESSURES AND/OR CONSTRAINTS THE NAVY IS CURRENTLY FACING ARE:

- Budget constraints and related limitations, for example, in terms of the Navy's capability to fulfil its mandate and acquire new equipment; and

- Space restrictions on land for expansion of land-based infrastructure in both Namibian ports (Lüderitz and Walvis Bay).

SOCIO-ECONOMIC TRENDS

The geo-strategic position Namibia occupies as a country and its diverse living and non-living marine resources are primary factors for its growing economy. The safety and economic interests of Namibia and its trade partners critically depend upon the unimpeded trade and commerce of the offerings of the Atlantic Ocean.

Namibia's national interests are therefore tied to a secure maritime environment. This places huge responsibilities on the Namibian Navy. Intensifying maritime-based trade also implies greater responsibility for the Navy to ensure maritime security and safety at sea. This also comes with the need to intensify the Navy's cooperation with other mandated entities to carry out joint monitoring, compliance and enforcement (e.g. with fisheries inspectors).

The enhanced capability of the naval forces thus required means that the Navy will expand eventually, even despite budget constraints, both in Walvis Bay and Lüderitz: more vessels, more sailors and marines, and more land-based infrastructure will be the result. This requires both more space within the ports limits to accommodate the Navy and at land for the Navy's bases as well as associated housing.

The complexity and extent of the vast country's maritime area creates security threats from terrorists and criminals for Namibia. The country's maritime area is easily accessible and largely unregulated, which allows criminals to carry out illicit activities. These activities include (possible) piracy, human trafficking, weapons proliferation, drugs smuggling, environmental destruction, and illegal, unreported and unregulated (IUU) fishing.

As a member of the SADC, Namibia's maritime security and related interests include effective cooperation arrangements with other member states for the effective management of the SADC maritime domain, ocean management and good order at sea. However, the recent re-emergence of piracy – that is not reported in Namibian jurisdictions but has taken place off Angola and Mozambique – is impacting negatively on SADC's maritime interests and economic prosperity. Namibia therefore needs to be able to provide military assistance to its SADC partners if required.

EXISTING (AND POSSIBLE) SPATIAL CONFLICTS

A possible conflict may – in theory – occur in the case of spatial overlap with other use(r)s during training in (envisaged) military exercise areas.

Due to the foreseen future spatial demand within the ports limits and at land for logistical infrastructure, the construction of the new oil terminal north of Walvis Bay Port poses a challenge for an expanding Navy force.

EXISTING (AND POSSIBLE) SPATIAL SYNERGIES

With the intended designation of military training areas, a possible synergy may, in theory, exist with environmental protection in the case where other human uses in military exercise areas are limited – with related positive effects on the marine biodiversity.

Non-spatial synergies exist in that the Navy seeks to collaborate and intensify its cooperation with other sector ministries and agencies (such as the Directorate of Maritime Affairs, DMA) in protecting the marine resources at sea, to prevent and minimize the impacts of possible oil spills and also in providing the necessary security for the protection of the territorial waters to enable maritime security and safety at sea for a stable socio-economic context fostering growth and peace. This includes cooperation with other sector ministries to monitor and observe the activities at sea (e.g. illegal activities like IUU fishing, illegal discharge of oil at sea).

In order to be prepared for national defence, the Navy places significant value on the collection and analysis of data to maximise situational awareness and ensure safety and operational effectiveness. This could possibly be useful for other sectors as well. Through such comprehensive awareness on all offshore activities, the Navy also advances national security, contributes to socio-economic development and ensuring conservation and sustainable use of the country's resources and biodiversity. Stakeholders could therefore advise the Navy of any sensitive sea areas (be it for social, economic, scientific, natural or other reasons) to include in this respect.

KEY ISSUES FOR MSP TO CONSIDER

THE NAVY REQUIRES THE MSP PROCESS TO ADDRESS THE FOLLOWING ISSUES:

- The Navy seeks to continue to support the seas delivering military and security objectives, maintaining freedom of movement for the navy and other sea users;
- The Navy requires the dedication of exclusive areas for training (during particular times of the year), which currently do not exist; and
- The Navy also requires flexibility and the mandate to close areas if and when needed for its operations.

4.3 ENVIRONMENTAL PROTECTION

BRIEF DESCRIPTION AND DEFINITION

Namibia is endowed with a rich and unique diversity of marine and coastal species and ecosystems. These natural resources and the associated biological diversity are the backbone of the Namibian economy and many of the sectors such as tourism, fisheries and mining.

It is against this background that the Government of the Republic of Namibia, at independence in 1990, recognized the importance of the environment, by including the protection of natural resources in its Constitution under Article 95. The article requires the state to actively promote and maintain the welfare of the people through "maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future generations". Conservation and sustainable use measures cover species and site/habitat protection measures.

The conservation and sustainable use of biological diversity supports a variety of human uses in the ocean and associated industries. It contributes to the well-being of Namibians through sustaining the provision of services provided by the marine, coastal and terrestrial ecosystems.

FIGURE 10:
FEEDING CAPE CORMORANTS (© JESSICA KEMPER)

THE CURRENT SITUATION

LEGAL AND POLICY FRAMEWORK

Article 95 of the Constitution provides the primary legal basis for the implementation of conservation and sustainable use measures. This constitutional mandate has also shaped the mission of the Ministry of Environment, Forestry and Tourism (MEFT), which is to promote biodiversity conservation in Namibia, through the sustainable utilization of natural resources and tourism development for the maximum social and economic benefit of the Namibian citizens.

RELEVANT LEGISLATION AND POLICIES FOR THE MEFT RELATED TO ENVIRONMENTAL PROTECTION INCLUDE BUT ARE NOT LIMITED TO:

- The Environmental Management Act (No. 7 of 2007);
- The Nature Conservation Amendment Act (No. 3 of 2017);
- The Pollution Control and Waste Management Bill;
- Protected Areas and Wildlife Management Bill;
- The Forest Act (No. 12 of 2001).

Namibia's NDP5 refers to conservation and sustainable use of natural resources as a key development priority. The focus here is on ensuring that biodiversity and natural resources continues to support socio-economic development through the maintenance of the provision of services.

A National Policy on Coastal Management for Namibia was approved by Cabinet in 2012. This policy aims to institutionalise and implement an integrated approach to coastal management in Namibia. An Integrated Coastal Management (ICM) Bill has been developed and is with the Ministry of Justice for further consideration.

The NBSAP2 aims for the implementation of MSP and the description and safeguarding of EBSAs to improve conservation and sustainable use of the marine environment. This is in line with the Agenda 2030 and the SDG 14 on life below water.[88]

Other related and relevant environmental legislation and policies include but are not limited to:

- Marine Resources Act (No. 27 of 2000) and its amendment (Act No. 9 of 2015);
- National Plan of Action for the Protection of Seabirds.

Furthermore, Namibia ratified the three Rio Conventions, namely the CBD, the United Nations Convention to Combat Desertification (UNCCD) and the United Nations Framework Convention on Climate Change (UNFCCC). MEFT is the focal point to the Rio Conventions and is mandated to implement and coordinate the work of the conventions in Namibia.

THE MEFT CONSISTS OF FOUR DEPARTMENTS, EACH OF WHICH HAS ITS OWN OBJECTIVES TOWARDS THE CONSERVATION OF THE BIOLOGICAL DIVERSITY:

1. Department of Environmental Affairs (DEA)
2. Department of Tourism, Planning and Administration (DTPA)
3. Department of Natural Resources Management (DNRM)
4. Department of Forestry

SPATIAL DISTRIBUTION OF THE RESOURCE/ACTIVITY AND CURRENT UTILISATION

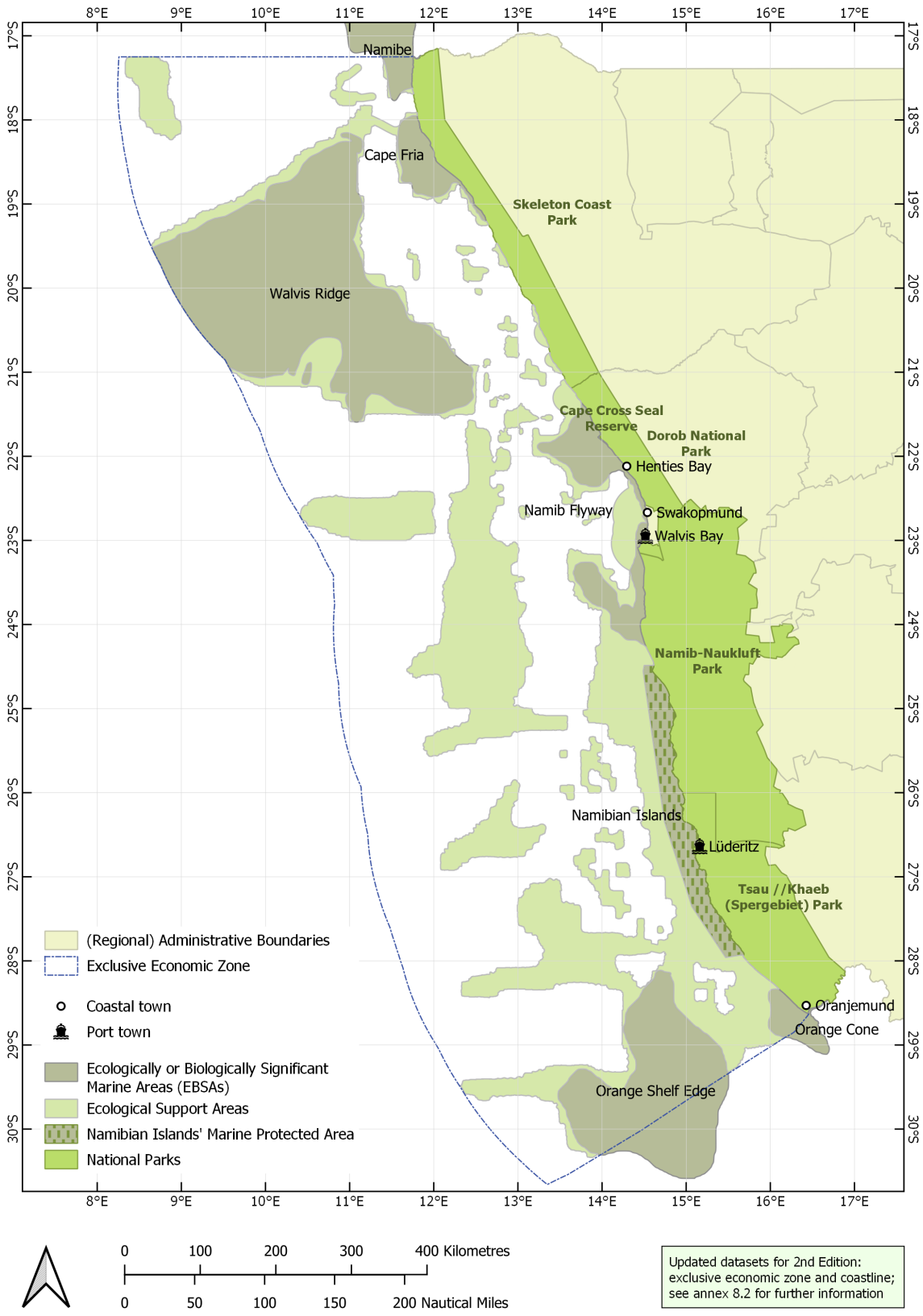
Key areas have been identified by the Government that require and are aimed at the application of site/habitat conservation measures to achieve biodiversity objectives and associated benefits, in line with the aforementioned legal and policy framework.

Seven marine areas in the Namibian ocean space have been identified as high priority areas for conservation and sustainable use (map 24). These areas are special places that have features related to one or more of the following seven scientific CBD EBSA criteria:[89]

TABLE 5:
THE SEVEN SCIENTIFIC CRITERIA FOR THE DESCRIPTION OF ECOLOGICALLY OR BIOLOGICALLY SIGNIFICANT MARINE AREAS (EBSAs)

CRITERIA	DEFINITION
Uniqueness or rarity	Area contains either (i) unique, rare or endemic species, populations or communities; and/or (ii) unique rare or distinct habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features
Special importance of life history stages of species	Areas that are required for a population to survive and thrive
Importance for threatened, endangered or declining species and/or habitats	Area containing habitat for the survival and recovery of endangered, threatened, declining species, or area with significant assemblages of such species
Vulnerability, fragility, sensitivity or slow recovery	Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery
Biological productivity	Area containing species, populations or communities with comparatively higher natural biological productivity
Biological diversity	Area containing comparatively higher diversity of ecosystems,habitats, communities, or species, or higher genetic diversity
Naturalness	Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation

In addition to EBSAs, Ecological Support Areas (ESAs) have also been identified and reflect secondary priority conservation areas. Although these areas do not meet the EBSA criteria they are important ecological areas with special attributes that support a healthy and functioning marine ecosystem.



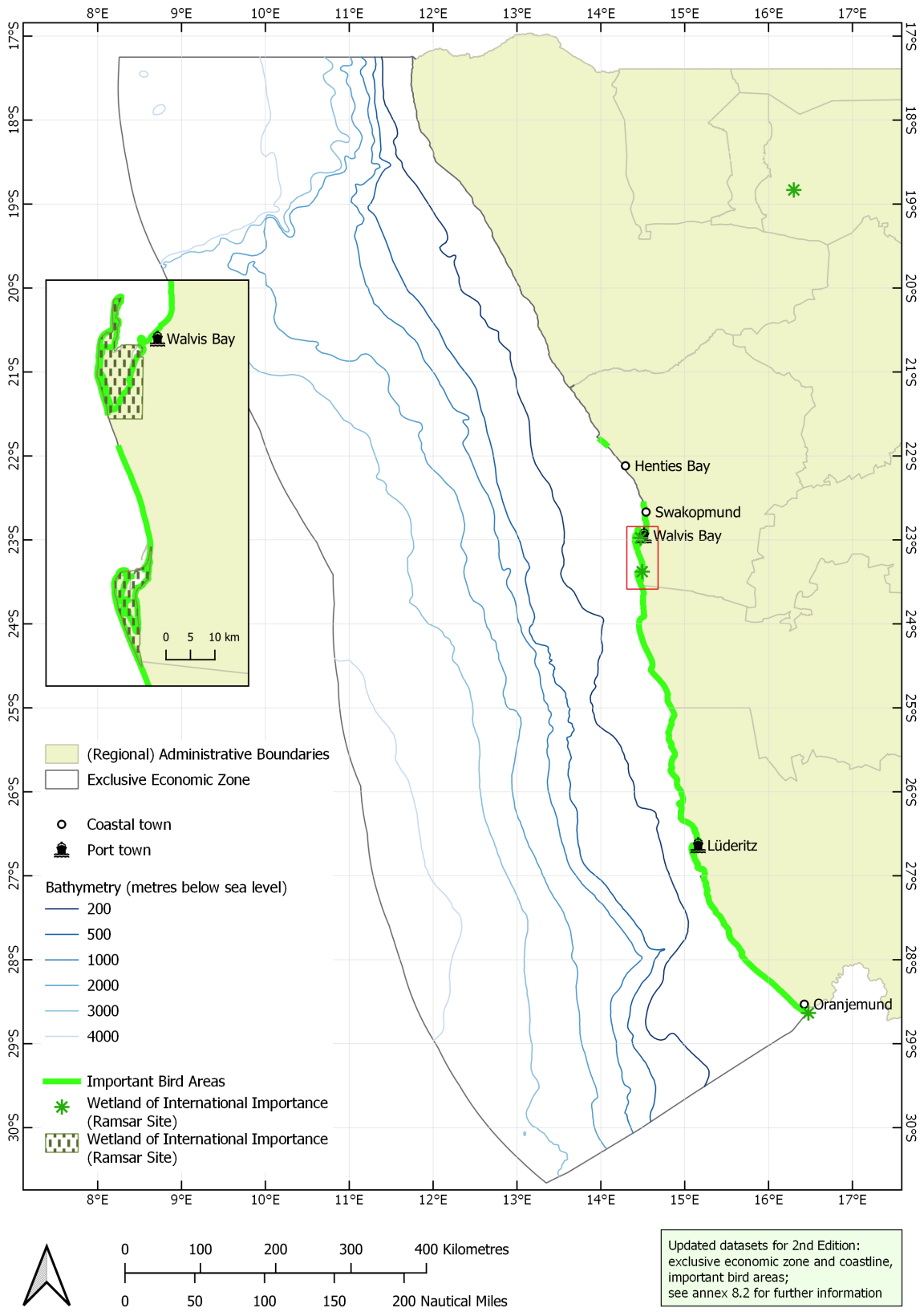
MAP 24:

THE EBSAS, THE ESAS, THE NIMPA AND THE COASTAL TERRESTRIAL NATIONAL PARKS (EEZ) (UPDATED FOR 2ND EDITION)

The coastal and inshore zone up to 1km inland shows important ecological connections with the marine environment.[90] For example abiotic connections such as coastal fog, wind speed, temperature and the influence of sea spray sustain ecological processes that ensure the survival of a unique set of desert-adapted organisms. Throughout the entire coastline, important bird sites and seal colonies exist (see map 25).

FIGURE 11:

MIGRATING TERNS IN THE NAMIB FLYWAY (© JESSICA KEMPER)



MAP 25:

IMPORTANT BIRD AREAS AND RAMSAR SITES (EEZ) (UPDATED FOR 2ND EDITION)

The NIMPA extends alongshore about 400km from Meob Bay to Chameis Bay and, on average, 30km offshore from the high-water mark (map 24). It is located between the latitudes of 24°S and 28°S, within the national jurisdiction of Namibia. NIMPA was gazetted in 2009 and covers nearly 1 million hectares of coastal waters that encompass all the natural seabird breeding islands in Namibia, some key seabird foraging areas, and protects spawning and nursery grounds of certain fish stocks and other marine resources (a key component for fish stock recovery). Cape fur seals, southern right whales, and Heaviside's dolphins are known to breed in the NIMPA and other cetaceans like killer whales, humpback whales, bottlenose dolphins, dusky dolphins and southern right whales transit through the NIMPA.[91]

The entire coastline, excluding municipal townlands and village councils, from the Orange River to the Kunene River is managed as a protected area. There are four national parks extending inland from the low water mark to between 35 and 200km from the coastline: the Tsau//Khaeb Park, the Namib Naukluft Park, the Dorob National Park and the Skeleton Coast Park (map 24). A variety of management categories classify the protected areas according to their management objectives. A zonation regime is applied to manage and sustainably use the matrix of different coastal habitats.[92] This includes strict nature conservation or tourism areas. Regular patrols along the coastline to monitor compliance to permit conditions are conducted. The sand dunes along the coast of the Namib Naukluft Park are part of the Namib Sand Sea UNESCO World Heritage site.

SOCIO-ECONOMIC IMPORTANCE

OCEANS ARE FUNDAMENTAL FOR HUMAN WELL-BEING AND PROVIDE VALUABLE ECOSYSTEM SERVICES. THESE SERVICES ARE THE BENEFITS NATURAL ECOSYSTEMS PROVIDE TO PEOPLE. ECOSYSTEM SERVICES ARE GROUPED INTO FOUR BROAD CATEGORIES[93]:

- Supporting services are those that make it possible for the ecosystems to provide services and which underpin the different benefits provided (for example: primary production)
- Provisioning services are those that provide tangible, harvestable goods (for example: fish, shellfish and seaweed for food);
- Regulating services are the benefits ecosystems provide in regulating our environment (for example: coastal protection or climate regulation); and
- Cultural services are the many non-material and intangible benefits derived from nature (for example: spiritual and recreational benefits).

Namibia's highly productive and diverse marine environment provides a multitude of these benefits for the country. Natural resource-based sectors are among the largest contributors to GDP and they employ more than 30% of the country's workforce.[94] Yet, many of the values of the ocean cannot be valued in financial terms. An inventory undertaken by the MEFT of ecosystem services in 17 ecosystem zones in the country details the services each zone provides.[95] For the coastal and inshore ecosystems, the full suite of the above service categories are provided. The country's marine and coastal environment is a core component of the growing tourism sector.[96] Healthy marine ecosystems provide the fishing industry with valuable living marine resources.[97] There are various provisioning services such as mariculture products and guano for fertilizer production, as well as rich mineral deposits such as salt, gypsum, uranium, diamonds and phosphates.[98] Marine protected areas for biodiversity conservation, for example, can contribute to achieving fisheries management objectives at the same time, thereby sustaining commercial, recreational and subsistence fisheries resources.[99] In times of climate change, a healthy and clean marine environment is also a prerequisite to using sea water for desalination, turning it into the increasingly rare product of freshwater. Protecting areas can also be helpful in coping with climate change because protected areas keep natural resources healthy and productive so they can withstand the impacts of climate change and continue to provide the provisioning services required.[100]

ENVIRONMENTAL IMPACT

Implementation of conservation and sustainable use generally has positive environmental impacts in terms of biological diversity and ecosystem service provision. Species and site/habitat conservation measures must however be well designed, evidence-based and implemented in such a way as to avoid unintended consequences. For example, restriction of human activities in one area can lead to spatial displacement of certain environmental impacts (associated to the human use) to other locations.

LOOKING TO THE FUTURE

STRATEGIC OBJECTIVES

Conservation and sustainable use measures are guided by the following strategic objectives with direct spatial relevance:

NBSAP2 (2013 – 2022)

Target 10: By 2020, coastal and marine areas of particular importance to biodiversity and ecosystem services are identified and measures for their protection initiated.

This strategic initiative relates to the Aichi Biodiversity Target 11 of the CBD, which specifies that by 2020, "at least 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape". The aim is that EBSAs are identified and conservation measures in these areas enhanced, including through using the EBSAs to advance the establishment of an ecologically representative network of marine protected areas.

Target 5: By 2022, all living marine and aquatic resources are managed sustainably and guided by the ecosystem approach.

This strategic initiative aims at introducing MSP for informed and coordinated decision-making on the sustainable use of marine resources. It also contributes to target 10 above in terms of integrating marine protected areas into the wider seascape.

NDP5

The NDP5 advocates for the identification of the EBSAs to inform and strengthen MSP and with the aim of achieving the country's commitments under the CBD. This is in line with the above NBSAP2 strategic goals and the targets, the NDP5 intention to safeguard ecosystems and species and to use the potential of the country's biodiversity and natural resources to contribute to socio-economic development.

AGENDA 2030 AND SDG 14

SDG 14 on "life below water" provides the overarching framework for sustainable ocean development with the aim to conserve and sustainably use the oceans, seas and marine resources, linking to the aforementioned Aichi Biodiversity Target 11 and goals 5 and 10 of the NBSAP2.[101]

EXTERNAL PRESSURES AND/OR CONSTRAINTS

External pressures with potential direct spatial implications for the conservation and sustainable use of marine biodiversity include climate change as this may cause changes in the distribution of species and habitats.[102, 103]

FIGURE 12:
HEAVISIDE' S DOLPHINS (© SIMON ELWEN)

In general, the growth of the Namibian economy leads to increasing pressures through the confluence of human uses and related environmental and spatial impacts, such as in the context of fishing, mining or transport.[104] Overlapping and contradicting legislation and mandates, for example between the MEFT and the MFMR, non-compliance by marine users (e.g. illegal fishing), lack of enforcement capacities (e.g. to conduct regular patrols), or lack of coordination between the mandated government authorities for the various sectors (e.g. pro-active rather than reactive cooperation prior to planned projects) are all external pressures with more indirect spatial implications.

SOCIO-ECONOMIC TRENDS

Population growth, associated land- and marine-based pollution, coastal and port development in Walvis Bay and, generally, intensified human use of the ocean through a growing economy all potentially lead to negative impacts on marine biodiversity and natural resources, in particular where the diverse human impacts cumulate to impact harmfully on marine ecosystem health.[105] Loss of biodiversity and degrading functionality of the ocean are observed, with consequences for the provision of the necessary ecosystem services. Overfishing of sardines in Namibian waters with resulting impacts on other fish stocks and the ecosystem as a whole is an example.[106] This could increasingly threaten the ability of Namibia's marine ecosystem to benefit society.

The important role of the ocean in providing multiple benefits, its enabling function for sustainable development as well as its increasingly threatened ecosystem health status, are leading to growing political awareness and commitment for the conservation and sustainable use of the marine and coastal biodiversity. This is most prominently reflected at global level in the dedicated SDG 14 on the sustainable use of the world's oceans and seas of the Agenda 2030, and – in the context of Namibia – witnessed in related national targets, policies and legislation for the conservation and sustainable use of marine habitats and species. This trend is supported and accompanied by a growing interest and support for the conservation and sustainable use of the marine environment, and the implementation of species, site and wider sea conservation measures, both within civil society and academia.[107]

EXISTING AND POSSIBLE (SPATIAL) CONFLICTS

THE FOLLOWING EXISTING AND POTENTIAL SPATIAL CONFLICTS HAVE BEEN IDENTIFIED:[108]

- HABITATS AND SPECIES DISTURBANCE/DAMAGE THROUGH OTHER SECTORS USING THE SEA:
  - Fisheries (e.g. overfishing; illegal fishing in fishing sanctuaries; bycatch; and bottom trawling impacts on seafloor habitats);
  - Geological resource mapping and exploitation (e.g. seismic surveys that alter normal marine mammal behaviour; exploitation of diamonds and phosphate that have potential negative impacts on seafloor habitats, including the installation of and impacts caused by associated land-based infrastructure and processing plants);
  - Maritime transport (e.g. underwater noise and ship-based pollution, including the release of untreated ballast water into the sea);
  - Defence (e.g. underwater noise caused by sonar; and pollution); and
  - Marine tourism (e.g. disturbance of the natural behaviour of cetaceans, waste (mainly litter) from recreational boats and land-based leisure activities).

- HABITATS AND SPECIES DISTURBANCE/DAMAGE THROUGH COASTAL AND PORT INFRASTRUCTURE DEVELOPMENT AS FOLLOWS:
  - Development of the Walvis Bay port and associated dredging and underwater noise;
  - Municipal developments close to the shoreline that disturb both sea and shore birds in one of Namibia's
  - Important Bird Areas (beach between Swakopmund and Walvis Bay, which is also part of the Namib Flyway EBSA);
  - Future conflicts may also arise with intensified coastal development that is encroaching into protected areas along the coast; and
  - Desalination brine effluent.

Lack of consultation and communication between the relevant sectors is a non-spatial conflict that has already lead to incoherent decision-making and associated inter-sectorial conflicts (e.g. phosphate mining).

EXISTING AND POSSIBLE (SPATIAL) SYNERGIES

THE FOLLOWING EXISTING AND POTENTIAL SPATIAL SYNERGIES HAVE BEEN IDENTIFIED:[109]

- Conservation and sustainable use of habitats and species help maintain a healthy environment and are prerequisites for the sustainable development of the nature-based marine tourism industry.

- Fisheries management and biodiversity conservation have common goals of sustaining habitats and resources. For fisheries management the priorities are typically sustainable human use and food security while for environmental management the priorities are maintenance of biodiversity and ecosystem processes that underpin natural resource productivity. Enhanced risk aversion of harmful human uses for biodiversity in the EBSAs, for example through the designation as marine protected areas with multiple objectives, can therefore serve both the interests of fisheries management and biodiversity conservation if well and appropriately designed.[110] A well-managed and sustainable fisheries management regime will also provide conservation benefits in general.

- The use of areas for naval defence training may have indirect positive effects on biodiversity through access and use restrictions.

- Access restrictions related to areas explored and eventually exploited for mineral resources may also have indirect positive effects on certain species if the mining activity is well-managed and environmental impacts monitored, evaluated and reduced as much as possible

- Salt mining activities in Swakopmund and Walvis Bay provide extra habitat for both sea and shore birds which attracts the tourists.

NON-SPATIAL SYNERGIES INCLUDE:

- Opportunities for enhanced environmental monitoring (including for marine pollution reporting and control) and research through inter-ministerial (e.g. with MME, MoDVA, MAWLR and MFMR) and private sector cooperation (e.g. with tourism operators);

- Joint patrolling and law enforcement operations in cooperation with other relevant ministries could be strengthened;

- The processes for the evaluation of Environmental Impact and Strategic Environmental Assessments (EIA and SEA) could be improved through re-enforced inter-ministerial cooperation;

- The covering of propellers to guard against ship strikes with cetaceans would have a positive impact on these species; and

- Increasing the existing efforts to reduce seabird bycatch.

KEY ISSUES FOR MSP TO CONSIDER

THE ENVIRONMENTAL PROTECTION INTEREST AND USE REQUIRES THE MSP PROCESS TO CONSIDER AND SOLVE THE FOLLOWING ISSUES:[111]

- Designation of EBSAs as marine protected areas, where appropriate, through inter-sectoral and interministerial cooperation (appropriately designed to serve both the interests of fisheries management and biodiversity conservation, and fully integrated in terms of objectives and management strategies for sustainable use and conservation of the ocean);
- Implementation of enhanced risk aversion measures in the management of human uses in all other EBSAs not designated as marine protected areas;
- Agreeing the spatial extent of the no-go-areas for the marine tourism operators and ensure the enforcement of the agreed code of conduct for tourism operators;
- Establish effective links between MSP and wider marine management approaches (e.g. ICM) into a coherent environmental management framework; and
- Establish an inter-ministerial committee to oversee the issuing of marine licences to be more effective and pragmatic as per the forthcoming agreed Marine Spatial Plan.

4.4 GEOLOGICAL RESOURCE MAPPING AND EXPLOITATION

BRIEF DESCRIPTION AND DEFINITION

Namibia is endowed with rich geological resources, including a wide range of minerals and hydrocarbons. The mining industry has been the backbone of Namibia's economy since the turn of the last century. The process of mineral exploration results in finding and mapping concentrations of minerals that would merit commercial exploitation through physical extraction.

Mined diamonds are the largest earner of foreign exchange. While Namibia is only a medium-sized producer, it has the highest average carat value output in the world. Since onshore diamond reserves are becoming depleted, diamond-mining activities are increasingly moving offshore.[112] The Namdeb Diamond Corporation is involved in onshore mining operations while DeBeers Marine mines for diamonds offshore. Other major marine diamond companies are Ocean Diamond Mining and Diamond Fields Namibia.

Namibia also has uranium, base metals such as copper, lead, zinc, magnesium, cadmium, arsenic, pyrites, silver and gold, lithium minerals (fluorspar, salts, wollatonite), dimension stone (granite, marble, blue sodalite) and many semi-precious stones. In the marine environment, phosphates are important mineable minerals.[113]

FIGURE 13:
DIAMOND MINING VESSEL (© JESSICA KEMPER)

The Government has created a modern and enabling legislative, fiscal and institutional environment in which exploration and mining companies can operate. It regulates the allocation of licences for prospecting and mining activities, and has a strategy in place to address the environmental implications of such operations.[114]

The energy sector plays a vital role in Namibia's economy, as the various sectors – agriculture, mining, fishing, tourism, transport and communication – are largely dependent on petroleum fuel for transporting goods and services. Energy needs are expected to grow, not least as a result of a rural electrification programme to provide electricity to the rural communities.[115]

Renewable energies are increasingly being promoted in Namibia in order to achieve increased self-sufficiency, security of supply and sustainability in the electricity sector, although institutional and development challenges still need to be overcome.[116] Currently there are no plans to develop renewable energies offshore, although this may be an option in the future.

Opportunities for hydrocarbon exploration exist on- and offshore. The Kudu Gas Field was discovered in 1973 off the Orange River in the southern offshore area about 170km from Oranjemund (map 30). Production was scheduled to start by mid-2005, however due to economic and strategic decisions production has been shifted through time to allow for suitable production timing. The possibility currently under consideration is to have the natural gas produced feeding a power station in Oranjemund to generate electricity for the local and international market.[117]

The exploration for oil and gas on the Namibian continental shelf is an ongoing activity. Namibia constantly tries to enhance its geological understanding through an improvement in geophysical data acquisition of two-and three-dimensional seismic data in the offshore licence areas. The interpretation of a combination of these data together with other information available has enabled a number of prospects and leads to be mapped, and made available a number of drillable targets. Through the exploratory drillings, a number of these prospects will be tested to see if the discovery of commercial volumes of hydrocarbons can be attained. As currently, Namibia has no oil and gas producing fields; it is due to this factor that the country has not developed refining capacity to refine crude oil. All petroleum products consumed in the country are mainly imported from South Africa.

FIGURE 14:
WALVIS BAY SALT WORKS (© NACOMA)

All development within the energy sector will be carried out according to Namibia's Energy White Paper, which encourages private-sector participation, security of supply, development and growth, and sustainability.

Salt mining occurs in Walvis Bay, Swakopmund and Cape Cross. Sea water is pumped into evaporation pans in Walvis Bay and Swakopmund. In Walvis Bay there is a salt refinery. Rock salt is mined in Cape Cross in the salt pans for local use.

THE CURRENT SITUATION

LEGAL AND POLICY FRAMEWORK

THE MINERALS, PETROLEUM AND ENERGY SECTORS OF NAMIBIA ARE ADMINISTERED AND REGULATED BY THE GOVERNMENT THROUGH THE MINISTRY OF MINES AND ENERGY (MME) UNDER THE FOLLOWING LEGISLATIVE AND POLICY FRAMEWORKS:

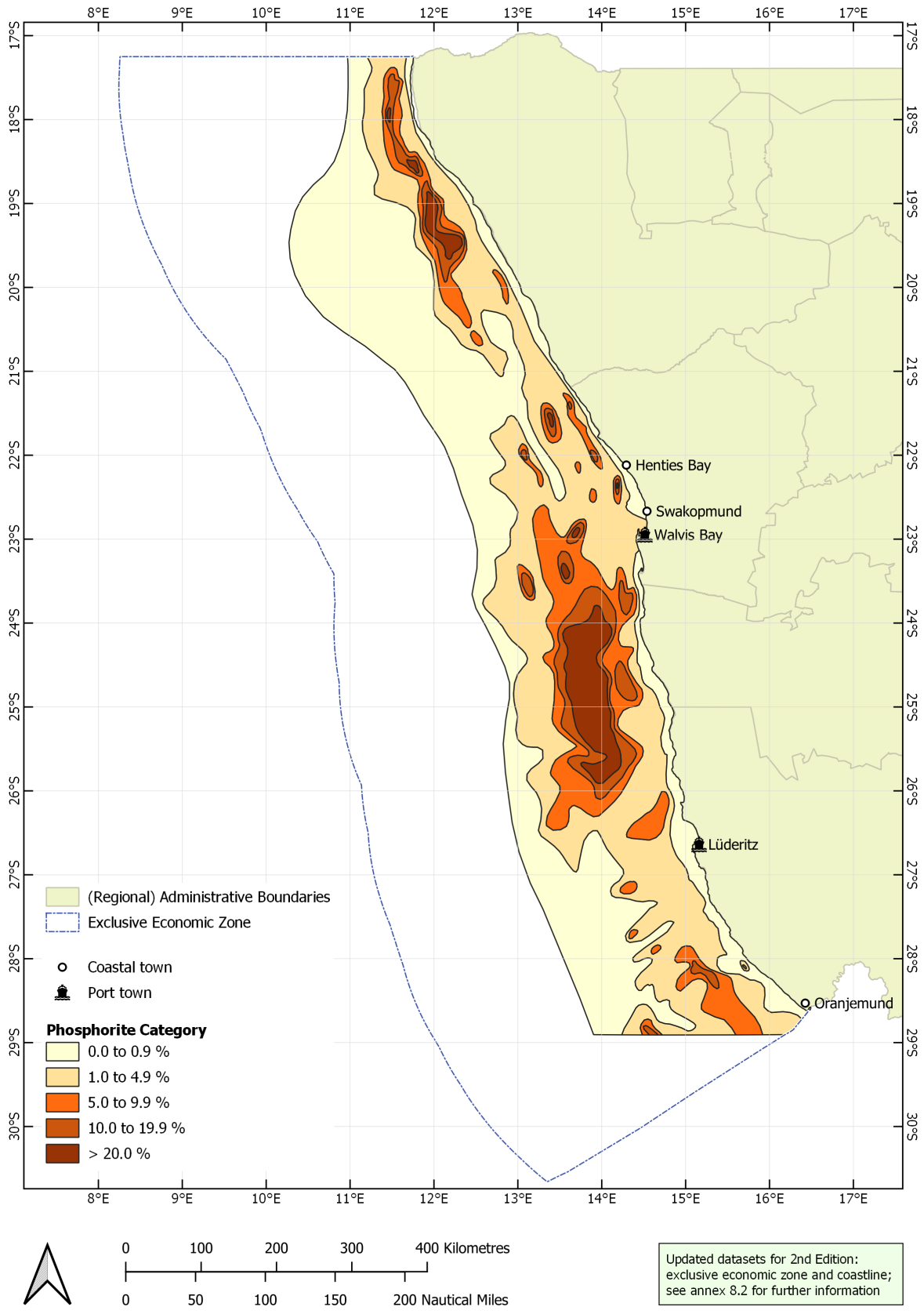
- The Minerals (Prospecting and Mining) Act (No. 33 of 1992) provides for the reconnaissance, prospecting and mining for, and disposal of, and the exercise of control over minerals in Namibia.
- The Diamond Act (No. 13 of 1999), on the other hand, provides for the implementation of control measures in respect of the possession, purchase, sale, processing, and the importation and exportation of diamonds.
- The Draft Minerals Policy will ensure the development of the mining industry through creating an environment that attracts both foreign and local investment in mining, thereby ensuring that the country benefits from its mineral resources.
- The Petroleum Act (No. 2 of 1991) provides for the exploration and production as well as the administration, regulation, promotion and control of upstream petroleum resources.
- The Petroleum Product and Energy Act (No. 13 of 1990, and its amendments and Petroleum Regulations, 2000) regulates the petroleum products supply and distributions in the country.
- The White Paper on Energy Policy (1998) primarily aims to achieve security of energy supply, social enhancement, effective governance, investment and growth, economic competitiveness, economic efficiency and sustainability.

Namibia's NDP5 identifies mining as a key industry with a focus on value addition of mining exports and the growth of mining service providers.

This regulatory and policy framework provides clear guiding principles as well as regulations and rules that govern the exploration and exploitation including marketing of sustainable use of the non-living natural resources of Namibia. The jurisdictional area covers the Namibian land defined to include the sea and seabed within the territorial sea referred to in section 2 of the Act Establishing the Territorial Sea and Exclusive Economic Zone of Namibia (1990; as amended).

SPATIAL DISTRIBUTION OF THE RESOURCE/ACTIVITY AND CURRENT UTILISATION

The EEZ of Namibia hosts mineable deposits of diamonds and phosphates, with phosphate deposits known to occur south of Kunene river mouth in the north and between Swakopmund and Lüderitz (map 26). The exceptional biological productivity of the BCLME leads to the formation of biogenic sediments enriched in phosphorous content up to 23%.[118]



MAP 26:

KNOWN LOCATIONS OF PHOSPHATE DEPOSITS IN THE NAMIBIAN SEA (EEZ)

(UPDATED FOR 2ND EDITION)

Exploration and geoscientific research on the sea floor within the marine space is important not only for discovery and development of mineral resources but also serves as a crucial source of data and information necessary for understanding the earth system. A well-known example is the environmental data generated by De Beers Marine Namibia diamond mining operations south of Lüderitz. Over the years this has produced a significant amount of invaluable data used in the environmental studies of this particular area.

By means of geophysical methods, it is possible to investigate the resource potential of the subsoil beneath the seabed for several thousands of meters before drilling. The geophysical methods through which data of the seafloor is acquired, range from marine seismics, marine gravity, and magnetics to heat flow measurements. This leads to identification of areas that indicate mineral resource occurrences. Geological sampling through drilling, dredging or grabbing methods then enables extraction of seabed material (sediments and rocks) that are then examined for mineral potential. It is these geological examinations and analyses of sampled material that subsequently provide information on the subsurface mineral resource potential.

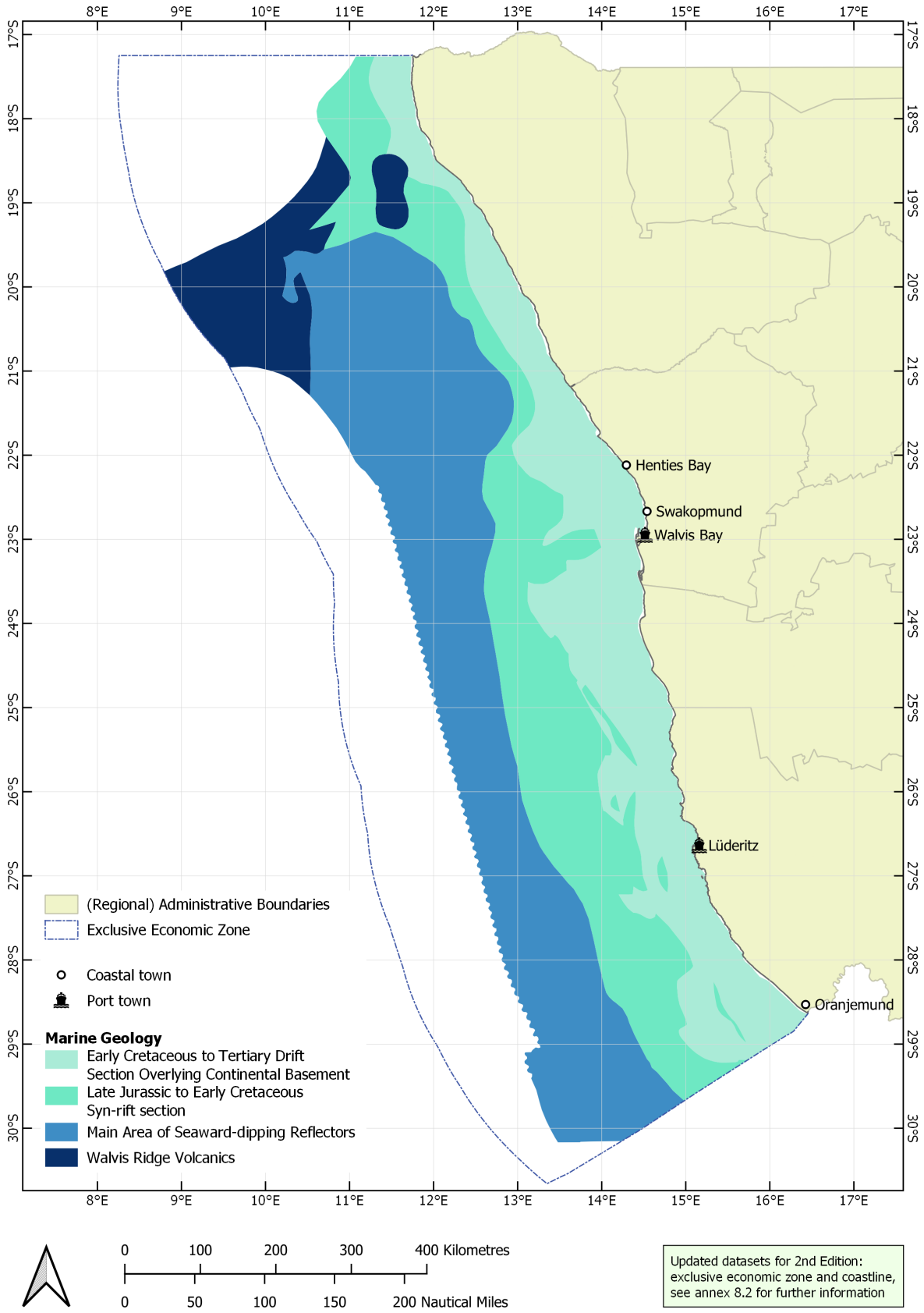
The exploration of areas through the above prospecting methods can generally take place anywhere. Some geophysical exploratory work has been conducted in areas such as the shelf edges, and transects running from east to west in Namibian ocean space, and data generated has contributed to finding known occurrences in the area to date. Extensive offshore diamond mining and exploration for both hydrocarbons and industrial minerals, particularly phosphate, has been active in Namibia's EEZ (map 31). It is however important to note that the geophysical surveys conducted so far do not cover all possible mineral occurrence, and also were most likely done at a regional scale. This means that further surveying works may still be carried out to better understand the resource potential and therefore increase confidence levels in the discovery of the initial (regional) surveys.

Mineral and Petroleum exploration and exploitation licences are obtained through the Minerals Act (No. 33 of 1992) and the (amended) Petroleum Act (No. 2 of 1991) respectively. Mineral rights include Exclusive Prospecting licences (EPLs) and Mining licences (MLs), whereas Petroleum licences include Exploration Licences (ELs) and Production Licences (PLs).[119]

In terms of mineral resources as regulated by the Minerals (Prospecting and Mining) Act no. 33 of 1992, the process of prospecting and mining is as follows: EPLs are issued for a period not exceeding three years (the duration may be determined by the minister at the time of the granting of such licence).[120] The EPL shall not be renewed on more than two occasions for a period that is determined by the licensing authority. The EPL can be renewed on a third or subsequent occasion if the minister deems it desirable in the interest of the development of the mineral resources of Namibia.[121] The size and extent of the EPL area is specified in the licence application but shall not exceed 100,000 hectares[122]; and then determined by the authority. Once an EPL is awarded, the assumption is that prospecting activities are carried out; this is however not an obligation. Map 28 shows the currently granted location of EPLs.

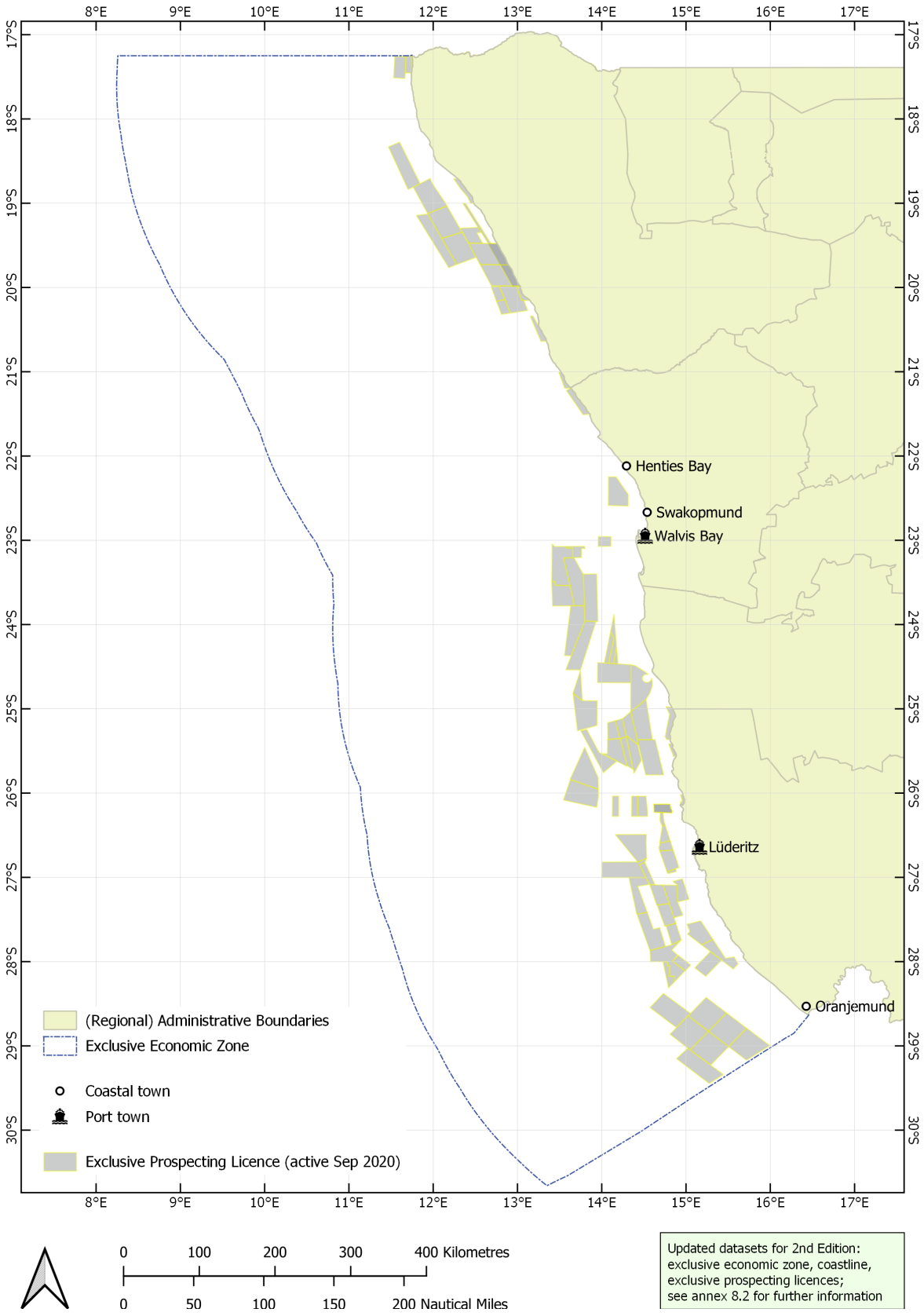
In the case that the prospecting activities lead to the discovery of mineral resources that are both exploitable with given technologies and in an economically viable way, a ML can be granted to carry out mining operations in an area to be specified in the application[123] and to which such licence relates for such mineral or group of minerals as specified in the licence.[124]

MLs are normally issued for 25 years or shorter periods as determined by the minister.[125] The renewal of a ML shall not be made later than 12 months before expiration date.[126] Holding a ML does not come with an obligation to mine. However, once a ML is awarded, the assumption is that activities are carried out. Only one ML is issued to one area (or areas) at the same time to which such licence relates for such mineral or group of minerals as specified in the licence. The size and extent of the mining claim area is determined by the authority in the awarding process.[127] Map 29 shows the areas relating to currently active MLs and related commodities.



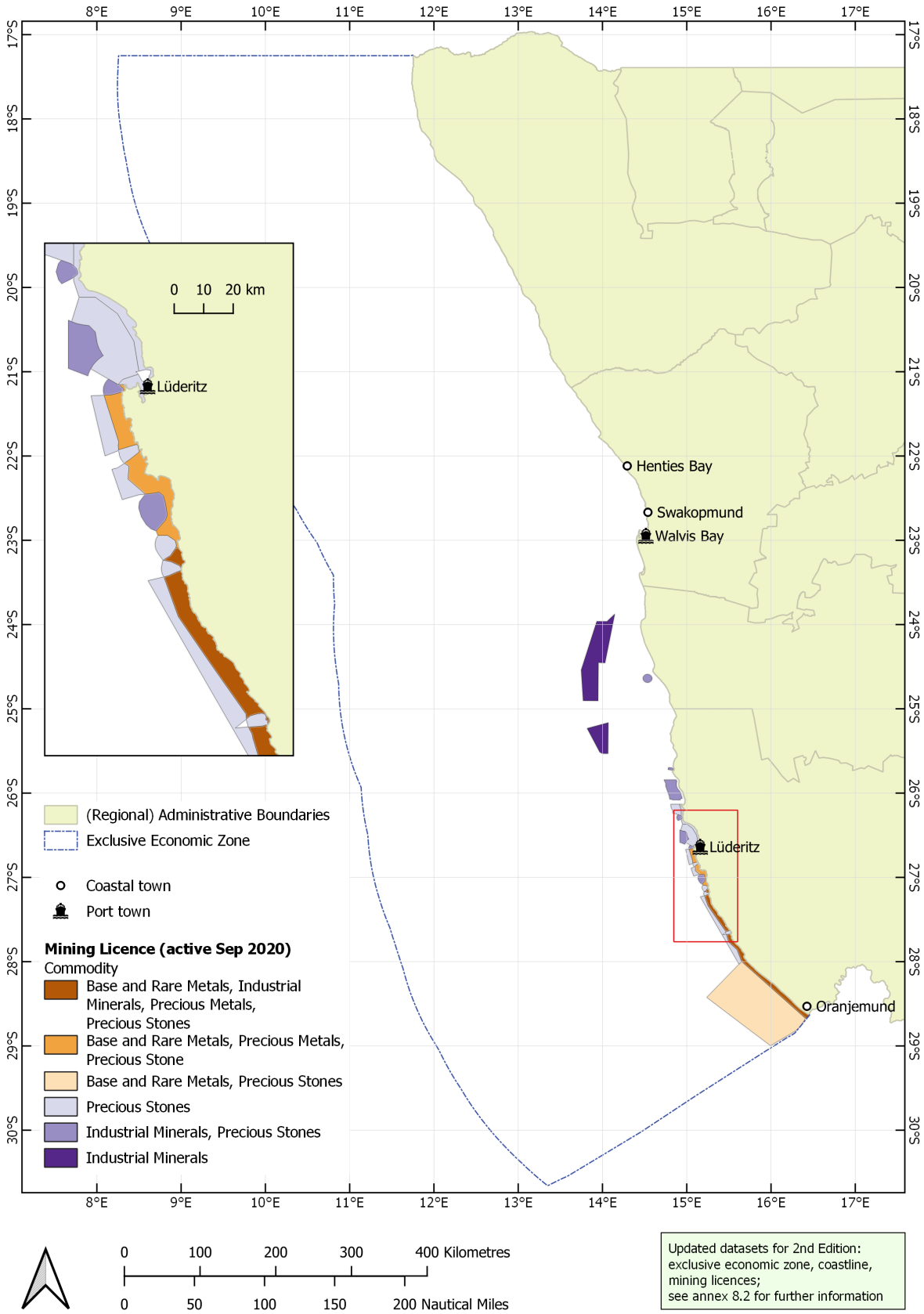
MAP 27:

GEOLOGY IN THE MARINE ENVIRONMENT (EEZ) (UPDATED FOR 2ND EDITION)



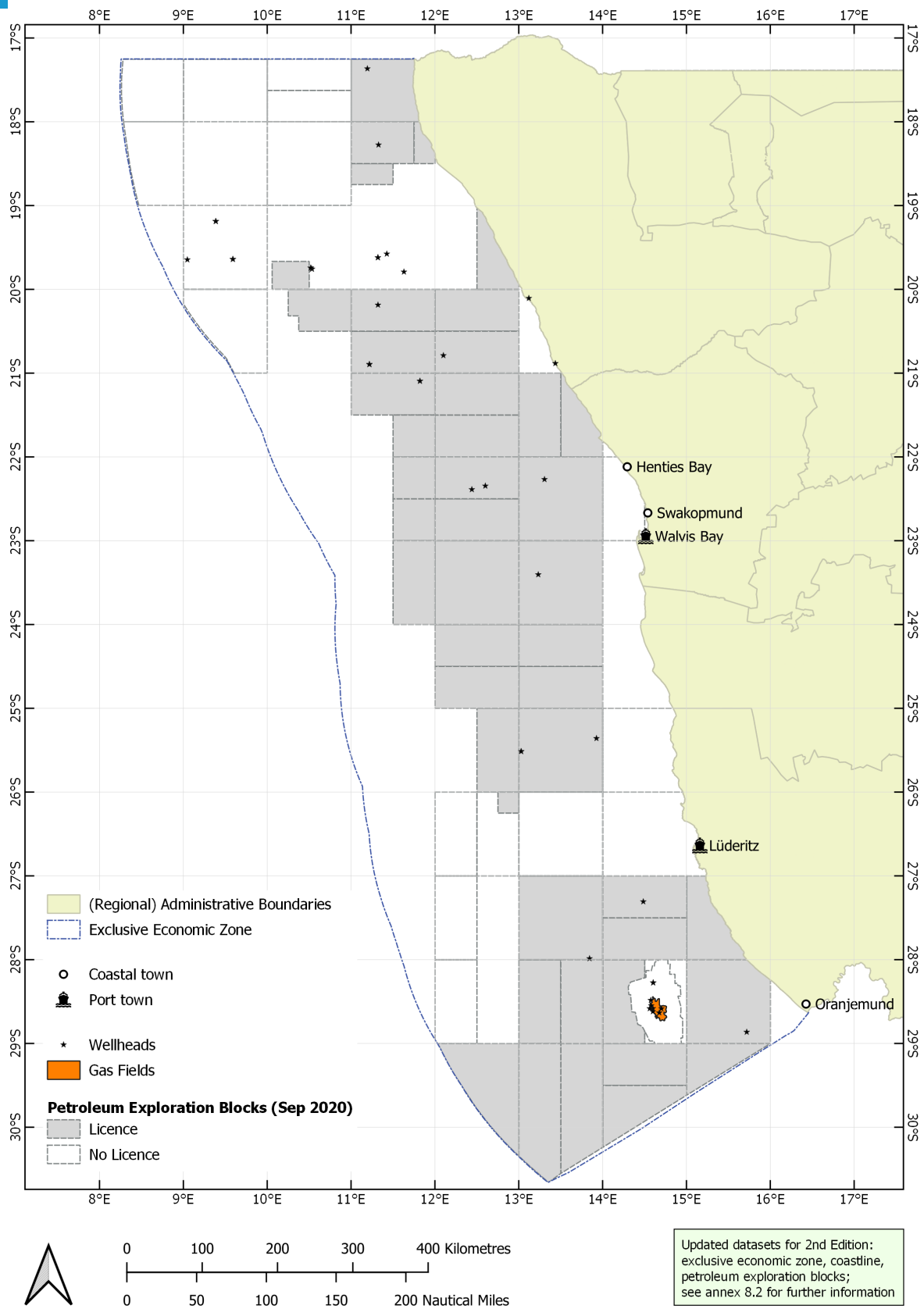
MAP 28:

AWARDED EXCLUSIVE PROSPECTING LICENCES (EEZ) (UPDATED FOR 2ND EDITION)



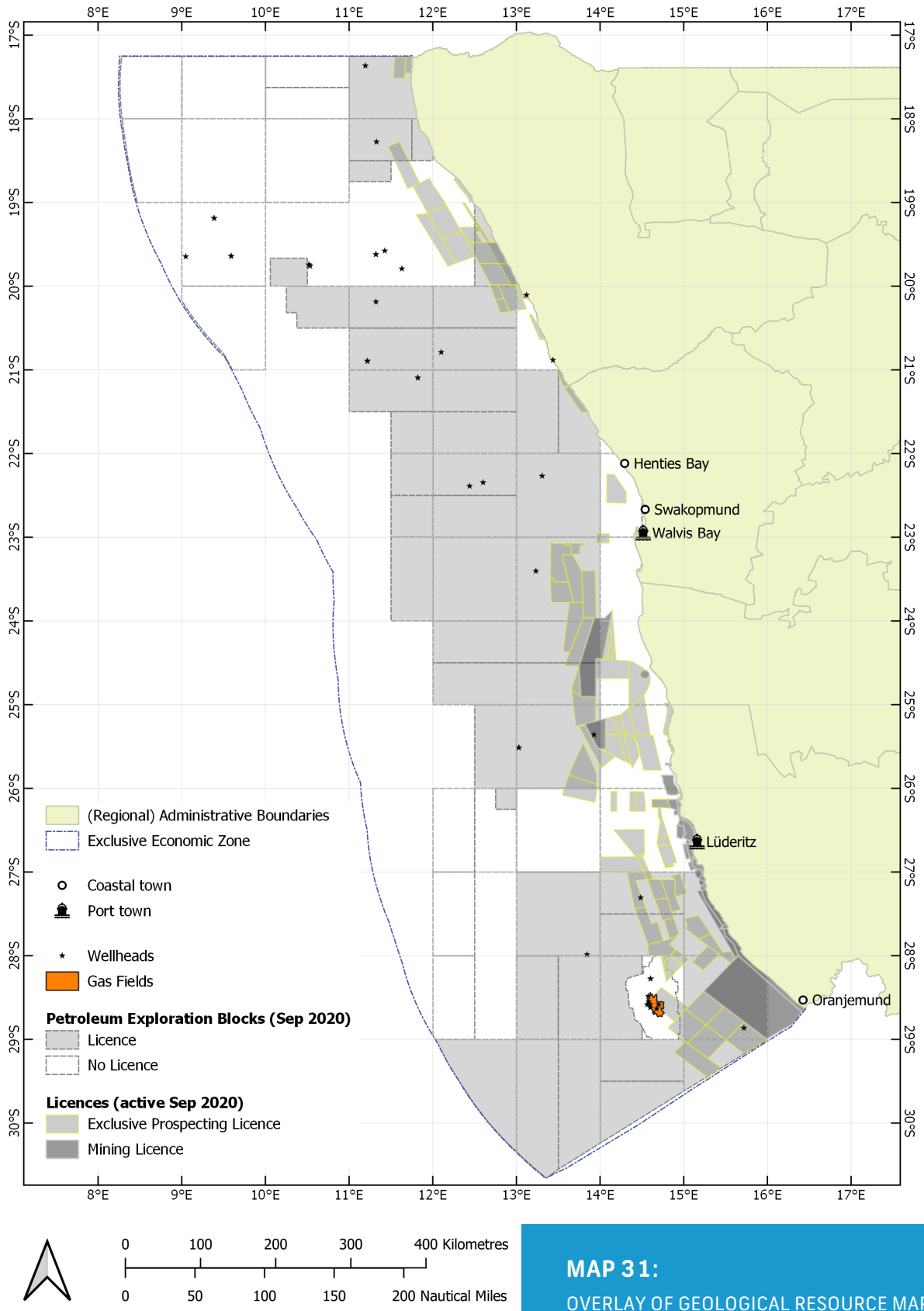
MAP 29:

ACTIVE MINING LICENCES AWARDED (EEZ) (UPDATED FOR 2ND EDITION)



MAP 30:

EXPLORATION LICENCES AND KNOWN GAS FIELDS IN THE NAMIBIAN SEA (EEZ) (UPDATED FOR 2ND EDITION)



Updated datasets for 2nd Edition:
exclusive economic zone, coastline, mining licences, exclusive prospecting licences, petroleum exploration blocks; see annex 8.2 for further information

MAP 31:

OVERLAY OF GEOLOGICAL RESOURCE MAPPING AND EXPLOITATION LICENCES, INCLUDING LOCATION OF WELLHEADS AND KNOWN GAS FIELDS (EEZ) (UPDATED FOR 2ND EDITION)

In terms of hydrocarbons as regulated by the Petroleum (Exploration and Production) Act 2 of 1991, the process of exploration and extraction for production is as follows:

ELs are issued for a period not exceeding four years (the duration may be determined by the Minister)[128]. An EL shall not be renewed more than two times for a period of less than two years unless otherwise determined by the licensing authority under certain conditions according.[129] The size and extent of the EL area is predetermined by the authority in blocks.[130] Once an EL is awarded, the assumption is that prospecting activities are carried out; this is however not an obligation.[131] The ELs are exclusive: Only one EL is issued to one block (or blocks) at the same time.[132]

Map 30 shows the predetermined licenced and non-licenced petroleum blocks, well-heads and the Kudu gas field, which is economically viable.

In the case that the prospecting activities lead to the discovery of hydrocarbon resources that are both exploitable and in an economically viable way, a PL can be granted for production operations (such as for gas or oil) to extract the resource within one of the predetermined blocks.[133] The holder of the EL can then apply for the PL within the period of two years.[134] In such case, the PL would allow the EL holder to carry on with operations on the block or blocks. Only one PL is issued to one block (or blocks) at the same time.[135]

PLs are valid for a period of not more than 25 years or as determined by the minister at the time of the granting of such licence.[136] The PL cannot be renewed on more than one occasion.[137] Holding a PL does not come with an obligation to produce.[138] Currently, no production operations are ongoing in the Namibian EEZ.

Map 31 indicates that there is a spatial overlap in terms of areas specified for both prospecting licences for mineral resources (EPLs) and hydrocarbons (ELs), and with regards to extraction licences for mineral resources (MLs) and hydrocarbons (PLs).

SOCIO-ECONOMIC IMPORTANCE

As a whole, the mining sector of Namibia contributes an average of about 12% to GDP and is a leading earner of foreign direct investment.[139] In the last five years, approximately US$ 3 billion have been invested in the mining sector of Namibia.

The mining sector produces minerals with value addition potential only to a certain extent; examples include special high grade zinc, copper cathode and blister copper. However, many opportunities for value addition in the manufacturing sector for Namibian minerals do exist. The Namibian mining industry is linked to many other sectors ranging from upstream linkages (such as the production of sulphuric acid by Dundee Precious Metals, Tsumeb) to supply mining operations. Furthermore, mining support services such transport, power, research and development, skills and communication to mention but a few, are examples.

Currently a total of 176 legal entities hold exploration and exploitation licences in marine and coastal areas.[140]

Employment in the mining and petroleum sector is strongly demand driven, with job generation mainly dependent on active mining or extraction. Mining and extraction, in turn, is dependent on commodity prices on global commodity markets. This makes predictions of industry trends difficult and leads to considerable fluctuation in terms of employment and revenue.

An added 2,000 jobs (direct and indirect) are envisaged to be created from the proposed phosphate mining within the area.[141] Project investment during construction, skills development through training, support services, and contribution to GDP in royalty and taxes are some of the socio-economic benefits associated with mining in the area. The mining sector amongst a few others is therefore regarded as a strategic sector that is deliberately harnessed to grow the country's economy.

ENVIRONMENTAL IMPACT

IT IS COMMON KNOWLEDGE THAT ALL EXPLORATION AND MINING OPERATIONS HAVE SOME IMPACTS ON THE ENVIRONMENT IN WHICH THEY OPERATE.[142] IN SUMMARY, THE POSSIBLE IMPACTS OF GEOLOGICAL RESOURCE MAPPING AND EXPLORATION ON THE MARINE ENVIRONMENT ARE:

HABITATS AND SPECIES DISTURBANCE / DAMAGE	**POLLUTION**	**(UNDERWATER) NOISE**

It is the government's presumption and policy that mining is only tolerated on the premise that a due process has been undertaken to ensure mitigation measures are established and that the damage to the environment is minimal. It is also necessary to differentiate between exploration, which has few and localised impacts on the environment, and potential impacts that would arise once active mining begins. The severity of these impacts would also depend on the mining technology used.

Mining operations for hydrocarbons can be associated with oil and fuel spills from vessels, impacts of drill rig and anchors on the seafloor, disturbance to seabirds, disposal of drilling muds, interference with fisheries, gaseous emissions, deck drainage, sewage and solid waste, and helicopter operations. Environmental impacts with direct relevance to marine space include potential contamination with oil and fuel, disturbance of benthic communities by drill rigs and anchor, smothering of benthic communities by drilling muds, and sewage and solid waste disposal. Environmental impacts with indirect relevance to marine space include damage to hake and tuna fishing vessels, drilling light illumination, release of carbon dioxide, carbon oxide, and nitrous oxide (NOx), contaminated water off the deck, and disturbance of fauna by helicopter operations. In order to ensure minimal environmental impact, scientifically sound mitigation measures are employed to ensure the environment is sufficiently protected. Known and utilized mitigation measures include, but are not limited to: oil spill contingency planning, monitoring of benthic fauna, safety precaution to avoid issues with fisheries, shielding of light to avoid attraction of birds to light, removal of fines from drilling muds, minimizing exhaust gases, collection of waste water, sewage and solid waste management, and ensuring helicopter altitude compliance of more than 500m.

Mining operations for phosphate on the seabed could be associated with environmental aspects such as disturbance to marine macro-fauna, benthic fauna, and may have negative influence on the commercial species. These environmental aspects can be associated with impacts such as acoustic pulses of geophysical equipment, marine sediment removal, pollution and losses of stock of commercial species. Mitigations can be put in place to minimize the impacts. Mitigation measures could be informed by monitoring marine macrofauna, monitoring of benthic fauna, and ensuring best practices of pollution control.

The environmental considerations for diamond mining operations include fine tailings discharge and shoreline accretion, shoreline modification, activities off shore- and vessel-based divers. The associated environmental impacts include damage to terrestrial environment, biodiversity loss of rocky and sandy intertidal communities, loss of habitat through smothering of subtidal reef, biodiversity loss of subtidal reef and kelp bed communities, and pollution. Mitigation controls can be adopted to ensure minimal environmental damage, including: rocky and sandy beach monitoring, shallow subtidal zone monitoring, rock lobster and kelp monitoring, water quality surveying and spill modelling.

LOOKING TO THE FUTURE

STRATEGIC POLICY OBJECTIVES

In recent times, calls for robust legislation and policy to ensure increased local value addition or beneficiation has been made by government. These calls are enshrined in national strategic policies such as Vision 2030, Harambee Prosperity Plan and NDP5, thereby aligned to ministerial strategic plans, e.g., the cross-cutting inter-ministerial Growth at Home Strategy.

In the medium term, the current ministerial 5 year (2017-2022) strategic plan outlines strategies related to environmental sustainability and value addition on minerals. The emphasis is on ensuring that the exploitation of mineral resources is done in a manner that takes regard of the environment through existing environmental legislation, for example the 2007 Environmental Management Act. This applies to both landbased and offshore-based resources.

EXTERNAL PRESSURES AND/OR CONSTRAINTS

Most mining operations are conducted by multi-national companies. A global decline in commodity prices therefore has negative consequences for the sector in Namibia, while the opposite results in a boom for the industry, expressed, for instance, in a greater number of active licences. Population growth could therefore influence the mining sector as a result of increased demand for minerals resources to meet human needs. Furthermore, weakening of the international trading currency (US$) could also result in a depressed mining sector as a result of the linkage of the multi-national companies to the currency.

Another constraint is that the mining sector is limited by knowledge about where what kind of resources are located. In other words: exploration activities that provide baseline data are essential to enable mining. In addition, competition of other sectors for the same ocean space adds additional pressures on the mining sector.

The negative perception of some stakeholders and lobby groups concerning the role of mining in the sustainable economic development agenda of Namibia remains a huge challenge to the sector. Furthermore, the negative views by some stakeholders with regard to the environmental impacts of geological resource mapping and exploitation operations could also have a negative influence on the mining sector due to possible public and stakeholder disagreement with mining operations and resulting political pressures to withdraw licences – despite the fact that neither exploration nor exploitation activities take place without an Environmental Clearance Certificate (ECC) and environmental management plans. The sector therefore recognizes a need for enhanced awareness creation in terms of the environmental mitigation measures applied through the regulatory framework prior to and during mining.

While it is acknowledged that the favourable regulatory framework has led to increased investment in the mining sector, this situation can easily be reversed by changes in regulatory environment and policies.

SOCIO-ECONOMIC TRENDS

Trends in the industry are strongly dependent on global demands as reflected by the commodity prices. This makes it difficult to predict trends in the mining sector or the specific developments such as licence applications or exploration activities that are likely to happen in the Namibian EEZ and affect the MSP areas in the coming 10-20 years. One exception may be phosphate mining in the central MSP area, which might start as soon as commodity prices are attractive – in which case provisions should be made now for how to deal with this.

Innovation in mining technology may lead to increased mining activities as this might allow easier access to and mining of resources, which are currently economically non-viable due to their nature, location or form of occurrences. In addition, technological advancement can lead to increased demand for metals as primary materials for various technological applications in the telecommunication markets.

EXISTING AND POSSIBLE (SPATIAL) CONFLICTS

In the case of active mineral exploitation, spatial conflicts could conceivably arise with fishing, mariculture, environmental protection, shipping and naval defence. Other than competing for the same space, potential conflicts are also due to the possible environmental impacts of exploitation. The expression of such conflicts will depend on the intensity of proposed mining operations, possibilities for mitigation, as well as options for co-use.

Exploration is likely to be less conflicting due the nature of its operation. It generally involves sampling on limited ground, and therefore smaller areas of ocean and associated habitats/species are affected.

EXISTING AND POSSIBLE (SPATIAL) SYNERGIES

Exploitation requires exclusive access to certain marine areas. Due to the temporal nature of exploration, and its minimal impact on the environment, exploration could easily be carried out with limited conflict with other sectors.

Salt mining activities in Swakopmund and Walvis Bay have a positive effect on biodiversity as they provide habitat for birds, which, in turn, attract tourists.

Non-spatial synergies exist with other sectors in terms of data collection and environmental monitoring. Knowledge that is generated by geological resource mapping may also inform the mapping of important areas of interest to fisheries and/or biodiversity conservation.

KEY ISSUES FOR MSP TO CONSIDER

FROM THE PERSPECTIVE OF GEOLOGICAL RESOURCE MAPPING AND EXPLOITATION, AND GIVEN THE SOCIO-ECONOMIC AND POLITICAL CONTEXT SET OUT ABOVE, THE FOLLOWING ARE IMPORTANT REQUIREMENTS FOR THE SECTOR THAT NEED TO BE CONSIDERED IN THE MSP PROCESS:

- Mining and hydrocarbon exploitation should be prioritized in areas where resources have been found and/or areas with high potential; and

- Exploration should be possible in areas that have so far remained unexplored.

MSP should also ensure that land-based supporting infrastructure (e.g. ports) can be accessed from the sea to ensure effective mining operations and processing of mined resources. This also applies to phosphate as volume-based commodity, which requires storage areas on land and processing facilities.

The sector considers MSP as a means for exploring the temporal dimensions of exploration, with a minimal degree of environmental impact and the resulting potential for multi-use and co-existence – this potential of MSP should be fully utilised. In addition, solid scientific knowledge is required to assess the environmental impacts of mining, which may require monitoring over a period of time. A potential way forward may be to start small, monitor and control, and then expand as appropriate.

4.5 MARICULTURE

BRIEF DESCRIPTION AND DEFINITION

"Mariculture" (or marine aquaculture) is the farming and ranching of aquatic and marine organisms in marine water. "Farming" in this context means the husbandry, production, development or improvement of aquatic organisms, and includes placing enclosures or artificial structures in demarcated areas. "Sea ranching" is a type of mariculture where mariculture products are intentionally released, without restriction, into the marine environment for the purpose of harvesting them when they mature (for example abalone).

The main mariculture species that are cultured in Namibia include Pacific oysters (*Crassostrea gigas*), clams (*Venerupis corrugata* and *Ruditapes decussatus*), abalone (*Haliotis midae*) and mussel species (*Mytilus galloprovincialis*). There is also a small amount of European flat oyster (*Ostrea edulis*) being cultured in the central region in a land-based pond system. Red seaweed (*Gracillaria spp*) is cultured in a 40 ha plot in Lüderitz lagoon to supplement the collection of beach cast product. Abalone farming has recently attracted interest in Namibia and one farm is now operational at Lüderitz Bay. There is also considerable interest in rearing rock lobster (*Jasus lalandii*), marine finfish (dusky kob, *Argyrosomus inodorus*; and turbot, *Psetta maxima*) and scallops.

Pacific oysters are farmed mainly in special plastic containers suspended from longlines within the Lüderitz lagoon and in the Walvis Bay area on the eastern side of the Pelican Point Peninsula (see fig 15 below). One company in Lüderitz suspends its oyster bags from wooden platforms in shallower water areas. Mussels are farmed on suspended long lines in the Walvis Bay area on the eastern side of the Pelican Point Peninsula.

FIGURE 15:
MARICULTURE (© JESSICA KEMPER)

Marine cultured products, such as abalone and oysters, are internationally sold. Abalone meat is considered a delicacy in Latin America (especially Chile), South East Asia and East Asia (especially China, Japan and Korea). These species reach a market size of 200 – 300 g within three to four years. The successful oyster industry currently sells locally, to South Africa and to Asian markets (especially China and Hong Kong). Production advantages for mariculture in Namibia include: suitable areas in sheltered bays along the coast (Lüderitz and Walvis Bay in particular), unpolluted high-quality marine waters, high natural primary productivity of the seawater, and well-established processing, packaging and marketing systems, which exist due to the marine capture fisheries, that can be adapted for aquaculture purposes.[143]

THE CURRENT SITUATION

LEGAL AND POLICY FRAMEWORK

The mariculture sector falls within the responsibility of the Ministry of Fisheries and Marine Resources (MFMR), whose overall mandate, derived from the Marine Resources Act (No. 27 of 2000), is to manage the living aquatic resources and promote the aquaculture sector. For that purpose, it provides for the exercise of control over marine resources and for matters connected therewith.

THE PRIMARY LEGISLATION AND POLICY FOR MFMR RELATED TO MARICULTURE ARE:

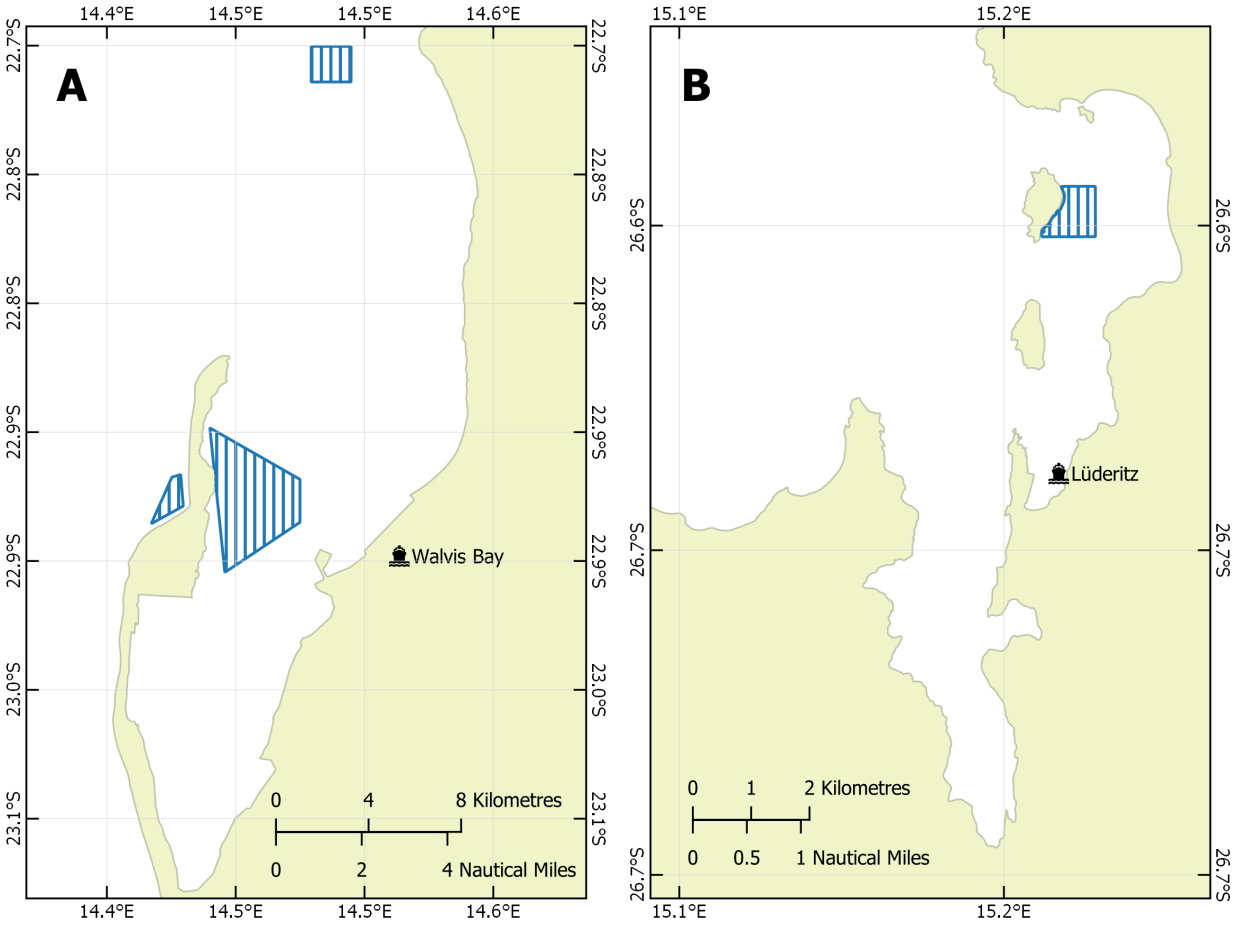
- The Aquaculture Act (No. 18 of 2002)
- The (draft) Fisheries Policy (2015)[144]

The most important legislative framework for mariculture is Namibia's Aquaculture Act that was passed in 2003 making Namibia the first of the three BCLME countries to translate aquaculture policy into a comprehensive development strategy. This Act provides the mandate to the Minister responsible for fisheries to "regulate and control aquaculture activities; to provide for the sustainable development of aquaculture resources; and to provide for related matters". The Aquaculture Act defines "aquaculture" as the farming and ranching of aquatic organisms and it also defines "Namibian waters" as the inland waters of Namibia as well as the internal waters and territorial sea, as defined in the Territorial Sea and Exclusive Economic Zone of Namibia Act (No. 3 of 1990) and includes the seabed up to the high water mark and further includes private water as defined under section 1 of the Water Act (No. 54 of 1956).

Namibia's fisheries policy (final draft 2015) guides the management and development of aquaculture including mariculture and fish ranching, as well as products derived from living aquatic resources.[145] Mariculture is anchored within Namibia's general development framework. NDP5 refers to fisheries and aquaculture as key industries, and sets out strategies designed to create an ecologically and socioeconomically enabling environment for mariculture. NDP5 seeks to promote investment in mariculture, promoting mariculture as a viable economic option by demarcating land in suitable places, and facilitating infrastructure and other services necessary for mariculture development.[146]

Namibia's NBSAP2 also seeks to enhance the sustainable management of the mariculture industry as a vehicle for socio-economic development.[147]

The Animal Health Act (No. 1 of 2011) is also relevant as it provides the mandate to the Minister responsible for agriculture "To provide for the prevention, detection and control of animal disease; to provide for the maintenance and improvement of animal health; and to provide for incidental matters". This act defines "animal" as any member of the animal kingdom (other than human), whether alive or dead, including (a) any mammal, bird, fish, shellfish or reptile; (b) any invertebrate declared under paragraph (a) of subsection (2) to be an animal. It should also be noted that the Aquaculture Act (No. 18 of 2002) as well as the Aquaculture (Licensing) Regulations: Aquaculture Act, 2002 provide for management and control measures, as well as for the control of disease outbreaks within Namibian waters. The regulations provide for the establishment of programmes for the surveillance and monitoring of aquaculture facilities and the natural waters of Namibia with respect to specific aquatic animal diseases, as outlined by the International Aquatic Animal Health Code of 1924 of the World Organisation for Animal Health (OIE). The Minister responsible for fisheries by law has the mandate to develop and implement national contingency plans for disease control, including (1) the isolation, quarantine or treatment of infected aquatic organisms; (2) destroying or restricting the movement of infected aquatic organisms; (3) the quarantine of any aquaculture facility in which it is reasonably suspected that a disease or harmful organism is present.

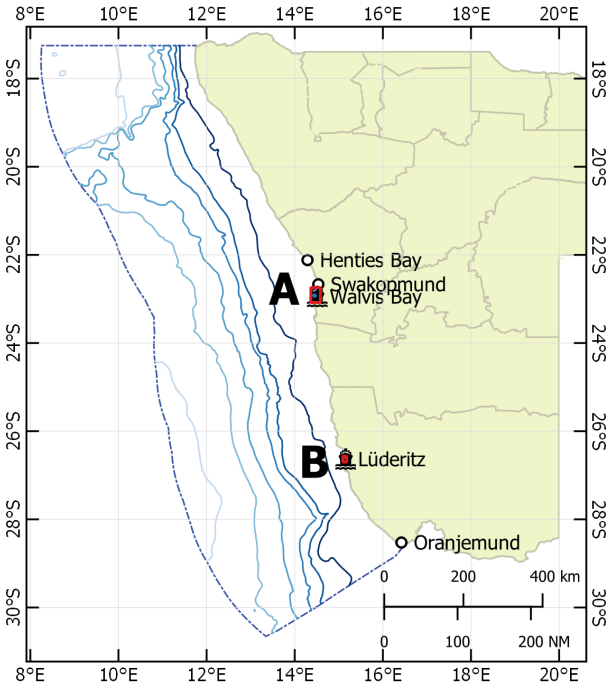


(Regional) Administrative Boundaries
Exclusive Economic Zone

Coastal town
Port town

Bathymetry (metres below sea level)
200
500
1000
2000
3000
4000

Mariculture Areas



Updated datasets for 2nd Edition:
exclusive economic zone, coastline,
mariculture areas;
see annex 8.2 for further information

MAP 32:
MARICULTURE AREAS IN WALVIS BAY AND LÜDERITZ (UPDATED FOR 2ND EDITION)

Secondly, the Environmental Management Act (No. 7 of 2007) is relevant as it provides the mandate to the minister responsible for environment "to promote the sustainable management of the environment and the use of natural resources by establishing principles for decision making on matters affecting the environment; and to provide for a process of assessment and control of activities which may have significant effects on the environment". The Environmental Management Act (No. 7 of 2007) commenced on 6 February 2012 and under Government Notice No. 29 dated 06 February 2012, the minister for Environment, Forestry and Tourism listed aquaculture activities as an activity that may not be undertaken without an ECC under the 2007 Environmental Management Act. This includes:

- Construction of facilities for aquaculture production, including mariculture and algae farms where the structures are not situated within an aquaculture development zone (ADZ) declared in terms of the 2002 Aquaculture Act; and
- The declaration of an area as an ADZ in terms of the 2002 Aquaculture Act.

This implies that all or any aquaculture activity (marine or freshwater) conducted outside of a declared ADZ needs an environmental clearance certificate. It also implies that the declaration of an ADZ needs an environmental clearance certificate.

One of the four directorates of MFMR deals specifically with aquaculture.

SPATIAL DISTRIBUTION OF THE RESOURCE/USE AND CURRENT UTILISATION

Mariculture locations are distributed unevenly along the Namibian coastline and concentrate around Lüderitz, Walvis Bay, and Swakopmund (see map 32). Other than sea areas, mariculture producers also need land-based areas for the processing of live oysters, including washing, cleaning, sorting and packing for selling on the local, regional and international markets. Allocation of such associated land-based areas falls under the jurisdiction of the local authorities.

All current mariculture production areas are located in Lüderitz and Walvis Bay falling within the port limits under NAMPORT's authority. Currently, four farms operate within the so called Aquaculture Production Area of Walvis Bay, five farms operate within the aquaculture production area of Lüderitz and two farms in Swakopmund in salt pans.

THE FOLLOWING AQUACULTURE PRODUCTION AREAS ARE BEING USED FOR THE CULTURING OF MARINE AQUACULTURE PRODUCTS (MAINLY MOLLUSCAN SHELLFISH):

- LÜDERITZ: Abalone ranching takes place around the islands within the port limits, and abalone culture is conducted in tanks in land-based facilities.
- WALVIS BAY: Aquaculture production is mainly aimed at Pacific oysters, with one farm producing mussels *(Mytilus galloprovincialis)* for the local market. The Walvis Bay Municipality also earmarked a portion of Farm 46 for land-based aquaculture activities.
- SWAKOPMUND: The Swakopmund Municipality has earmarked a portion of land just to the north of Mile 4 and right at the end of the town boundaries for mariculture purposes and the process of surveying and rezoning this area is in an advanced stage. The only area where shellfish farming activities are taking place falls in private land of the Swakopmund Salt Works, where oysters and clams are cultivated.

SOCIO-ECONOMIC IMPORTANCE OF THE SECTOR

Mariculture was worth ± N$ 23.5 million in 2018 and ± N$ 25.0 million in 2019. This reduced to ± N$ 14.5 million in 2020 due to the COVID pandemic. In the years 2019 and 2020, just under 366 MTs of oysters (2019 - 216.97 MTs, 2020 - 149.47 MTs) were produced for the Chinese and South African market, with a combined value of ± N$ 39.4 million. In the same period, 0.35 MTs of abalone (2019 - 0.3 MTs, 2020 - 0.0548 MTs) worth N$ 72400 were produced. Mussels produced in previous years were mainly for the Namibian market; abalone is exported to China. [149]

Employment in the aquaculture sector generally has increased during the past years and drastically decreased due to the pandemic in 2020 in all fourteen regions of the country. These include Government, private sector, casuals and community workers. With the growth of the aquaculture industry, employment is expected to increase exponentially in relation to this growth.[150]

Companies apply for an aquaculture licence first and then for space with NAMPORT within the designated Aquaculture Production Areas. Currently, there are 11 companies active in the sector: four in Walvis Bay, two in Swakopmund and 5 in Lüderitz. Overall, approximately 15-20 inactive licence holders exist.

The combined work force of the mariculture sector decreased from 188 in 2019 to 169 in 2020 due to the COVID pandemic. About one third of the workers are women. The mariculture industry is particularly important in the local coastal towns and the direct jobs support about 800 persons in the communities.

ENVIRONMENTAL IMPACTS OF THE SECTOR

Due to the small scale of mariculture operations and their restricted spatial footprint, the environmental impact of the sector in the sea is negligible. No incidents with mammals or birds have been recorded on account of entanglements.

There are some aesthetic considerations at Langstrand due to the possible visual impact of mariculture installations but these too have so far remained negligible.

LOOKING TO THE FUTURE

STRATEGIC POLICY OBJECTIVES

The strategic policy objectives for mariculture are largely aimed towards sustainable growth and increased economic viability and stability of the current mariculture activities.

It is a national development objective to promote mariculture as a viable economic option.[151] This is to be achieved by investments in land-based facilities e.g. for cleaning, handling, sorting and future processing, demarcating land in suitable places, and facilitating infrastructure and other services necessary for mariculture development. NDP5 also refers to the need for more stringent sanitary and phytosanitary standards in order to improve market access to lucrative export destinations.

Namibia's NBSAP2 focuses on enhancing the sustainable management of the mariculture sector so that, by 2022, all living marine and aquatic resources are managed sustainably and guided by the ecosystem approach.[152] One of the key performance indicators to achieve this is that income is generated from aquaculture and mariculture industries, and the strategic initiative is to "Promote the sustainable management of the aquaculture and mariculture industries as vehicles for socio-economic development." Furthermore, the indicative activities identified in the NBSAP2 are (1) to conduct an assessment of viable aquaculture and mariculture farms and use this as a basis to establish and support fish farms to enhance food security and rural development; (2) Strengthen control, monitoring and evaluation of aquaculture and mariculture activities to minimise the environmental threats therefrom; (3) Promote the use of indigenous species for aquaculture and mariculture activities; and (4) Improve the surveillance of aquatic diseases.

Namibia's 2002 Aquaculture Act sets out growth targets for the aquaculture sector generally but not specifically for mariculture.

In the medium term, the key objectives for the sector are achieving and maintaining economic sustainability and expansion into available plots on the basis of new markets. This includes growing local demand through the expanding marine and coastal tourism as well as new international markets.

EXTERNAL PRESSURES AND/OR CONSTRAINTS

External pressures on the sector and constraints on growth are mainly environmental but there are also economic constraints related to logistics.

Environmental phenomena that impact on all the mariculture production areas include harmful algal blooms (HABs), low oxygen in water, and sulphur eruptions. Another impact on shell growth of oyster spat and juveniles may come from ocean acidification.[153]

Climate change impacts will influence marine planktonic systems globally, and it is conceivable that HABs may increase in frequency and severity in the future. Despite all uncertainties in the predictions, there is expectation that the spatial extent of HABs will expand in some cases, as will seasonal windows of opportunity for HABs at higher latitudes.[154]

A particular spatial constraint is that mariculture is only feasible in sheltered bays, with an added constraint imposed by affordable logistics and accessibility from land, effectively restricting it to the two bays which host Namibia's ports, Lüderitz and Walvis Bay.

In high risk areas (areas with low oxygen, HABs and sulphur), mariculture is a sector with low predictability and is highly susceptible to boom and bust cycles (mainly due to environmental events). These cycles are difficult to deal with due to the lack of subsidies and also the limited potential for market expansion due to raised cadmium levels (see below). On the coast, land still has to be zoned for mariculture operations.

Coastal water quality is of huge importance to the mariculture sector as this affects the ability to harvest and export products to the EU and Asia.[155] Exporting mariculture products is of paramount importance since the Namibian market is limited to luxury or tourist demand seeing that mariculture products are not considered essential to enhancing national food security. Routine and development dredging within port limits has had negative impacts on the water quality and it is believed that dredging contributed towards elevated cadmium levels detected in oyster flesh. There are also concerns about the impact on water quality from increased vessel traffic to and from the ports (e.g. new channels dredged as a result of traffic separation schemes) as well as from vessels lying at anchor within port limits (e.g. possible dumping of raw sewage, cleaning bilge and ballast water). Releasing of semi-treated sewage water by the municipalities into the sea can also have a detrimental effect on water quality. Pollution (sewage and raw offal) from the fish processing factories within the port areas in Walvis Bay and Lüderitz and aquaculture installations inland could additionally have a negative impact on water quality.

The construction of the new National Oil Storage Facility and its oil tanker jetty also poses a risk in the event of a large oil spill during offloading or pumping of products to the oil tanks in Walvis Bay.

SOCIO-ECONOMIC TRENDS

Growth of the mariculture sector is limited by environmental and spatial constraints and markets as indicated; the latter being limited by the quality of products and contamination levels.

The sector is currently stable with an interest in expanding within already dedicated zones. There are four farms in Walvis Bay and five farms in Lüderitz currently in use. The active companies currently have an interest in not overstocking the available area due to water quality issues and inefficient markets to sell the products.

Abalone farming is currently expanding in Lüderitz from 100t to 300t.

EXISTING (AND POSSIBLE) SPATIAL CONFLICTS

The mandate of the MFMR to develop an aquaculture sector may clash with the mandate of the Ministry of Works and Transport (MWT) and NAMPORT to develop and expand commercial ports along the Namibian coastline. Fulfilling the MFMR mandate is increasingly difficult due to the current and envisaged port expansions over the next 10 to 20 years. As the ports expand, the available and suitable areas for mariculture within the ports limits are decreasing. There are no direct conflicts with shipping lanes; spatial conflicts are rather due to vessels lying at anchor close to or within areas designated for mariculture (particularly in Walvis Bay).

Conflicts also exist with respect to pollution and its impact on water quality (land- and sea-based pollution). There are also concerns over the potential lack of space on land: allocation of further areas on land for mariculture activities and development (e.g. for cleaning, handling, sorting and future processing) in and near ports is therefore required.

Aquaculture activities in and around the port areas are facing big challenge from self-polishing anti fouling paint used by many vessels. Self-polishing anti fouling paints are copper based and toxic when washed by the water from the vessels and a potential threat to the mariculture industry.

EXISTING (AND POSSIBLE) SPATIAL SYNERGIES

Spatial synergies are also conceivable with tourism, e.g. the boat tours operating out of Walvis Bay, using the oyster lines as an attraction. Mariculture offers a topic for environmental education and an opportunity to promote oysters and mussels as a product.

Non-spatial synergies exist with other ministries with respect to water quality monitoring. There are specific synergies with NAMPORT as oysters can be used as a bio-indicator, assisting NAMPORT in developing a “clean port”.

In terms of land-based infrastructure, some synergies are conceivable with fishing companies that rely on the same or similar processing infrastructure.

KEY ISSUES FOR MSP TO CONSIDER

THE FOLLOWING TWO KEY ISSUES SHOULD BE CONSIDERED BY MSP FROM A MARICULTURE POINT OF VIEW:

- Secure the available and suitable areas within the ports limits for mariculture activities; and
- Enhanced management and monitoring of water quality, including through sewage monitoring of vessels lying at anchor (e.g. to combat *E. coli*).

4.6 MARINE AND CULTURAL HERITAGE

BRIEF DESCRIPTION AND DEFINITION

The overall harsh environmental conditions and scarcity of fresh water in the coastal areas of Namibia have always discouraged people from settling. However, some areas have been occupied for hundreds of thousands of years. Archaeological sites along the central coast witness the evidence of human activity and date back between 400,000 and 700,000 years were dominated by piles of used shells (mainly white mussel shells) and scattered bones.[156] The Kuiseb river delta, close to Walvis Bay, shows a remarkably rich record of occupation over the past 2,000 years with a number of remaining artefacts. In particular the Aonin (Topnaar) community lived along the central coast and survived through supplementing their diet with shellfish and stranded mammals collected along the shore.[157]

From the 15th century onwards new artefacts were discovered which revealed trading between the coastal communities and seafarers.[158] During 1844 the Europeans established a trading post onshore where the locals started trading cattle and small stock with the seafarers. By the mid-19th century, British merchants had set up commercial operations at Walvis Bay. Interest among the seafarers mostly from Europe to trade with the coastal communities increased, as did the shipping and fishing vessel activities within Namibian waters.

The BCLME typically experiences thick fog, strong winds and heavy swells resulting in dangerous shipping conditions. This is well illustrated by the fact that around 300 shipwrecks are recorded, with a further 200 identified relics throughout Namibia's coastline and marine area; one of the oldest dated back to 1533 ("Bom Jesus").

Despite the long history of human settlement along the coast, there is however no coastal and marine related traditional heritage of intangible nature due to the extreme natural conditions which prohibited the development of such immaterial heritage. This makes Namibia quite different from its neighbouring countries South Africa and Angola where humans have settled along the coast for long and developed traditions and cultures closely associated with the marine and coastal environment.

Nevertheless, the remote and largely untouched coast of Namibia also presents an intangible value in its own right in terms of scenic and landscape value and a tourist attraction.

LEGAL AND POLICY FRAMEWORK

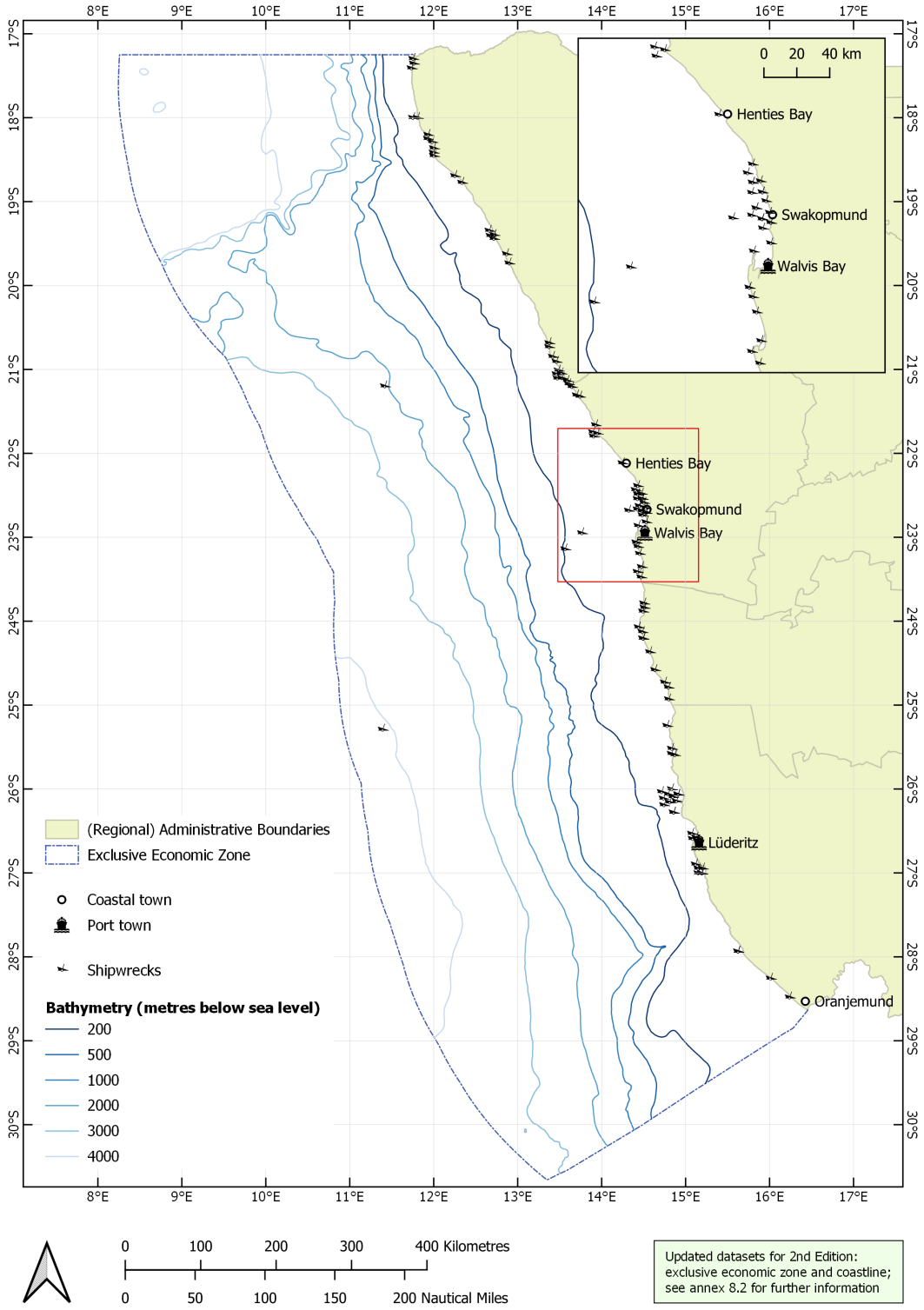
The National Heritage Act (No. 27 of 2004) provides for the protection and conservation of places and objects of heritage. The Act indicates that the remains of all ships that have been situated on the coast, in the territorial waters or the EEZ of Namibia for 35 years or more are historic shipwrecks for the purposes of this section.[159] In that sense, the Act serves to protect Namibia's cultural heritage related to its maritime history. It also allows, for example, for the declaration of areas as conservation areas on the ground of its historic, aesthetic or scientific interest.[160]

Namibia furthermore ratified the UNESCO Convention on the Protection of the Underwater Cultural Heritage in 2011. This convention is intended to support the protection of Namibia's submerged cultural heritage, with one of its main principles being the obligation to preserve the underwater cultural heritage. Namibia is in the process of technically and legally integrating the convention in order to better protect shipwrecks and other underwater cultural heritage in the country's lakes, rivers and the sea.

SPATIAL DISTRIBUTION OF THE RESOURCE/USE AND CURRENT UTILIZATION

There are many archaeologically important sites along the Namibian coast, in particular the Conception, Sandwich, Kuiseb Delta (including Walvis Bay), Cape Cross, 40km to Kunene river mouth and Spencer Bay sites.

The following map 33 illustrates the known location of some of the around 300 shipwrecks. There is evidence suggesting that at least another 200 ships also may have been lost in Namibian waters; however their exact locations are often not known.



MAP 33: SHIPWRECKS ALONG THE COASTLINE OF NAMIBIA AND IN THE EEZ (UPDATED FOR 2ND EDITION)

A number of ship and plane wrecks are found along the Namibian coastline and few further in the sea (within EEZ), but only one plane wreck and four shipwrecks are visible and being used for tourism and scientific study purposes. The rest of the wrecks are either under the water or completely disappeared. The "Eduard Bohlen" wreck that is found close to Conception Bay is 370 meters from the sea. This ship was sailing from Cape Town in September 1909 and ran aground in thick fog. Tourists view the wreck during scenic flights or overland guided tours. The "Zeila" (figure 17) is another visible shipwreck within the Central MSP Area that has become a tourism attraction. The ship was a fishing trawler on its way to India for scrapping when it ran aground south of Henties Bay in 2008. The Otavi wreck ran aground in Spencer Bay in 1945 (figure 16). The ship was a steamer with a cargo of Guano. Another famous shipwreck in the northern MSP area is the Dunedin Star, stranded on 29 November 1942, 40 km south of the Kunene river mouth. Several rescue attempts were undertaken to rescue passengers and crew members from this ship of which most of them failed. The plane wreck (Ventura) in this area stems from one of the failed rescue attempts, when it was sent to provide food and water to the survivors of the Dunedin Star in the desert.

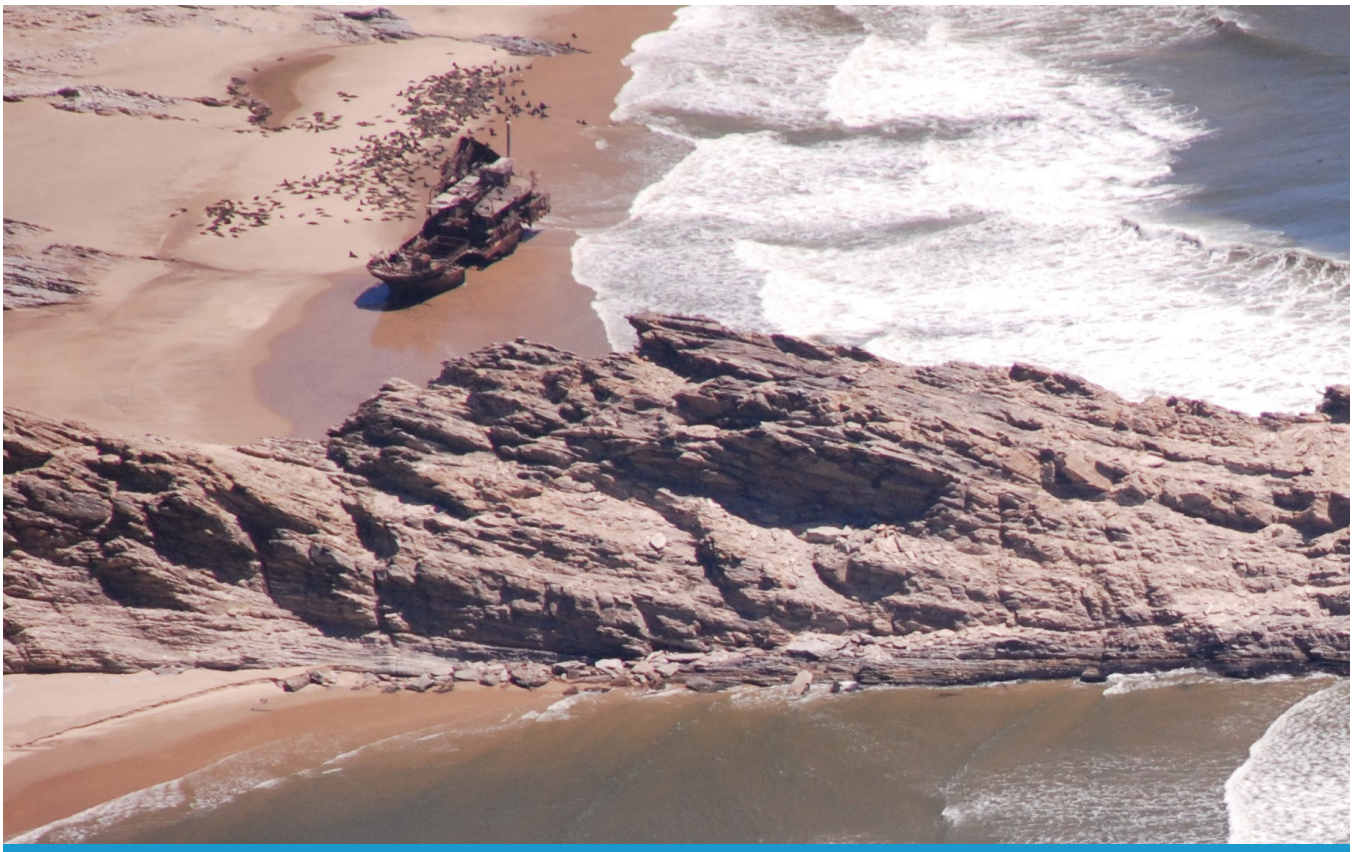


FIGURE 16:
OTAVI SHIPWRECK (© NACOMA)

SOCIO-ECONOMIC IMPORTANCE

While no detailed statistics exist concerning the socio-economic significance of marine and cultural heritage, it is evident that Namibia's heritage is a critical component of the country's coastal tourism sector, particularly in the central and northern MSP areas. The marine heritage of Namibia, specifically the shipwrecks, also has significant international value as it is a visible sign of the country's and continents past.

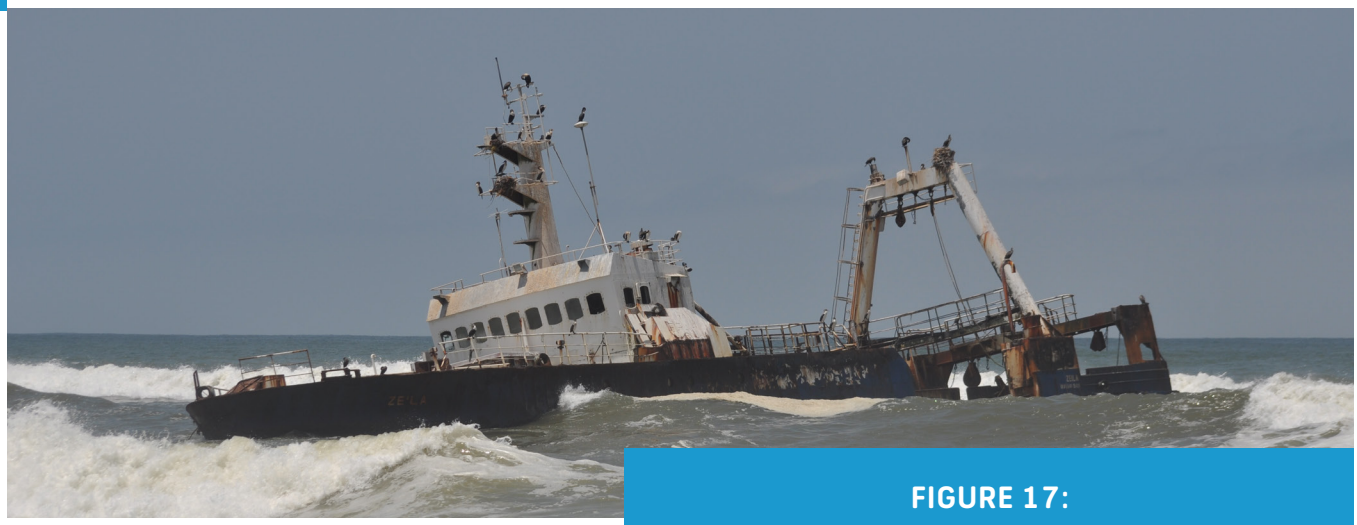


FIGURE 17:
ZEILA SHIPWRECK (© FRANK WITTNEBEN)

LOOKING TO THE FUTURE

EXTERNAL PRESSURES AND/OR CONSTRAINTS

Many cultural objects face the risk of being moved from their original position by the strong currents, waves and wind. The corrosive nature of the Namibian coastal weather and rough seas has a significant and negative impact on the longevity of shipwrecks.

Financial and human resources to sufficiently protect and manage the known heritage sites, in particular shipwrecks, are limited. The current legal framework does not grant full protection to shipwrecks and other underwater cultural heritage as per the 2001 UNESCO convention. This limited protection leads to people tending to take heritage objects related to the sites away or damage the heritage objects. It furthermore does not guarantee appropriate consideration in development planning as no spatial management measures have been applied so far.

SOCIO ECONOMIC TRENDS

The important role of the Namibian cultural heritage in understanding and appreciating the country's rich cultural past and in growing the country's tourism sector are leading to growing political awareness and commitment for the protection of Namibia's heritage of the sea. This can be witnessed by the recent ratification of the UNESCO convention by Namibia in 2011.

EXISTING AND POSSIBLE (SPATIAL) SYNERGIES

Conserving the country's marine cultural heritage – in particular shipwrecks – for which the Skeleton Coast is internationally famous, can be beneficial for the marine and coastal tourism sector as an attraction for visitors to the coast. This synergy is however somewhat limited by the remoteness of the wrecks and limited underwater visibilities that prohibits diving.

KEY ISSUES FOR MSP TO CONSIDER

The known shipwrecks should be protected from developments and human uses with adverse effects through the formal declaration of the sites as either a protected place with appropriate buffer zones or a conservation area on the ground of its historic, aesthetic or scientific interest as per the National Heritage Act.

In addition, synergies between the conservation of the marine – particularly maritime – cultural heritage and the tourism sector should be strengthened for the good of the country's socio-economic development.

4.7 MARITIME TRANSPORT AND PORTS

BRIEF DESCRIPTION AND DEFINITION

Maritime transport is the shipment of goods (cargo) and people (passengers) by sea. The Namibian ports of Walvis Bay and Lüderitz provide the transport infrastructure between land and sea and are critical to enabling the movement of goods and people. Ports are a key part of the Namibian maritime and logistics infrastructure. The maritime transport sector and the ports are essential for the country's trade, industrialization, socio-economic development and regional integration. The sector therefore is a key enabler for continued growth of the country as highlighted in the NDP5.[161]

Over the past 20 years, the Government has invested in transport infrastructure development (roads, rail, ports and aviation) in order to meet both the national demand and position Namibia as a logistics hub in the SADC and beyond. As such, the Namibian Ports Authority (NAMPORT) has invested approximately N$ 7.6 billion into the Walvis Bay port extension in the past five years.[162] The overall financial stability of Walvis Bay NAMPORT has increased following the inauguration of the new container terminal.

The port of Lüderitz serves as the base for offshore diamond mining and fishing industries in the southern regions of Namibia. The mining industries in the southern regions of Namibia as well as the north-western provinces of South Africa import and export mining commodities through this port. Also the local fruit industries (particularly grapes from Aussenkehr and from the Northern Cape province) export to Europe from the Lüderitz port.

The Namibian ports look after maritime traffic, including shipping, offshore diamond mining, fishing, sports and recreational traffic. Approximately 3,300 ships visit the Namibian ports annually of which around 2,500 call in Walvis Bay and 800 in Lüderitz.[163] The types of shipping goods include: containerized cargo vehicles, general cargo, bulk (sugar, salt, coal, grapes, manganese), and tankers (fuel, sulphuric acid). Offshore drilling platforms are anchoring within port limits of Walvis Bay for repair with offshore supply tugs servicing them and Luderitz is also an important base for the local fishing and mining industry. The port of Walvis Bay has a dedicated oil terminal which receives petroleum imports, these form the biggest quantity of one commodity landed at the port. About 52% of the goods landed in the ports are for transshipment, which refers to the process of off-loading a container from one vessel and loading it onto another vessel for further transportation to the final port of discharge. 25% are imports into Namibia, while the remaining 23% accounts for exports from Namibia (including commodities from neighbouring countries).[164] There are currently no Namibian-owned goods shipping companies. The international goods shipping companies calling the Namibian ports are MAERSK, CMA CGM, MSC, OCR and COSCO.

Recreational traffic includes large passenger cruises that bring tourists mainly en route from and to Cape Town. All passenger cruise ships are owned by international companies such as Cunard Line or MSC. Local recreational traffic includes marine wildlife tours and yachting for example.

THE CURRENT SITUATION

LEGAL AND POLICY FRAMEWORK

The overall responsibility for maritime transport policy and legislation as well as the management, development and maintenance of port infrastructure is with the Ministry of Works and Transport (MWT). The Directorate of Maritime Affairs (DMA) is the maritime transport regulatory arm of MWT. DMA is tasked with the responsibility of ensuring safety of life and property at sea, maintenance of maritime security compliance, protection of the marine environment from maritime activities, registration of ships and the promotion of the maritime interests of Namibia within the international community.

THE PRIMARY LEGISLATION IN RELATION TO SHIPPING AND PORTS ARE:

- The Merchant Shipping Act (No. 57 of 1951; as amended) provides for the control of merchant shipping in Namibia.

- The Marine Traffic Amendment Act (No. 15 of 1991) regulates marine traffic in Namibia.
- The Namibian Ports Authority Act (No. 2 of 1994) establishes the state-owned enterprise NAMPORT that has the role to manage and exercise control over the operation of ports and lighthouses and other navigational aids.
- The Prevention and Combating of Pollution of the Sea by Oil Act (No. 6 of 1981; as amended) seeks to combat and prevent pollution of the sea by ships, tankers or offshore installations, and determines liability for any damage caused.
- The Environmental Management Act (No. 7 of 2007) promotes the sustainable management of the environment and the use of natural resources by establishing principles for decision-making on matters affecting the environment.
- The Disaster Risk Management Act (No. 10 of 2012) seeks to prevent or reduce the risk of disasters, which also relates to disasters in the maritime transport sector that may harm the marine environment.

The NPD5 seeks to expand the Walvis Port facilities to make it the most preferable port on the African West Coast by 2022.[165]

Other regulatory frameworks that allow for governance over the shipping industry include the International Convention for the Prevention of Pollution from Ships (MARPOL), the UNCLOS, and regulations set by the International Maritime Organization (IMO), of which Namibia is a member. The IMO Convention for the Control and Management of Ships Ballast Water and Sediments entered into force in 2017. This Ballast Water Management Convention aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships' ballast water and sediments.

SPATIAL DISTRIBUTION OF THE RESOURCE/ACTIVITY AND CURRENT UTILIZATION

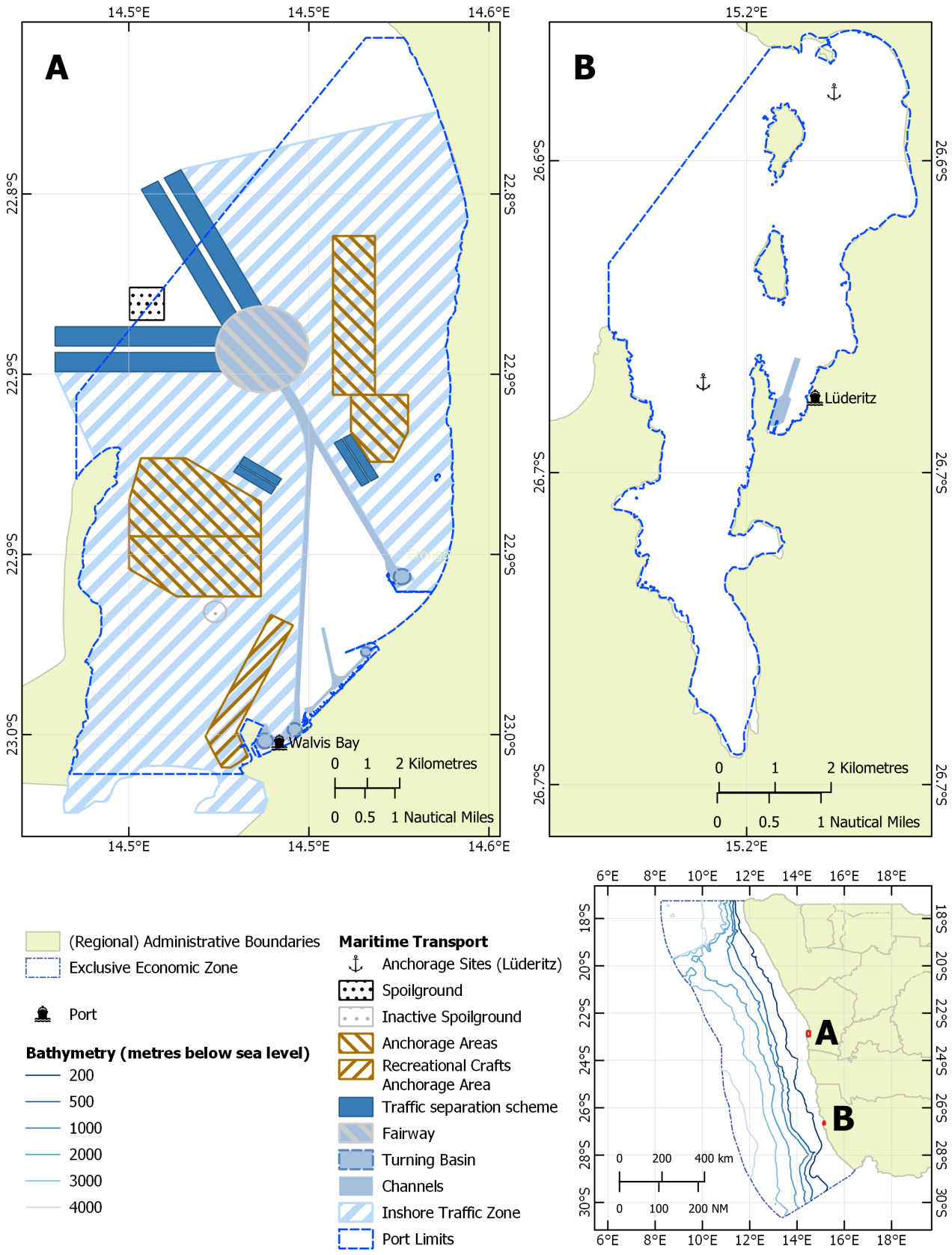
There are two ports in Namibia: Walvis Bay and Lüderitz (see maps 34 and 35). The port of Walvis Bay is the country's major port, situated in the central Namibian coast at the heart of the Central MSP Area. The port of Lüderitz (southern MSP area), located 254 nautical miles south of the Port of Walvis Bay along Namibia's coastline, caters for the southern part of the country, and provides access to markets in the Northern Cape of South Africa.

The ports and linked land transportation corridors present a strategic position of the country as a transport hub for all regional and international trade between the SADC countries, Europe, the Americas, and the rest of the world.

Walvis Bay port has been operating near full capacity in 2019 handling more than 8 million tonnes of cargo annually. The port was recently expanded to enable the handling of more and bigger ships, including more passenger cruises, increasing the volume of containerized cargo handled to approximately 750.000 TEU per annum. Lüderitz port is located in a rocky area which limits its expansion which is why scoping studies are being undertaken to build a new deep water port at Angra Fria point near the existing port. Lüderitz port has a handling capacity of around 800,000 tonnes of cargo per annum. Both ports are linked to the Namibian rail and road infrastructure. Walvis Bay airport provides an international air cargo and passenger link.

There are small ski-boat landing areas in Swakopmund, Lüderitz and Walvis Bay used by small-scale sport and recreational fishers.

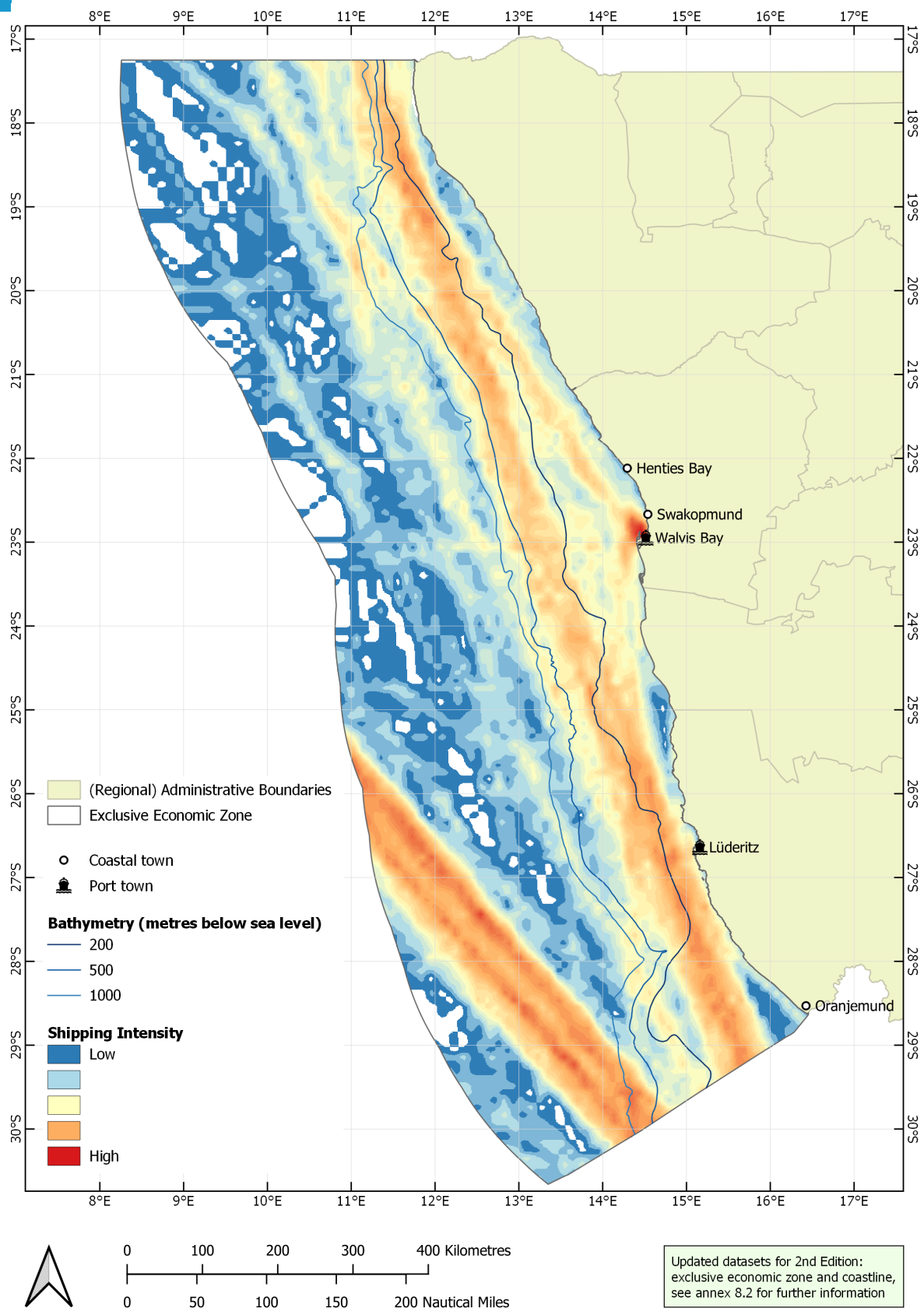
Major transport routes connect the two ports with its neighbouring countries and direct access to principal shipping routes exists. An intensely frequented shipping lane from the Cape to Europe and West Africa crosses the southern part of the Namibian EEZ. Map 35 indicates the intensity of shipping in the Namibian EEZ:



MAP 34:

AREAS RESERVED FOR MARITIME TRANSPORT IN WALVIS BAY AND LÜDERITZ (UPDATED FOR 2ND EDITION)

Updated datasets for 2nd Edition: exclusive economic zone, coastline, maritime transport areas; see annex 8.2 for further information



MAP 35:

THE TWO PORTS OF NAMIBIA (WALVIS BAY AND LÜDERITZ) AND SHIPPING INTENSITY IN THE NAMIBIAN SEA (EEZ) (UPDATED FOR 2ND EDITION)

Namibia's fishing grounds are all accessed from the two ports and Walvis Bay in particular with around 220 fishing vessels registered under the Namibian flag. The offshore diamond mining vessels, of which 10 are Namibian-flagged, call mainly at Lüderitz close to the mining areas in the south of the country. Additionally, two Namibian registered fishing vessels call in Lüderitz.

THE ACTIVITIES OF DMA THAT ARE OF SPATIAL RELEVANCE INCLUDE:

- Regulation of traffic for safety of navigation in the Namibian waters;
- Aids to Navigation; and
- Maritime Search and Rescue (SAR).

SOCIO-ECONOMIC IMPORTANCE

There is no information available for the socio-economic importance of the maritime transport sector. However, currently, the entire transport and logistics sector employs about 25,700 persons which is about 3.6% of the total work force, while contributing 4.7% to the GDP.[166] NAMPORT alone employs 977 workers nation-wide.[167] The ports of Walvis Bay and Lüderitz are the respective city's economic backbones that ensure employment of a large and growing number of inhabitants.

ENVIRONMENTAL IMPACT

MARITIME TRANSPORT AND THE PORT INFRASTRUCTURE HAVE A NUMBER OF ENVIRONMENTAL IMPACTS[168]:

- Marine pollution and ballast water discharge

Maritime transport in the Namibian ocean space and its port infrastructure have the potential to impact on marine biodiversity through oil spills as a result of shipping accidents, discharge of ballast water and/or other waste materials and through ship strikes (collisions between vessels and large marine animals such as whales). Pollution reduces the quality of the ocean, making it less suitable for marine life.

Domestic waste discarded by ships anchored in the bay is increasing both in Walvis Bay and Lüderitz and is picked up on a regular basis during beach clean-ups in the Swakopmund area (for waste from Walvis Bay port), this is big concerns among marine users.

Oil spills can have far-reaching environmental impacts. A number of shipping accidents and oil spill incidents occurred in Namibian ocean space between 2001 and 2006.[169] It is on this basis that Namibia has developed the National Marine Pollution Contingency Plan (NMPCP), which sets out principles on how to deal with and mitigate the risks and details responsibilities, management actions and procedures in case of pollution. The NMPCP is approved by Cabinet, giving effect to Namibia's obligations under the UNCLOS and the 1990 International Convention on Oil Pollution Preparedness, Response and Cooperation. It became effective as from April 2017.[170]

FIGURE 18:
OILED PENGUINS (© JESSICA KEMPER)

Ballast is required to ensure safety of ships' and their operation. Ballast water can however impact the marine environment through the accidental introduction of non-native species when ballast water is discharged. Apart from posing a serious threat to marine biodiversity, invasive alien species can also have serious economic impacts through their detrimental effect on commercial fisheries stocks, including mariculture.[171]

The IMO Convention for the Control and Management of Ships Ballast Water and Sediments that entered into force in 2017. This Ballast Water Management Convention, which has been ratified by Namibia in 2020, aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships' ballast water and sediments. The Marine Environmental Protection Committee of the IMO has adopted a set of voluntary guidelines for preventing the introduction of unwanted aquatic organisms and pathogens from ships' ballast water and sediment discharges as an annexure to the MARPOL Protocol to which Namibia is a party. Currently, there are however no ballast water treatment facilities at neither of the two Namibian ports.

- Navigational and port extension dredging

NAMPORT is responsible to maintain navigation channels for port users, which requires dredging of port sediment to keep the channels functional. Port and port infrastructure expansion developments, navigational dredging and the dumping of dredged material cause loss and/or disturbance of habitat and marine biodiversity through physical smothering or chemical or heavy-metal contamination of disposal sites. There are currently two designated dredged material disposal sites located near the Lüderitz and Walvis Bay ports.

- Underwater noise

Shipping, dredging and port expansion work leads to underwater noise which may disturb marine wildlife. Ships may also carry out activities, such as geophysical exploratory work (e.g. seismics) that may also harm marine wildlife.

- Air pollution and emissions

Shipping causes air pollution through emissions by the fishing, cargo and passenger transport, tourism, and oil and gas industries. The IMO is seeking global agreement on lowering shipping emissions. In terms of NOx, the use of shore-based electricity generation as opposed to that generated by ships would significantly reduce NOx emissions, thereby enhancing air quality especially in and around ports. The IMO set the standards for NOx emissions for international shipping. New regulations were introduced in 2008 under MARPOL, which strengthen the requirements worldwide for all new ships built after January 2011.[172]

LOOKING TO THE FUTURE

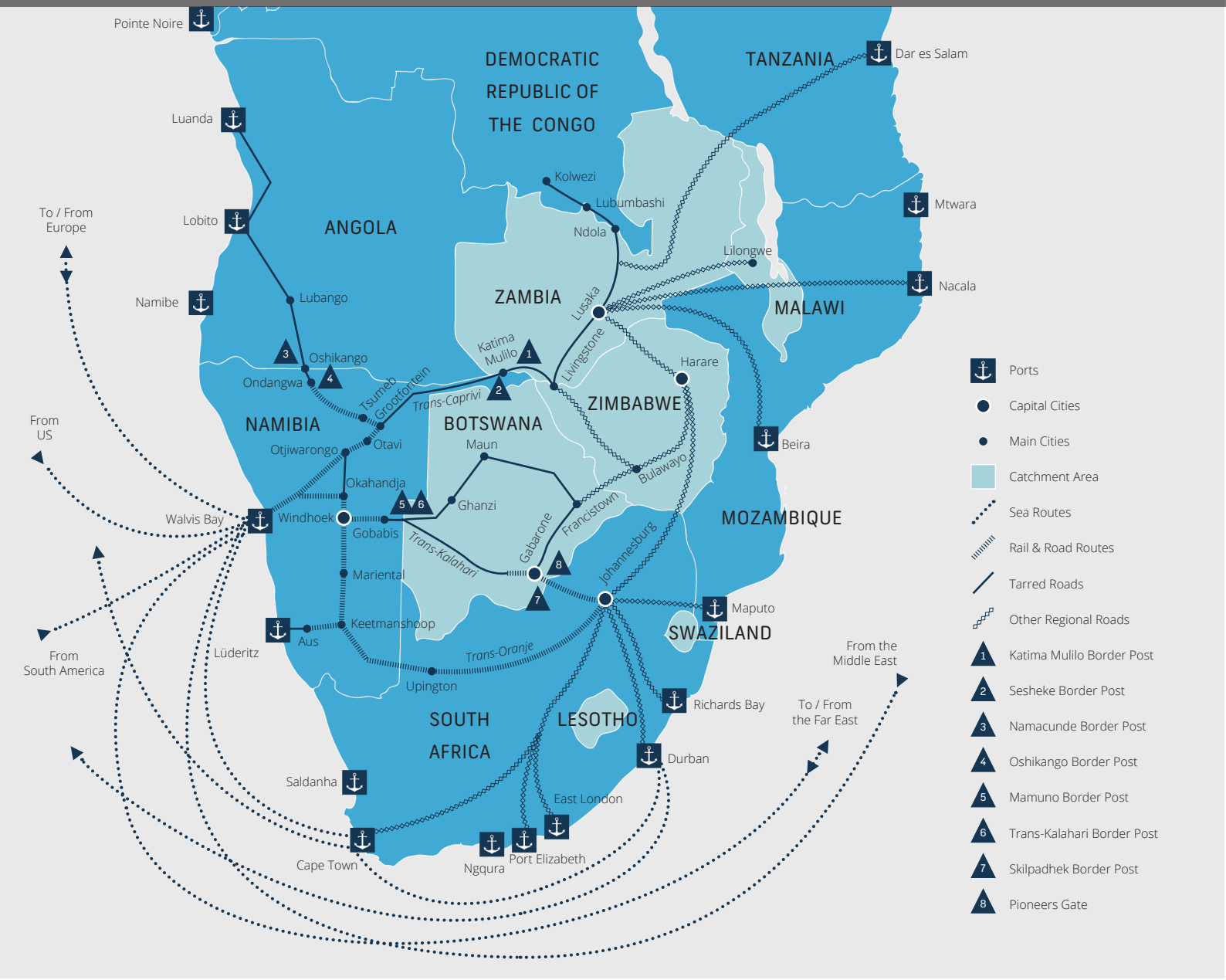
STRATEGIC POLICY OBJECTIVES

The key strategic objectives relating to maritime transport are to accommodate and enable an increasing number and size of ships calling at the ports in order to contribute to national development through the provision of an efficient, effective and well connected Walvis Bay transport and logistic hub in accordance with NDP5, the Transport Master Plan, and the Master Plan of an International Logistics Hub for SADC countries.

The objective for the port of Walvis Bay is that it will have the capacity to handle a minimum of one (1) million TEUs per annum by 2022.[173] Developing the port of Walvis Bay to be a preferred African West Coast Port by forging strategic alliances through public-private-partnerships to overcome the government's financial constraints is key. A critical public-private partnership in this context is the Walvis Bay Corridor Group, that was established to promote the utilization of the Walvis Bay corridors; a network of transport corridors connecting the port of Walvis Bay with Namibia and its SADC neighbours, for example, through the Trans-Kalahari corridor (figure 19). In addition, it is essential to establish a strong and attractive operation base for international logistics, to automate all critical operations processes; and to ensure compliance to standards of the IMO. This entails the intention to develop a maritime transport and ports sector that contributes to ensuring healthy ecosystems, inter alia through oil spill contingency readiness and reducing the environmental footprint of the sector.

FIGURE 19:

THE WALVIS BAY CORRIDORS (© WBCG)



The construction of a new container terminal on reclaimed land by 2019 is a key milestone. The new reclaimed land is created by dredging or deepening the port and using the sand obtained from deepening to form the new land. The project will not only provide increased container handling capacity in the Port of Walvis Bay, but will also increase the port's bulk and break-bulk handling capacity by freeing up the existing container terminal to become a multi-purpose terminal. An additional 600m of quay wall length will be added to the existing 1,800m, and a new passenger liner berth constructed.[174]

In addition, a new proposed port (north port of Walvis Bay) will be built just north of the current built-up area. The project consists of developing a 1,330 hectare plot of currently undeveloped land in the town of Walvis Bay, known as Farm 39. The water area in front of this land will be developed to accommodate port operations, whereas the land will be developed to house various cargo handling terminals. The development of a dig-out basin, which will reclaim water area from within the land, is also envisaged.[175] Close to Lüderitz port NAMPORT is looking into the possibility to develop the Angra Deepwater Port in order to increase the ports capacity.

FIGURE 20:
WALVIS BAY PORT (© NACOMA)

A functional and efficient Walvis Bay port is the backbone for the realisation of many of the NDP5 targets and a key enabler for ensuring enhanced access to and use of the sea in terms of trade, marine mining, fisheries, naval defence and tourism.

The protection of the existing shipping lanes is fundamental to ensuring the maritime transport and ports sector interests and strategic objectives. It is therefore important that there will be no developments in key navigational areas in Namibian waters: those areas with very high levels of ship density.

EXTERNAL PRESSURES AND/OR CONSTRAINTS

THE SECTOR IS EXPERIENCING THE FOLLOWING EXTERNAL PRESSURES:

- Shipping companies cost containment strategies are leading to the rationalization of trade routes and reduction of port calls. This, and the increasing competition of the Namibian ports with other ports in SADC that are also expanding and developing, leads to an economic pressure to expand the ports and deepen channel waters to accommodate bigger ships and enable more cargo handling, and to develop port (semi-)automation.
- Current limitations in the capacity of the hinterland connection infrastructure from Walvis Bay and Lüderitz to other SADC countries and the government's budget constraints present a challenge for the realization of the strategic positioning of the country's ports as transport and logistic hubs in the SADC region.
- The rocky seabed in Lüderitz is limiting the expansion of the port area due to the high costs involved to dredge.

SOCIO-ECONOMIC TRENDS

Maritime transport and ports will continue to be a key sector and factor for Namibia's growth and economy. Sluggish economic growth and weakened demand, coupled with a decline in commodity and oil prices and an unfavourable exchange rate, have however resulted in a decline in volumes handled by the ports in the past few years.[176] Worldwide though, the containerized worldwide trade is set to grow and so is the growth expectation in volumes handled by the ports. This trend and an expected increase in the large-scale bulk, break-bulk cargo volumes and liquid cargo is likely to reinforce the need for a) bigger ships which will require larger and deeper ports, and b) more and better ports, rail and road infrastructure. The expansion of the Walvis Bay port is a visible sign for this trend.

The geo-position of the Walvis Bay port makes it attractive for oil rigs anchoring for repair servicing, coming from Angola and beyond in West Africa. Limited space for land-based repair facilities, coupled with an increase in future demand for such services will lead to floating and bigger repair facilities within the ports limits.

The growth of the Namibian tourism sector and the expected increase in visiting tourists will lead to more passenger liners calling in at both Namibian ports (in particular Walvis Bay) and more tourists using services such as marine wildlife tours operating in the Walvis Bay port limits. This increase in visitors comes with a need for more land-based infrastructure to accommodate the tourists within the port area. A new marina, an extended waterfront, and a new passenger berth are planned as part of the port extension plans.[177]

The intensifying global trade of goods by sea will lead to equal or slightly increased levels of ship densities in the existing shipping lanes.

EXISTING AND POSSIBLE (SPATIAL) CONFLICTS

THE FOLLOWING EXISTING AND POTENTIAL SPATIAL CONFLICTS HAVE BEEN IDENTIFIED:

- Demand and competition for space within the Walvis Bay and Lüderitz port limits by different users is increasing;
- Mariculture is encroaching on the anchorage areas within the Walvis Bay port limits (south of anchorage area number 2); and
- Overlap of shipping lanes and mining sites is considered a potential conflict.
- In Lüderitz, there is a lack of of space on land to handle port activities due to fishing and diamond concessions issued within the port limit. The port is looking into reclaiming land to ensure it can operate efficiently.

The only significant non-spatial conflict identified is the lack of coordinated marine permit licencing according to an agreed spatial plan (causing the above current and possibly leading to the potential conflicts).

EXISTING AND POSSIBLE (SPATIAL) SYNERGIES

THE FOLLOWING EXISTING AND POTENTIAL NON-SPATIAL SYNERGIES HAVE BEEN IDENTIFIED:

- Use of other sector's vessels (e.g. the MFMR's patrol boat) would enable DMA to better monitor and observe the activities at sea (e.g. illegal activities like IUU fishing, illegal discharge of oil, ballast water and litter at sea); and
- Walvis Bay port as the centralized maritime infrastructure and logistics hub for the entire country enables synergies with other sectors and marine users through, for example, cost reduction in terms of logistics. This also applies for Lüderitz but to a lesser degree.

KEY ISSUES FOR MSP TO CONSIDER

THE MARITIME TRANSPORT AND PORTS SECTOR REQUIRES THE MSP PROCESS TO CONSIDER AND SOLVE THE FOLLOWING ISSUES:

- Avoid any developments in key navigational areas (e.g. areas of high levels of ship density, IMO recommended shipping lanes).

The Namibian maritime transport infrastructure attracts both development on land and at sea, and, in many respects, the development of the Namibian blue economy is unlocked by the provision of high-quality, integrated maritime transport infrastructure and services. In other words, the Namibian maritime transport infrastructure, especially in Walvis Bay, and linked shipping routes are key ingredients required for the development of all other sectors and therefore a prerequisite to unlock the blue economy and achieve the MSP goals. For the port of Walvis Bay this means that MSP must address the following:

- Increased risk of pollution and search and rescue incidents as a result of more traffic leads to the need to introduce a Traffic Separation Scheme (TSS) in the Walvis Bay port approaching area;
- Widen the existing Walvis Bay port channel from 130 to 220m, and dredge a new channel for the new port areas; and
- Find an appropriate and agreed "spoil ground" location for the dumping of dredging material.

In Lüderitz NAMPORT is experiencing conflicts between their activities and environmental conservation at Shark Island, Angra Point and Seawater Bay.

4.8 MARINE AND COASTAL TOURISM

BRIEF DESCRIPTION AND DEFINITION

Namibia's rich natural beauty and diversity has enabled the country to become one of the prime tourism destinations in SADC. Although most of recreational activities are concentrated inland, marine and coastal tourism is an essential component of the country's recreational offer and is expected to grow.

Marine tourism refers to sea-based activities as well as their land-based services, whereas coastal tourism refers to land-based tourism activities taking place on the coast for which the proximity to the sea is a condition including their respective services.

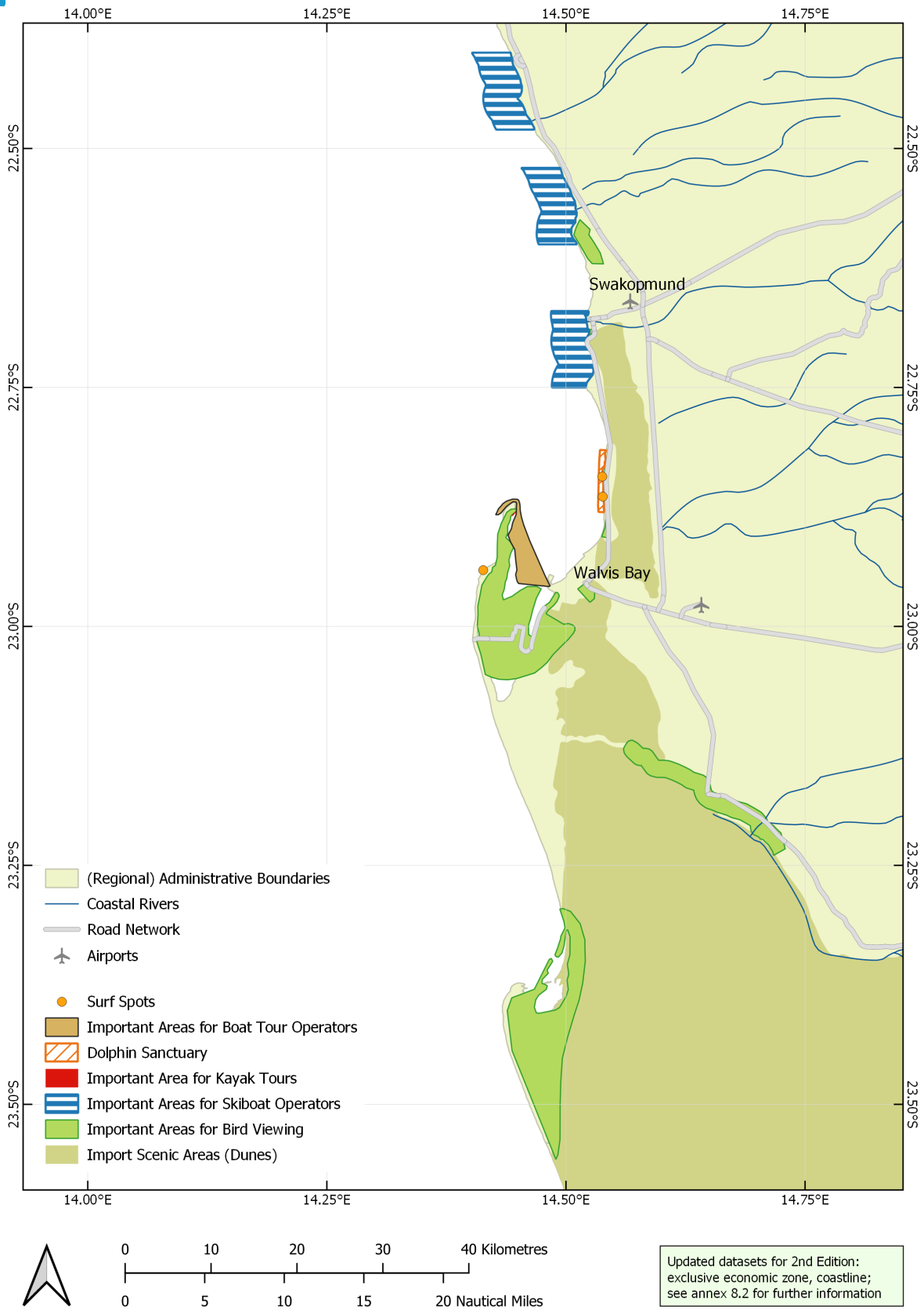
Marine and coastal recreational activities in Namibia include but are not limited to walking on the beach, fishing and/or marine wildlife cruises. Marine and coastal tourism activities organised by individuals or commercial operators take advantage of the attractive and unique coastal scenery where the ocean meets the desert. A clean and well managed marine environment is therefore fundamental to a successful marine and coastal tourism industry in Namibia.

TYPES OF MARINE AND COASTAL TOURISM:

Marine tourism activities that are currently happening around Walvis Bay, Swakopmund and Lüderitz include the following (map 36):[178]

- Motor boating tours that operate (Walvis Bay, around Pelican Point, Lüderitz Bay and Halifax Island)
- Boating/kayaking tours (at Pelican Point)
- Recreational sea angling
- Marine birding tours
- Yachting

FIGURE 21:
KAYAKING AT PELICAN POINT (© NACOMA)



MAP 36:

MARINE TOURISM ACTIVITIES AROUND WALVIS BAY AND SWAKOPMUND

(UPDATED FOR 2ND EDITION)

FIGURE 22:
TOUR BOAT (© MARISMA)

COASTAL TOURISM ACTIVITIES THAT ARE CURRENTLY TAKING PLACE INCLUDE THE FOLLOWING:

- Recreational fishing;
- 4x4 tours along the coast and self-drives;
- Sport (surfing, horse-riding, fat biking);
- Scenic and wildlife coastal tours to Cape Cross, Lüderitz Peninsula, Sandwich Harbour, Walvis Bay and Pelican Point.

LEGAL AND POLICY FRAMEWORK

The Ministry of Environment, Forestry and Tourism (MEFT) is mandated to manage and develop the country's marine and coastal tourism sector. The mandate is derived from the Constitution of the Republic of Namibia, and various other legal, policy, and regulatory instruments. The Ministry promotes biodiversity conservation through the sustainable utilization of natural resources and tourism development for the maximum social and economic benefit of its citizens.

THE MINISTRY OF ENVIRONMENT, FORESTRY AND TOURISM PRIMARY LEGISLATIONS AND POLICIES RELATED TO MARINE AND COASTAL TOURISM ARE:

- The Environmental Management Act (No. 7 of 2007);
- The National Tourism Policy (2008);
- The National Sustainable Tourism Growth and Development Strategy (NSTDGS) (2016 – 2026);
- The National Tourism Investment Profile and Promotion Strategy (NTIPPS) (2016 – 2026).

Namibia's NDP5 refers to tourism as a key industry with the potential to grow the economy, with the focus on improved competitiveness and diversification to increase the number of visitors. Investing in the conservation and sustainable use of Namibia's terrestrial and marine ecosystems is a goal as this means to also invest in the country's future as an ecotourism destination.[179]

Namibia's Tourism Policy aims to support sustainable development through tourism management. The main objective of the two tourism strategies (NSTGDS & NIPPS) is to grow and develop the sector with the aim of promoting tourism investment thereby increasing tourist arrivals and creating employment. In addition, the concessions policy shall be strengthened to support social empowerment, besides encouragement of sustainable management of natural resources at different levels of the government. The strategies also seek to increase the economic return gained from all the recreational activities within protected areas while promoting conservation of biodiversity. With the successful completion of these objectives, the goal is to make Namibia the most competitive tourism destination in Africa.

The Ministry of Environment, Forestry and Tourism unites the mandates of environmental and tourism management under one roof with relevant competencies. This highlights the significance of the natural environment and the services it provides for the tourism sector and the nation, as well as the important role of investing in its conservation and sustainable use.

The Namibia Tourism Board Act (No. 21 of 2000) established the Namibian Tourism Board (NTB) in 2000. Its purpose is to promote tourism and its development, and ensure high quality services provision. In addition, the NTB is mandated to promote an environmentally sustainable tourism that contributes to the conservation and sustainable use of the country's natural resources.

SPATIAL DISTRIBUTION OF THE RESOURCE/ACTIVITY AND CURRENT UTILIZATION

Marine tourism activities at present occur in areas close to the populated centres of Lüderitz, Walvis Bay,Swakopmund, and Henties Bay, with the central coast as a hotspot. Occasionally (once or twice a year) a marine tour has ventured due west of Walvis Bay to observe marine birds like albatrosses offshore.

Most of marine tourism activities focus on Walvis Bay and (to a lesser degree) on Lüderitz due to their embayment and shelter from the open ocean, the linked infrastructure such as marinas, tourism infrastructure on land, and the land-based services required such as specialist boat repair skills. Marine recreational activities mainly depart from the Walvis Bay and Lüderitz waterfronts and Yacht Clubs, and Swakopmund Mole. Cruise ships dock in Walvis Bay and, occassionally, Lüderitz and bring inlarge numbers of tourists, who make use of coastal recreational offers primarily. There are a number of surf spots close to Walvis Bay, including at Donkey's Bay, which is internationally known as is the world-famous kite-surfing location in Lüderitz where speed records are broken annually.

Information on participation in marine and coastal leisure activities in Namibia is scarce. However, it is estimated most of all foreign visitors to Namibia (1.57 million in 2016; Tourist Statistical Report 2016) visit the coast and make use of either marine or coastal tourism offers.[180]

THE FOLLOWING COMPANIES AND THEIR BOATS CURRENTLY OPERATE REGULARLY OUT OF WALVIS BAY[181](7) OR LUDERITZ (2):

- The Catamaran Charters: 1 x 60ft sailing catamaran; 2 x 45ft sailing catamaran; 1 x 40ft motorised catamaran;
- Laramon: 2 x 40ft motorised vessels;
- Mola Namibia: 1 x 40ft motorised catamaran; 3 x 30ft motorised catamarans;
- Ocean Adventures: 1 x 40ft motorised vessel;1 x 30ft motorised vessel;
- Sunsail Namibia: 1 x 40ft sailing catamaran; 2 x 40ft motorised catamarans;
- Levo Tours: 4 x 20ft motorised ski-boats;
- Walvis Tour Guides: 1 x 35ft motorised catamaran;
- Penguin Catamaran Tours: 1 x 42ft motorised catamaran (Lüderitz);
- Zeepaard Boat Tours: 1 x 35ft motorised catamaran (Lüderitz).

Tours depart daily at around 09h00 from the Waterfront and return at around 12h15 at both Walvis Bay and Lüderitz. Afternoon tours are done on an *ad hoc* basis. All tours in Walvis Bay follow roughly the same route: Waterfront – Oyster Farms – Lighthouse – Pelican Point – Open Sea around the point – return to the Waterfront past ships in the bay. In Lüderitz tours go from the waterfront to Halifax Island via Dias Point and return.

A number of tour companies offer guided tours in 4x4 vehicles along the coast between Lüderitz and Walvis Bay. There is also growing interest in tours operating along the Skeleton Coast Park coastline between Terrace Bay and the Kunene river mouth.

The coastal tourism activities are mainly concentrated in the Kuiseb delta and the dune area between Swakopmund and Walvis Bay as these are the only easily accessible coastal dunes in the country. Inbound tour operators cooperate with the local sea-based activity operators to provide the 'Atlantic Ocean Experience' to their clients in addition to the inland visit.

The most frequently occurring land-based adventure tourism use practices that occur along the coastline are recreational beach-based fishing, 4x4 tours and self-drives on the beach or in the dunes, sport (surfing, horseriding, fat biking), and coastal scenic and wildlife tours to Sandwich Harbour, Cape Cross Seal Reserve, Walvis Bay and Pelican Point.

SEASONALITY OF THE USE

Most recreational activities occur throughout the year. However, those recreational activities that depend on marine wildlife are seasonal such as rock lobster diving, surfing, sightings of whales and certain bird species. The Palaearctic birds arrive in September and leave in April, whales are most active between July and November. The rock lobster season is from November through April. The winter swell arrives in May and drops off in October, for wind and kite surfing the strong winds occur in the summer months. The shore angling, ski boat angling, kayak and boating tours generally occur throughout the year.

The number of boats going out from Walvis Bay for marine wildlife tours on any given day varies, during high season in August, often all boats by all companies go out, while in the very low season in January often only two or three boats go out.

During the summer vacation time the beaches in the central MSP area, especially between Swakopmund and Walvis Bay, become very crowded. During these peak times, tourism operators often cannot keep up with the demand.[182]

SOCIO-ECONOMIC IMPORTANCE

There is little information on the socio-economic significance of marine and coastal tourism as well as on the participation in marine and coastal leisure activities in Namibia. Overall, approximately 1.57 million foreigners visited Namibia in 2016.[183] It is estimated that most of these international visitors will visit the coast due to the promoted round-trips and tours that operators use.[184]

The tourism industry's direct impact contributed N$ 5.192 billion to the Namibia national economy in 2015, which accounts for around 3.5% of the country's GDP. In total, the tourism industry provides approximately 44,700 jobs representing 6.5% of total employment in Namibia. Looking at the broader indirect economic tourism sector footprint, the contribution was N$ 15.084 billion, which is equivalent to approximately 10.2% of total GDP and approximately 100,720 jobs representing 14.5% of total employment in 2015.[185] This makes the tourism sector the third largest income earner after mining and agriculture in Namibia. The marine and coastal tourism sector, which is a key component of the country's industry, therefore contributes significantly to the generation of employment, development, and poverty reduction in the coastal towns.

A total number of 50 tourist activity operators are registered in the Erongo region with the Namibian Tourism Board of which 18 are sea-based activity operators.[186]

The Ministry of Environment, Forestry and Tourism generates sustainable revenues through concessions for operators which contribute directly to poverty alleviation and job creation in rural areas. Since concessions were given out beginning in 1986, over N$ 6 million have been generated through fees, park permit entry fees and others such as fees for the processing of EIA applications.[187]

ENVIRONMENTAL IMPACTS OF THE SECTOR

RECREATIONAL ACTIVITIES CAN HAVE AN IMPACT ON THE MARINE AND COASTAL ENVIRONMENT, SUCH AS:

- Habitats and species disturbance/damage:
  - Recreational boats can act as a vector for introducing alien species around coastal waters;
  - Coastal development and expansion of maritime tourism-related infrastructure; and
  - Underwater noise.
- Waste from boats and land-based recreational activities incl. litter on beaches (e.g. tangled fishing lines, hooks, etc.);
- Negative impact of beach driving on breeding coastal birds;
- Illegal fishing in sanctuaries and over-fishing; and
- Additional stress on limited freshwater resources through increasing numbers of tourists.

LOOKING TO THE FUTURE

STRATEGIC POLICY OBJECTIVES

There are no specific policy objectives for the marine or coastal tourism sector. The strategic policy objectives for tourism in general however are aimed towards the development of a sustainable industry that contributes "to the generation of foreign exchange earnings, investments, revenue, employment, rural development, poverty reduction and to the growth of the country's economy. Tourism also creates strong direct and peripheral benefits because of its multiplier effect, based on its reliance on a wide spread of supplies and services."[188]

An agreed vision in Namibia's tourism policy is: "Namibia will develop the tourism industry in a sustainable manner to contribute significantly to the economic development of Namibia and the quality of life of all her people – primarily through job creation and economic growth".[189]

Based on the recognition that with every 13 tourists entering Namibia one job is created, the following key policy objectives for the country's tourism sector can be derived from the National Sustainable Tourism Growth and Development Strategy 2016 – 2026, the National Tourism Investment Profile and Promotion Strategy 2016 – 2026, and the 2008 National Policy on Tourism for Namibia:

- To become number one in tourism in Africa;
- Increase tourist numbers and improve geographic spread;
- Strengthen the coastal tourism sector;
- Increase cruise ship visits to Walvis Bay; and
- Improve and increase training and capacity development in the tourism sector.

In addition the expansion of the state-owned Namibia Wildlife Resorts facilities at the coast like Mile 14, Shark Island, Jakkalsputz, Mile 108 and Torra Bay camp sites into lodges and holiday villages with airfield access is planned.

EXTERNAL PRESSURES AND/OR CONSTRAINTS

External pressures with potential direct spatial implications for both marine and coastal tourism include climate change and other natural phenomena as this may cause changes in the distribution of habitats and species, which serve either as attraction for visitors or which are used for recreational fishing purposes.[190, 191]

A pressure on the marine and coastal tourism sector may also arise from spatial restrictions due to closures of areas in order to protect habitats or species. For example, the Atlantic bottlenose dolphin population in Walvis Bay is unique within Southern Africa and is the only inshore population of common bottlenose dolphins south of Angola. The population numbers less than 100 individuals.[192] This makes them susceptible to disturbances, including by marine tourism activities. There is an agreed upon no-go-area north of the Walvis Bay harbour to Long Beach from the shore to 15m depth for tourism operators as this area is used by the dolphins to rest.

Seeing that a clean, healthy marine environment is fundamental to a successful marine and coastal tourism industry, an external pressure is caused by the growth of the Namibian economy as this leads to increasing pressures on the marine environment and those areas of value for the tourism sector. Population growth and associated land-based pollution as well as coastal and port development in Walvis Bay are some of the driving forces. The coastal tourism industry is also affected by this, for example through the encroachment of infrastructure into coastal parks.

Another constraint for the growth of the marine and coastal tourism industry is that most of the international visitors only stay for a brief period at the coast (one to maximum three days). The coast is often considered as a transit destination with visitors overnighting on their way to the country's major inland destinations (e.g. Sossusvlei and Etosha).

Some of the external pressures or constraints such as extreme weather condition can be inhibiting to coastal tourism activities thereby making some activities seasonal or weather-dependent.

As recent experience has shown global health pandemics with accompanying travel restrictions can decrease the number of tourists substantially.

SOCIO-ECONOMIC TRENDS

Tourism is amongst the fastest growing industries at the coast and in Namibia. However, at this point in time, only a slight increase in marine recreational activities is expected.[193] The current number of 18 sea-based activity operators registered in the Erongo region and two in Lüderitz with the NTB is not expected to increase significantly because the current operators cater for the current, and slightly increasing, numbers of tourists. However, an increase in marine traffic by these operators, especially outside of the high season might be observed.

In addition, the portfolio of services and attractions offered by operators might diversify, which could lead to areas currently not used for recreation to be used in future. The revenue generated by and employment rate of the marine tourism sector is not likely to change considerably.

The two tourism strategies are promoting investment in cruise ship tourism, which is expected to result in an increase in the tourist arrivals at the coast with a slight increase in sea-based activities as described above and higher increases in coastal land-based recreational activities. The promotion and marketing of Namibia as a preferred film tourism destination is also expected to result in a diversification of marine and coastal tourism activities offered by operators.

The upgrading of the international airport of Walvis Bay and the coastal-linked road infrastructure as well as the current extension of the port of Walvis Bay are conducive developments that contribute to the above trends.

The increase in marine and coastal tourism activities – although expected to be slight only – may lead to further NTB unregistered, and thereby illegal, operations along the coast and in terms of boat-based fishing tours, which has already been witnessed. Although permits for fishing and visiting coastal conservation areas (e.g. Sandwich Harbour) are obtained, the operations are not registered with NTB and do not comply with visitor safety and security requirements.

EXISTING (AND POSSIBLE) SPATIAL CONFLICTS

THE FOLLOWING EXISTING AND POTENTIAL SPATIAL CONFLICTS HAVE BEEN IDENTIFIED:[194]

- Habitats and species disturbance/damage:
  - Underwater noise disturbs in particular those cetaceans that the tourists come to see;
  - Municipal developments close to the shoreline disturb both sea and shore birds in Namibia's Important Bird Areas (e.g. beach between Swakopmund and Walvis Bay, which is also part of the Namib Flyway EBSA); and
  - Future conflicts may also arise with intensified coastal development encroaching into the coastal protected areas.
- Waste from recreational boats and land-based leisure activities:
  - Pollution originating in the harbour and from ships docked in the bay is both ugly and plastic products including packaging straps kill marine wildlife; and
  - The lack of sanitary infrastructure at desolated coastal destinations (e.g. Sandwich Harbour) pollutes the unique environment and impacts the visitor's experience negatively.
- Illegal fishing by tourists in fishing sanctuaries:
  - This occurs in the sanctuaries of the Cape Cross Seal Reserve, Sandwich Harbour and from Pelican Point to Sandwich Harbour during migration season of gravid cob.

EXISTING (AND POSSIBLE) SPATIAL SYNERGIES

THE FOLLOWING EXISTING AND POTENTIAL SPATIAL SYNERGIES HAVE BEEN IDENTIFIED:[195]

- Artificial guano platforms as bird viewing spots;
- Conservation and sustainable use of habitats and species helps maintain a healthy environment which is a prerequisite for successful nature-based marine tourism; and
- Salt mining activities in Swakopmund and Walvis Bay provide extra habitat for both sea and shore birds which attracts the tourists.

KEY ISSUES FOR MSP TO CONSIDER

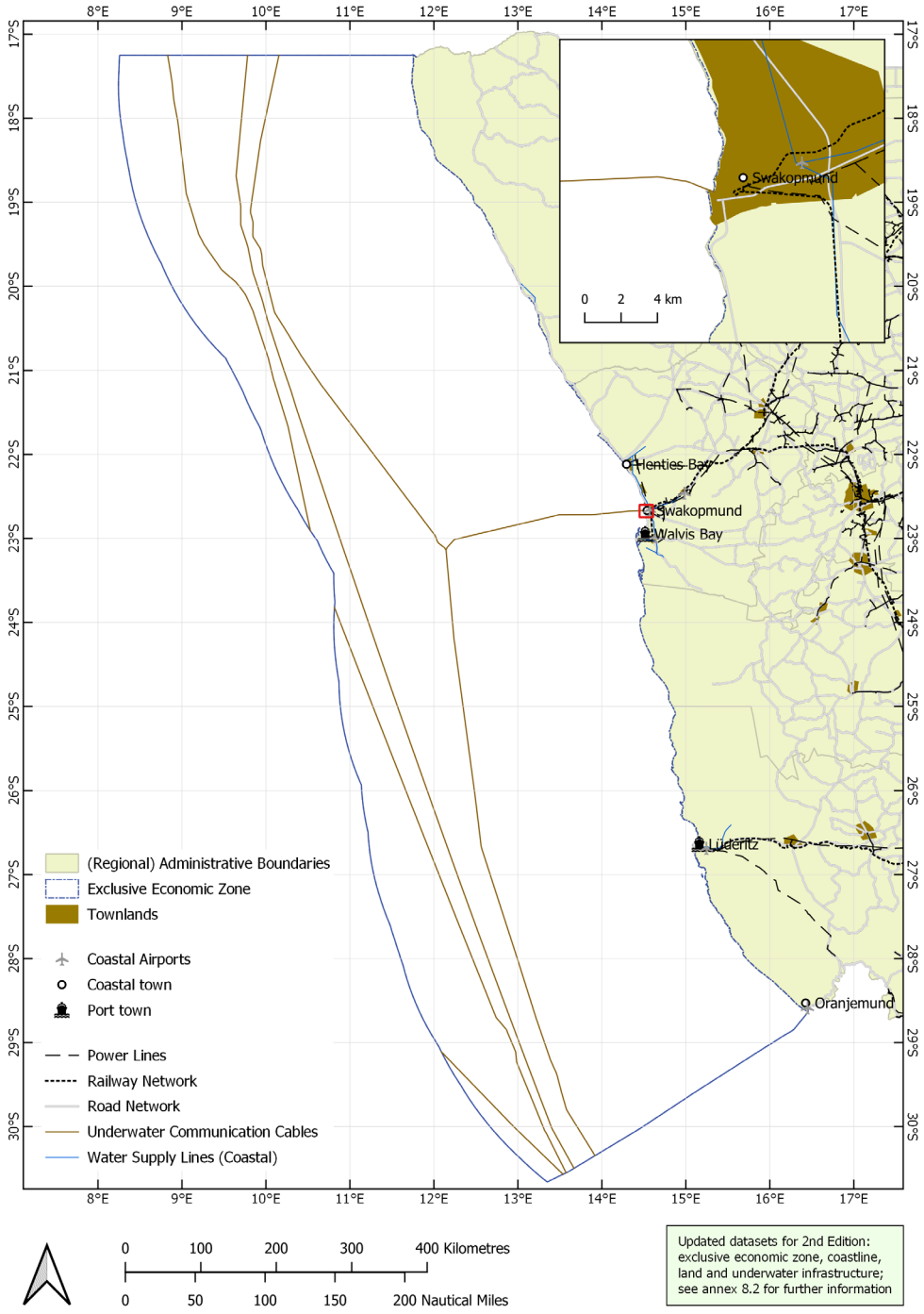
THE MARINE AND COASTAL TOURISM SECTOR REQUIRES THE MSP PROCESS TO ADDRESS THE FOLLOWING ISSUES:[196]

- Sustainable marine and coastal tourism requires a healthy marine environment;
- The marine tourism sector requires appropriate land-based infrastructure and associated services;
- With little information on the socio-economic significance of marine and coastal tourism as well on the participation in marine and coastal leisure activities in Namibia, there is a need to establish and enhance data availability on marine and coastal tourism in order to further support and monitor the sector's development;
- The routes of the marine tourism operators need to be agreed and the enforcement of the existing code of conduct ensured; and
- Sustainable tourism provides an ideal platform for environmental education.

4.9 INFRASTRUCTURE

THE CURRENT SITUATION

The central coast is the area along the Namibian coastline with the most intensely developed infrastructure on land (map 37), with less developed infrastructure in the south at Lüderitz and Oranjemund. In the north there are a few lodges, tourist camp sites, park management offices and a mining camp spread along the coastline. Infrastructure in that sense covers the built environment and facilities for the transportation of goods, passengers and services by road, rail and aviation. In addition, a set of underwater communication cables crosses the Namibian ocean space with connections to the central coast. Other infrastructure for energy and shipping is dealt with in sections 3.2 and 4.7.



MAP 37: COASTAL AND UNDERWATER COMMUNICATION INFRASTRUCTURE (EEZ) (UPDATED FOR 2ND EDITION)

The coastal built environment comprises Walvis Bay harbour town stretching for approximately 20km along the coast from "Lovers Hill" bordering the Dorob National Park in the south to "Langstrand" in the north, in the Walvis Bay district. The built environment of the town of Swakopmund stretches for approximately 15km from the Swakop River Mouth to the northern boundary of the Swakopmund Salt Works. Lüderitz is a much smaller harbour town in the south stretching for some 5km along a rocky shoreline and is surrounded by dunes. Oranjemund is a small mining town at the Orange river mouth. Wlotzkasbaken is a village settlement occupying approximately 1km of coastline midway between Swakopmund and Henties Bay. Henties Bay stretches for approximately 8km from an area known as "Solitude" to the Omaruru River Mouth. Other important infrastructure includes the desalination plant bordering the northern boundary of Wlotzkasbaken.

Other very isolated buildings include the campsites and NWR tourist facilities at Mile 14, Jakkalsputz and Mile 72, Mile 108, Torra Bay and Terrace Bay. At Cape Cross there is a lodge, some private houses and government buildings. Apart from Walvis Bay all other areas on the Erongo Region coastline fall within the Swakopmund district.

The on-land transport infrastructure enables connection between coastal towns, regions and the Namibian inland areas. In the central area there is one national road linking all coastal settlements and one national road to the interior. There is one national road linking Lüderitz to the interior.

Apart from the main tarred roads in the Erongo region there are six secondary gravel roads to the interior. In the southern area Oranjemund is connected to Lüderitz via gravel roads. The railway links Swakopmund and Walvis Bay as well as Lüderitz to the interior.

FIGURE 23:
WALVIS BAY INFORMAL SETTLEMENT SPREAD (© NACOMA)

There are five civil aviation airports at the coast with air services including one international airport at Walvis Bay, which – in terms of passenger numbers – is the second largest airport in Namibia. Walvis Bay has international flights to Johannesburg and Cape Town apart from national flights to Windhoek and Ondangwa. The other civil aviation airports along the coast near the sea are in Swakopmund, Lüderitz, Oranjemund and Henties Bay. There are numerous small aircraft landing strips between Orange river mouth and the Kunene river mouth. These are situated at all the Namibia Wildlife Resorts camp sites , lodges, mines and Ministry of Environment, Forestry and Tourism offices.

A national telecommunication broadband backbone connects all regions, districts and towns to access the 12,000km long national broadband infrastructure as well as the sea cable landing on the central shores of Swakopmund, known as the West Africa Cable System (WACS). Two submarine cables, the Africa Coast to Europe (ACE) and South Atlantic 3/West Africa Submarine Cable (SAT-3/WASC) cross the Namibian EEZ, but are not connected to the land. Additionally, the decommissioned SAT-1 cable crosses through the EEZ in the southwest (map 37).

LOOKING TO THE FUTURE

With the steady influx of new inhabitants, the economic growth of the coast-based industries, and the development of the Walvis Bay and Lüderitz corridors, a steady expansion and upgrade of the infrastructure will take place. For example, the upgrade of the road between Swakopmund and Henties Bay began in 2017 and has been completed. In addition, the development of a new road linking Swakopmund and Walvis Bay behind the dune belt skirting Swakopmund as part of the Walvis Bay harbour and logistics hub development has been completed in 2020. Walvis Bay International Airport's runway was upgraded in 2011 and the new terminal opened in 2016. Upgrading the airport, road and rail links between Lüderitz and the interior is ongoing.

KEY ISSUES FOR MSP TO CONSIDER

Maximising social and economic benefits through the sustainable development of the Namibian blue economy will rely on the coastal infrastructure and its gradual upgrade. This requires space on land for the various sectors to expand their land-based infrastructure requirements. The expansion of the port and the associated development of the Walvis Bay and Lüderitz corridors is an important element

4.10 SEA WATER ABSTRACTION

BRIEF DESCRIPTION AND DEFINITION

Water is essential for human life and the basis of our economies. Economic growth depends on the availability of water to support the operations of industries, power generation, and commerce. Sea water abstraction involves taking water, via pipe, from the sea and using it for an industrial process or human consumption (after desalination). Sea water can be either permanently (e.g. for agricultural uses) or temporally abstracted (e.g. for industrial purposes after which the water is screened and released back into the sea). Sea water abstraction therefore requires regular monitoring and control through a permit system. The seawater abstraction in Namibia mainly happen for industrial application in fish factories, mining, salt production and desalination points.

Water demand for economic activities and human consumption is estimated to increase.[197] Desalination of seawater accounts for a worldwide water production of 24.5 million m^3/day.[198] Although Namibia is not a region like the Arabian Gulf where most desalination takes place, the increase in water demand (25Mm3/year) also leads to renewed interest in desalination in Namibia, which is re-enforced by the envisaged impacts of climate change on water availability.

FIGURE 24:
ORANO DESALINATION PLANT, SWAKOPMUND (© MAWLR) [199]

THE CURRENT SITUATION

LEGAL AND POLICY FRAMEWORK

The Ministry of Agriculture, Water and Land Reform (MAWLR) is the key government ministry mandated to promote, develop, manage and utilize agriculture, water and forestry resources in Namibia, in a sustainable and equitable manner.[200]

The Department of Water Affairs (DWA) in MAWLR has the objective of ensuring that Namibia achieves sustainable water resources management and provides services contributing to socio-economic development and environmental sustainability.[201]

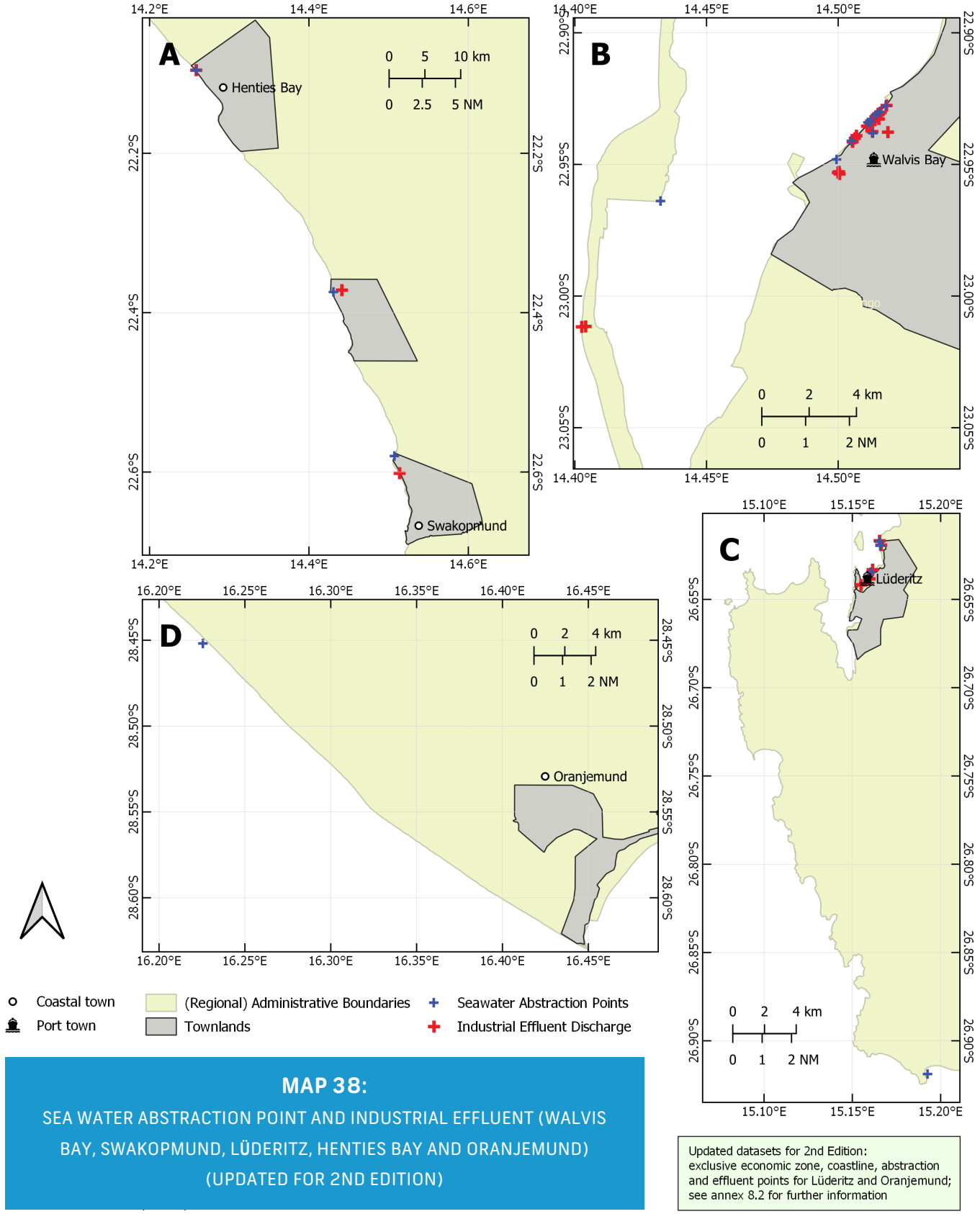
This is achieved through an enabling legal and policy framework that supports sustainable development and management of water resources, ensures efficient use of water resources in order to meet national economic and social development goals, seeks to ensure adequate Namibian access to water from internationally shared water resources, and improves knowledge on water resources for sustainable use, national security and development. Article 95 (j) and (l) of the Namibian Constitution provides the primary legal basis for the sustainable use of the country's water resources. In carrying out its water resource management mandate, the MAWLR is guided by but not limited to the following key legislation and policies:

- The Water Act (No. 54 of 1956) including amendments and regulations.
- The Water Resources Management Act (No. 11 of 2013).[202]
- The 2002 National Water Policy White Paper forms the basis for the 2013 Water Resources Management Act. The policy provides a framework for equitable, efficient and sustainable water resources management and water services and stresses sectoral co-ordination, integrated planning and management and resource management aimed at coping with ecological and associated environmental risks. It clearly states that water is an essential resource to life and that an adequate supply of safe drinking water is a basic human need. The policy recognises that water is essential to maintain natural ecosystems and that in a country as dry as Namibia, all social and economic activity depends on healthy aquatic ecosystems. The National Water Policy also stresses that the management of water resources needs to harmonise human and environmental requirements, recognising the role of water in supporting the ecosystem.
- The Water Supply and Sanitation Policy of 2008.
- Namibia's NDP5 identifies the sustainable production and consumption of water resources as a key development policy priority. The focus here is on ensuring that existing water infrastructure is maintained and upgraded, new infrastructure is built, and existing water sources are managed better to improve access to freshwater for the sustainable development of the country.[203] This is in line with the Vision 2030's freshwater objectives.[204]
- The Integrated Water Resources Management Plan of Namibia of 2010.
- The Revised SADC Protocol on Shared Watercourses of 2000.
- Land Survey Act (No. 33 of 1993).

SPATIAL DISTRIBUTION OF THE RESOURCE/USE AND CURRENT UTILIZATION

MAWLR is responsible for controlling abstraction of sea water from the ocean, disposal of domestic and industrial effluent, and potable water and effluent quality monitoring. The monitoring activities are conducted countrywide, including at the municipalities of Lüderitz, Swakopmund, Henties Bay and Walvis Bay (map 38).

As mentioned before, a significant amount of seawater is abstracted and desalinated primarily for supply of water to the coastal mining industry, human consumption and the processing of fish and fish products. Furthermore, sea water is abstracted for the purpose of salt production through evaporation at Walvis Bay, Swakopmund and Henties Bay.



MAP 38:

SEA WATER ABSTRACTION POINT AND INDUSTRIAL EFFLUENT (WALVIS BAY, SWAKOPMUND, LÜDERITZ, HENTIES BAY AND ORANJEMUND) (UPDATED FOR 2ND EDITION)

Updated datasets for 2nd Edition: exclusive economic zone, coastline, abstraction and effluent points for Lüderitz and Oranjemund; see annex 8.2 for further information

TABLE 6:

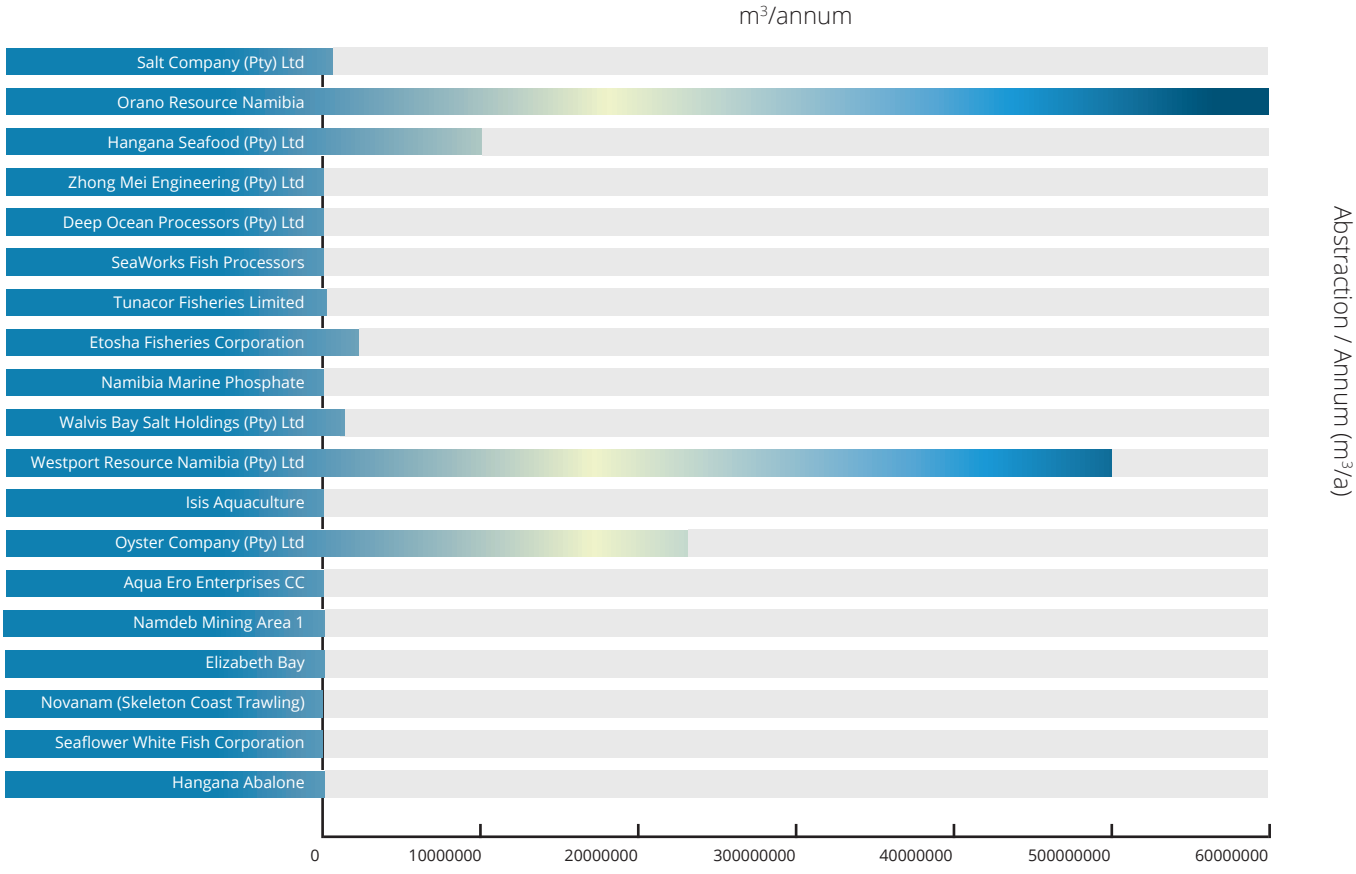
PERMITTED VOLUMES OF SEA WATER CURRENTLY ABSTRACTED BY VARIOUS OPERATIONS

PERMIT HOLDER	ABSTRACTION/ANNUM/(M3/A)
Salt Company (Pty) Ltd	1460000
Orano Resource Namibia	60000000
Hangana Seafood (Pty) Ltd	10080000
Zhong Mei Engineering (Pty) Ltd	50000
Deep Ocean Processors (Pty) Ltd	290000
SeaWorks Fish Processors (Pty) Ltd	220000
Tunacor Fisheries Limited	540000
Etosha Fisheries Corporation	3240000
Namibia Marine Phosphate	6000
Walvis Bay Salt Holdings (Pty) Ltd	2000000
Westport Resource Namibia (Pty) Ltd	50000000
Isis Aquaculture	3000
Oyster Company (Pty) Ltd	23000000
Aqua Ero Enterprises CC	6000
Namdeb Mining Area 1	90000
Elizabeth Bay	90000
Novanam (Skeleton Coast Trawling)	10000
Seaflower White Fish Corporation	2000
Hangana Abalone	20000

In terms of the law, it illegal to abstract seawater without a permit, therefore industries are required to be in possession of a seawater abstraction permit in order to draw water from the ocean. The permit regulates the amount of seawater that may be abstracted for an identified purpose. Table 6 and figure 25 below shows the current volumes of sea water abstracted by permit holders in the entire marine area.. This information is up to date until 2018 (central area) and 2020 (southern area) respectively.

It is evident that Areva Resources Namibia (now called Orano) abstracts the largest quantity of sea water. Orano abstracts sea water for desalination purposes and then supplies it to coastal mines in the vicinity for industrial use. A significant amount is used for human consumption. Other operations that abstract significant amounts of seawater are Westport Resources (for desalination), Oyster Company (for oyster farming), Hangana Seafood (fish processing) and Salt Company (Pty) Ltd and Walvis Bay Salt Holdings salt production as well as Elizabeth Mining Area 1 (in the south).

FIGURE 25:
VOLUMES OF SEA WATER PERMITTED TO BE ABSTRACTED BY PERMIT HOLDERS WITHIN ENITRE MARINE AREA



SOCIO-ECONOMIC IMPORTANCE

The water supply infrastructure, such as desalination plants, contributes to securing water availability, especially in times of increasingly erratic rainfall conditions and droughts that Namibia is experiencing of late. The operation and maintenance of such infrastructures also contributes to employment. For example, the Orano[205] desalination plant produces approximately 1 million m^3 of desalinated water per month and employs about 43 full time workers with different qualifications.[206] In addition, the desalinated water plays a major role in production and processing activities in the mining and fishing industries.

ENVIRONMENTAL IMPACT

In general, the abstraction of water from the sea has no significant negative environmental impacts. This may however depend on the quantity abstracted and location where abstraction takes place. It is possible that water flow, water levels, or marine species be impacted through seawater abstraction especially at ecologically sensitive areas. As a result, water abstraction activities need licensing and regular monitoring.

In the Central MSP Area, desalination has a positive impact on the sustainability of the Omdel aquifer as the Namibia Water Corporation (NamWater) was able to reduce the abstraction rate from this freshwater aquifer and on the socio-economic development of the Erongo region by making sufficient water available for industrial development through desalination.

LOOKING TO THE FUTURE

STRATEGIC POLICY OBJECTIVES

IN THE MEDIUM TERM, THE MAWLR'S STRATEGIC PLAN 2017/18 TO 2021/2022 SEEKS TO ACHIEVE THE FOLLOWING STRATEGIC OBJECTIVES:

- Improved sustainable management and utilization of existing water resources;
- Ensure water security for human consumption, livestock and industrial development; and
- Ensure access to adequate and improved sanitation facilities.

In addition, the NDP5 identifies the screening of options to construct additional desalination plants at the coast.[207]

EXTERNAL PRESSURES AND/OR CONSTRAINTS

The sector plays a regulatory role in terms of water resources management and therefore most pressures are of administrative and legislative nature.

From the regulator's side, the Water Resources Management Act of 2013 is not in force yet, leading to reduced effectiveness with regard to compliance monitoring. Budget cuts, capacity and shortages of staff and a shortage of environmental lawyers also negatively impact on the sector.

SOCIO-ECONOMIC TRENDS

With the expected population and economic growth, as well as the likely impacts of climate change on the natural availability of water inland, an increase in water demand for industrial purposes and human consumption is expected.[208] This may result in the construction of additional desalination infrastructure to supply freshwater to central inland Namibia and possibly neighbouring inland countries.

EXISTING AND POSSIBLE (SPATIAL) CONFLICTS

There are no significant spatial conflicts of sea water abstraction with other human uses in any of the MSP areas.. However, conflict may occur with other sectors that pollute the marine environment, thereby impacting on seawater quality at abstraction points.

On the terrestrial environment, spatial conflicts may occur with other interests as new desalination plants and water infrastructure are expanded, thereby possibly encroaching into nature conservation areas e.g. the Dorob National Park, which is of interest for biodiversity conservation. As a case in point, the Orano desalination plant north of Wlotzkasbaken encroaches on one of the Dorob National Park's important plant areas containing lichen fields.[209]

The current legislative environment may also present possible conflicts. There is a need to harmonise different policies/laws governing seawater use and management within the different institutions to enable coordination and minimise duplicated mandates.

EXISTING AND POSSIBLE (SPATIAL) SYNERGIES

No direct spatial synergies exist with other sectors. However, an indirect synergy may exists with those sectors seeking to achieve a good marine environmental status, which will be beneficial in terms of ensuring good quality sea water.

KEY ISSUES FOR MSP TO CONSIDER

The MSP process should consider that new water infrastructure, especially new desalination plants, may be constructed along the coast in the future and that sea water will be abstracted at these locations. The abstraction of sea water for industrial and human consumption purposes requires a healthy marine environment with non-polluted and high quality sea water.

5. SECTORS WITH IMPACTS ON THE SEA AND PLANNING AREAS

In addition to the activities that directly use marine resources and/or space, there are others with important supporting functions. They are important for MSP to consider as they play a key enabling role for other sectors and activities, partly ensuring that these can take place at all. These supporting sectors encompass wastewater treatment and disposal as well as environmental monitoring and research. While wastewater treatment and disposal supports the safeguarding of the health of the marine environment, monitoring and research matures our understanding of the marine environment and its health status and therefore supports sustainable use and conservation.

5.1 WASTEWATER TREATMENT AND DISPOSAL

BRIEF DESCRIPTION AND DEFINITION

Wastewater treatment and disposal involve the whole process of treating wastewater to remove harmful contaminants to produce effluent that can be reused, recycled or returned into the environment ideally with insignificant impact.

Good water quality is important to a healthy marine ecosystem and plays an important role for some marine sectors e.g. fishing, mariculture, tourism. In addition, the proper treatment of and well-regulated disposal thereof, as well as minimising pollution of surface water, plays an important supporting function in terms of ensuring marine ecosystem health which would otherwise be polluted through anthropogenic activities.

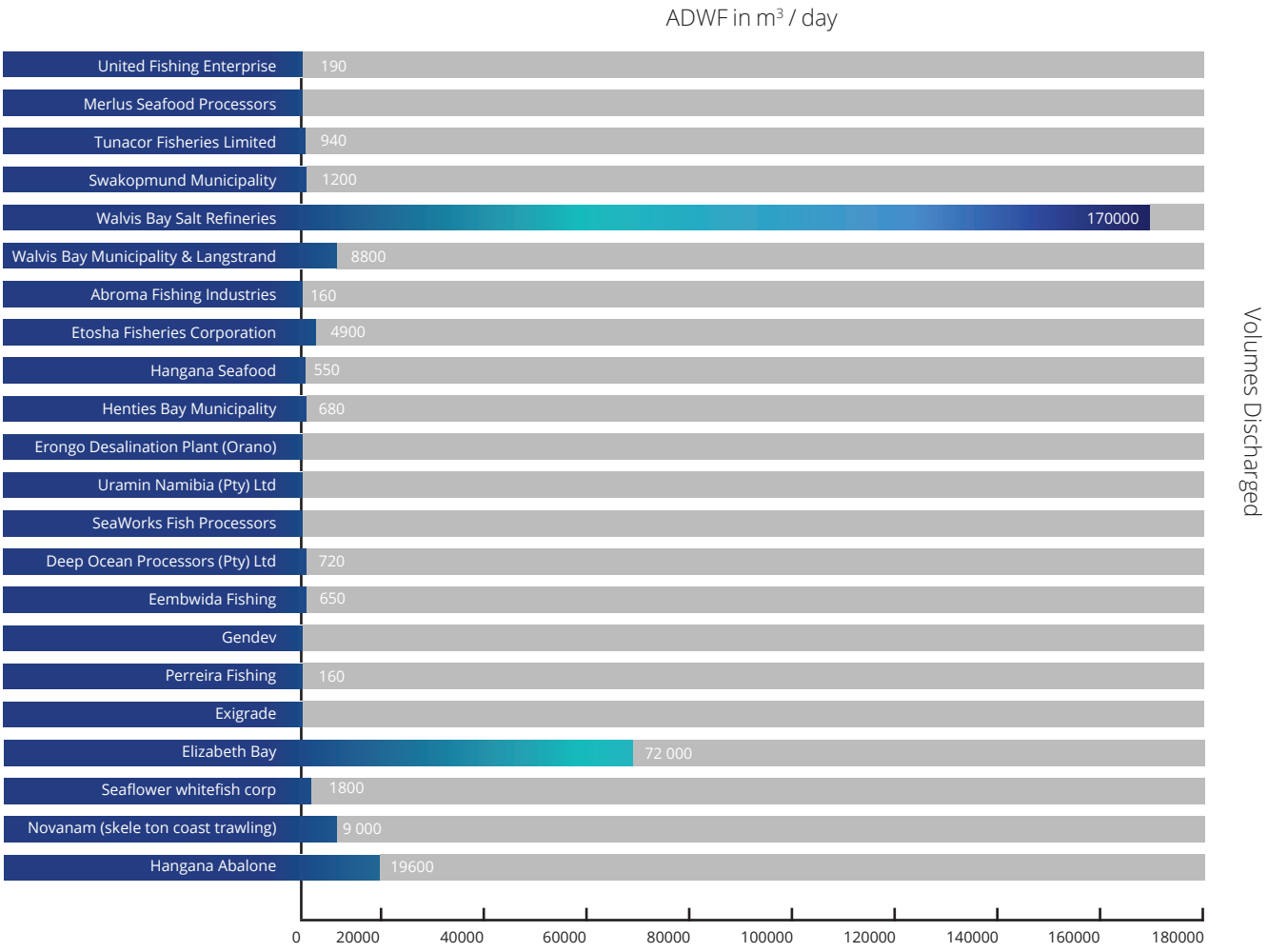
The DWA within the MAWLR is mandated to regulate wastewater treatment and effluent disposal by coastal settlements and industries through a wastewater discharge permit system. The general objective of the permit is to ensure that domestic and industrial effluent is discharged legally into the environment and that the quality meets the recommended national effluent quality standards for Namibia.

The sources of industrial wastewater currently being discharged into the ocean on the Namibian coast are from fish processing factories, aquaculture operations, salt mining production works and desalination plants at Walvis Bay, Lüderitz and Swakopmund. In addition, treated domestic effluent is also infrequently discharged into the ocean by the Municipality of Swakopmund.

Figure 26 shows the actual amounts of industrial wastewater being discharged into the ocean by the permit holders up to date till 2019. The operations discharge all possible wastewater on their sites into the ocean, and therefore, DWA does not restrict the volume of wastewater discharged.

FIGURE 26:

INDUSTRIAL EFFLUENT VOLUMES DISCHARGED INTO THE SEA IN THE ENTIRE MARINE AREA[210]



THE CURRENT SITUATION

LEGAL AND POLICY FRAMEWORK

As is the case with seawater abstraction, MAWLR is also mandated to monitor and control treatment and disposal of wastewater into the ocean to ensure protection of water resources and marine ecosystems. The following legislations are available to enable the ministry to carry out its mandate:

- The Water Act (No. 54 of 1956) including amendments and regulations and the Water Resources Management Act (No. 11 of 2013)[211] stipulates that wastewater discharge permits are required for the disposal of wastewater and effluent into the ocean.
- The 2002 National Water Policy White Paper seeks to guarantee environmental and economic sustainability by ensuring that in-stream flows are adequate both in terms of quality and quantity to sustain the ecosystem.
- The Water Supply and Sanitation Policy of 2008.

- Namibia's NDP5 identifies the sustainable production and consumption of water resources as a key development policy priority. The focus here is on ensuring that existing water infrastructure is maintained and upgraded, new infrastructure is built, and existing water sources are managed better to improve access to freshwater for the sustainable development of the country.[212] This is in line with the Vision 2030's freshwater objectives.[213]
- The Integrated Water Resources Management Plan of Namibia of 2010.
- The Revised SADC Protocol on Shared Watercourses of 2000.

MONITORING EFFLUENT QUALITY

The DWA conducts regular water quality and quantity monitoring in the MSP areas to assess the quality of effluent discharged into the ocean by industries (see map 38).

Monitoring entails the observation of spatial and temporal variability in effluent quality parameters in order to assess compliance of (mainly industrial) discharges with set national effluent quality standards. Some of the parameters of importance that need to be taken into account when monitoring the marine ecosystem include temperature, dissolved inorganic nutrients (ammonia and nitrate), dissolved oxygen (DO), and total dissolved solids (TDS). In general, most nutrients enter coastal waters through anthropogenic (human) inputs in the form of nitrogen and phosphates originating primarily from wastewater. Some of these nutrients are biologically available for uptake by primary producers such as algae and phytoplankton.

Fish factories and other operations discharging industrial effluent into the sea are inspected at least once per annum. During inspections, wastewater samples are collected at discharge points to assess the quality of the effluent being introduced into the marine system by operations. The DWA has a network of about 19 monitoring points inboth southern and central MSP area (see map 38).

FIGURE 27:
SWAKOPMUND WASTEWATER TREATMENT PLANT[214]

Effluent into the ocean from fish factories generally contains organic matter, oils and suspended solids. It is very important to treat wastewater before disposal, to reduce the impact on oxygen levels and general water quality in the ocean. The average fish factory effluent is 1.7 times higher in chemical oxygen demand and biological oxygen demand than normal sea water.

The coastal Erongo region bordering the Central MSP Area, has the second highest number of valid wastewater discharge permits (27%) and fifth lowest number of expired permits (8%) in comparison to all other Namibian regions. Up to 2017, there are in total 12 permits in the Erongo region of which 8 (47%) are valid and 4 (24%) are expired.[215]

At the coast, especially in Walvis Bay and Lüderitz, the industrial effluent from factories is screened to removed solids before it is discharged into the ocean and monitoring thereof is crucial to protect the integrity of the marine ecosystem.

Excessive amounts of nutrients entering the marine environment are behind most major problems affecting coastal ecosystems, such as eutrophication, phytoplankton blooms and hypoxia (low oxygen levels).

It is therefore important that baseline data is available and the situation around wastewater outlets is continuously monitored for nutrient levels to address existing and imminent problems. Figures 28 and 29 indicate the ammonia and nitrate concentrations discharged by fish factories at Walvis Bay, as analysed in 2016.

The DWA monitors all operations discharging into the ocean, whether in possession of a permit or not. The operations given in Figure 26 are the ones for which effluent quality results were available. The following operations are monitored: Walvis Bay Salt Holdings, United Fishing (now closed), Etosha, Tunacor, Seaflower Pelagic, Gendev, Gendor (Deep Ocean Processors), Hangana, Exigrade, Cadilu (now Eembwinda), Seaworks, Salt Company, UNAM, Abroma, Merlus, Pereira, and Namport.

FIGURE 28:

AMMONIA CONCENTRATIONS DISCHARGED AT FISH FACTORIES IN WALVIS BAY, 2016[216]

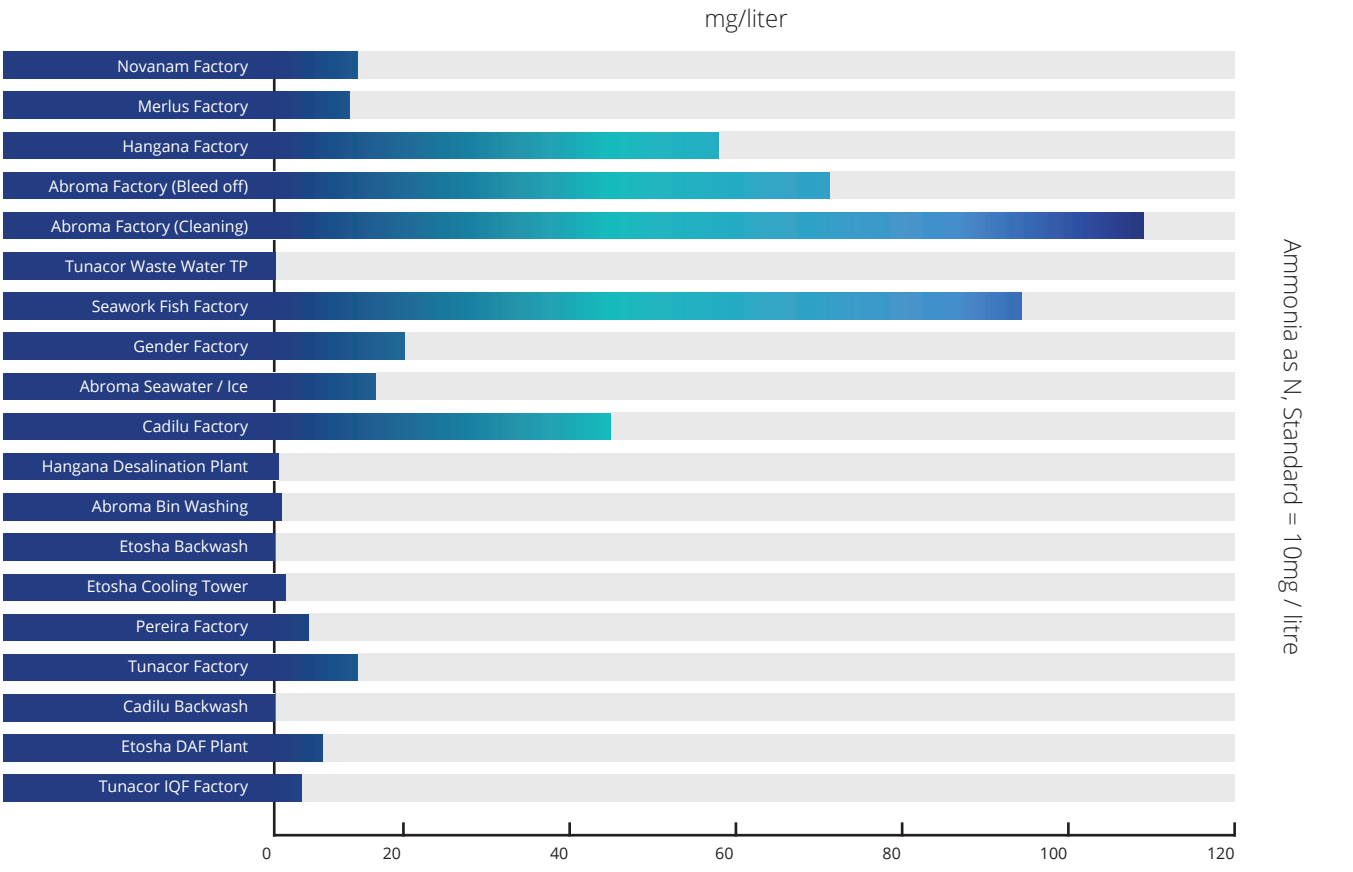
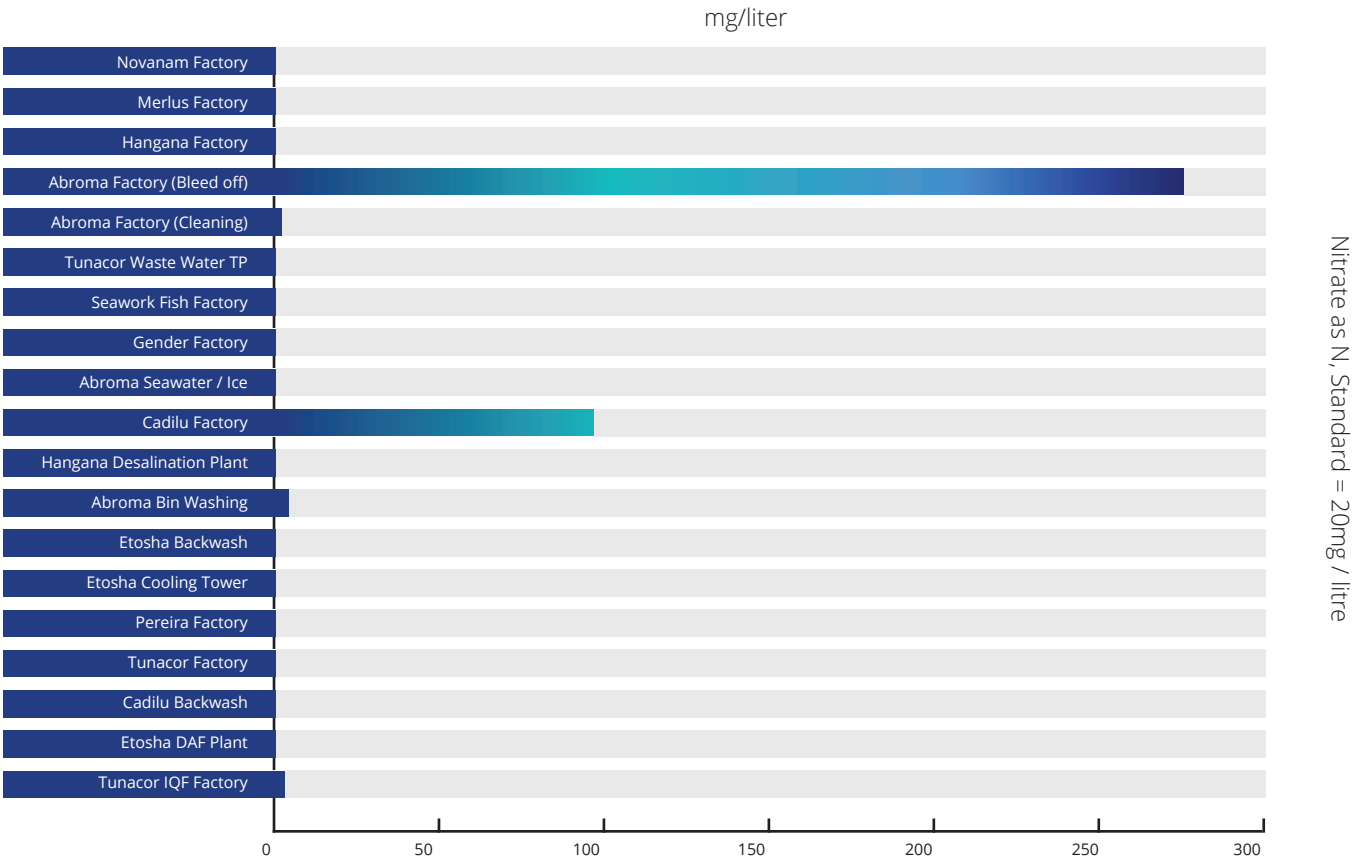


FIGURE 29:

NITRATE CONCENTRATIONS DISCHARGED AT FISH FACTORIES IN WALVIS BAY, 2016[216]



The recommended standards limits for ammonia and nitrate concentrations are 10 and 20mg/ℓ, respectively. Based on the information in figures 28 and 29, in 2016, a number of fish factories discharged effluent with higher content of nutrients, being Hangana (50mg/ℓ), Abroma (63mg/ℓ and 100mg/ℓ), Seaworks (86mg/ℓ) and Cadilu (37mg/ℓ) for ammonia; and Abroma (270mg/ℓ) and Cadilu (80mg/ℓ) for nitrate.

Both in Oranjemund and Lüderitz discharging points have recorded <0.5 mg/l of nitrate concentration and <0.01 mg/l concentration for ammonia nitrates respectively at all monitoring points.

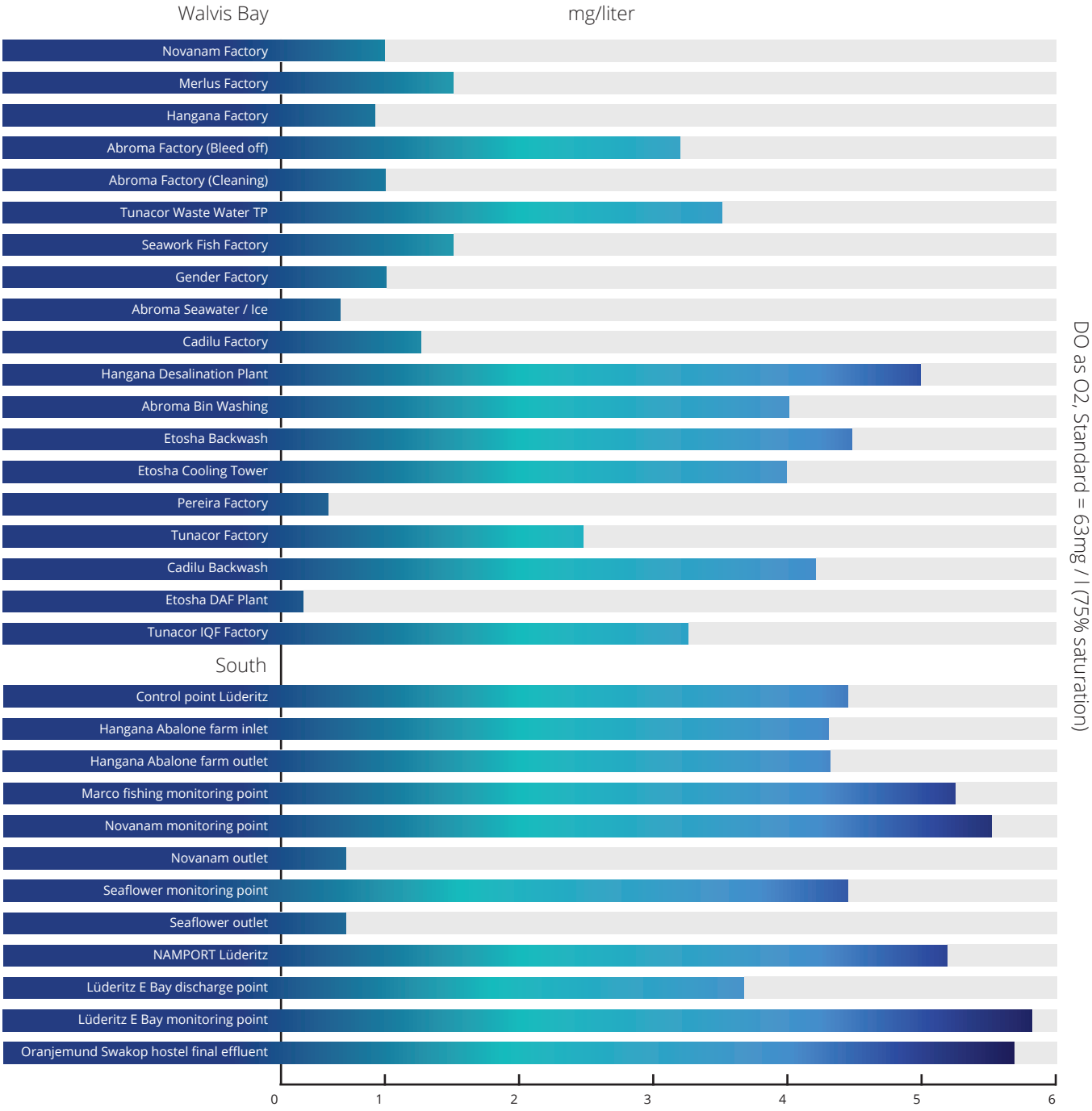
The dissolved oxygen (DO) concentration is a measure of how well the water is aerated. This parameter is one of the best and most immediate indicators of a system's health. Because oxygen is needed to support animal and plant life, consequences of declining DO levels will set in quickly. This immediate impact on plant and animal life makes measuring the level of oxygen an important means of assessing water quality in the marine environment. Additionally, at low oxygen conditions, nutrients (and other pollutants) will be released from sediments, thereby exacerbating problems. Figure 30 indicates DO levels at fish factories in Walvis Bay, measured in 2016.

It is evident from figure 30 that effluent discharged into the ocean from the fish factories at Walvis Bay has lower DO saturation levels than the required limit of 6.3mg/ℓ. This could possibly be linked to a high content of organic pollutants in the wastewater, e.g. oils from canning and other seafood that require plenty of oxygen to decompose chemically.

Together with temperature, TDS is one of the most important physical properties of the marine environment, influencing many physical, chemical and biological processes such as density, capacity to hold DO, sensitivity to toxic wastes, and metabolic processes and photosynthesis. It also dictates the types, distribution and abundance of marine flora and fauna. Monitoring levels of TDS, and more importantly, changes in its levels, should provide a direct indication of potential problems. Figure 31 indicates TDS level at fish factories in Walvis Bay, measured in 2016.

FIGURE 30:

DO CONCENTRATIONS AT FISH FACTORIES IN WALVIS BAY, 2016[216] AND AT MONITORING STATIONS IN LÜDERITZ AND ORANJEMUND, 2020[217]



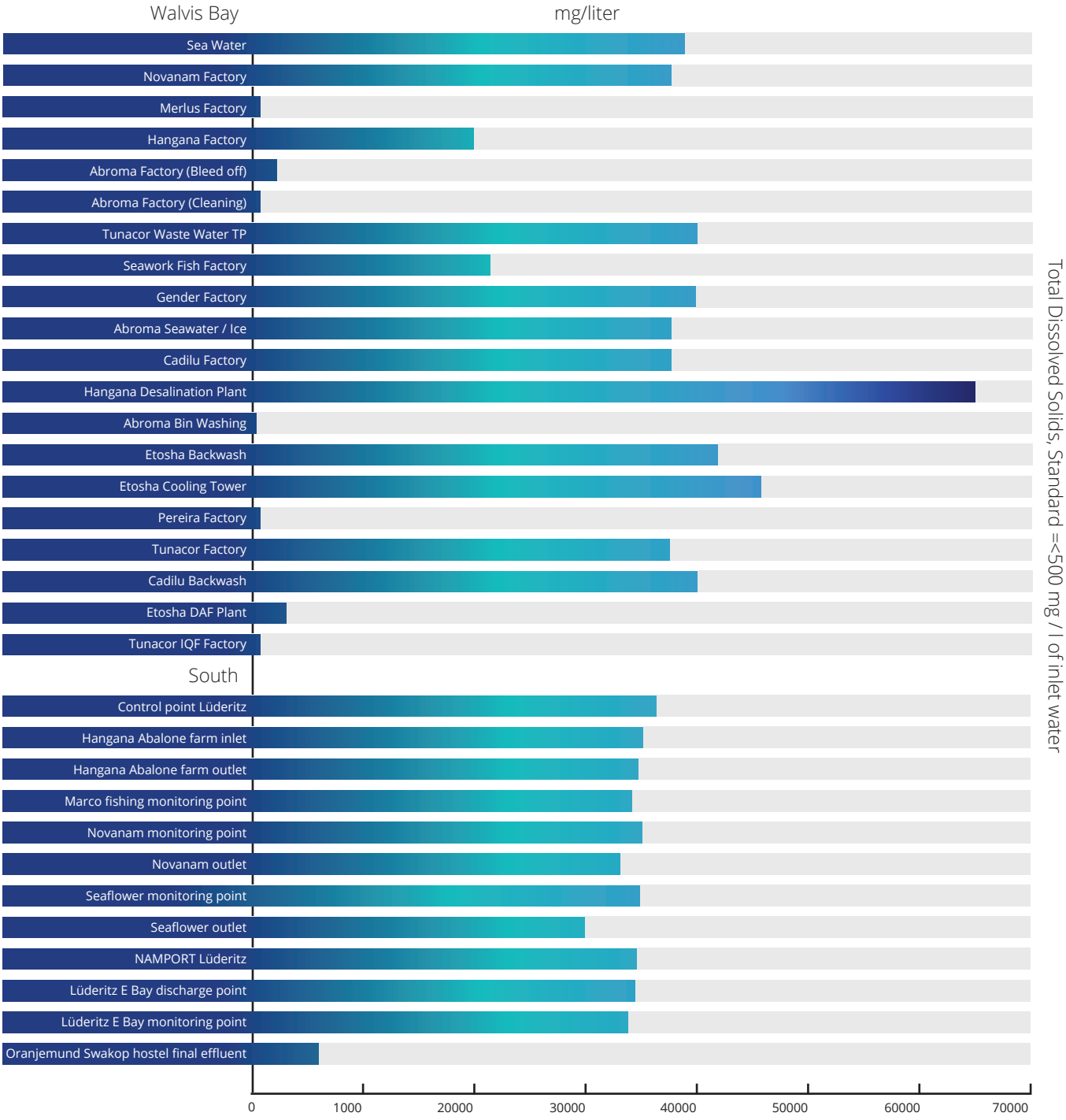
In case monitoring results show that levels exceeds the required standards, the specific operations are engaged and advised by DWA to apply corrective measures and ensure effluent quality levels meet standards.

The standard for TDS is set that final effluent concentration should not increase by more 500 mg/ℓ over the intake water TDS concentration. From the figure above it is evident that Hangana Factory (outlet TDS quality of 64,490mg/ℓ) and Etosha Cooling Tower (41,159mg/ℓ) are exceeding the standard by 25,916 and 2,585 mg/ℓ, respectively.

Desalination plants discharge brine into the ocean, thereby possibly affecting water quality in the process by introducing brine containing high TDS, Sodium, Chloride and Turbidity. Dedicated monitoring at brine discharge points is important.

FIGURE 31:

TDS LEVELS AT FISH FACTORIES IN WALVIS BAY, 2016[219] AND AT MONITORING STATIONS IN LÜDERITZ AND ORANJEMUND, 2020[217]



LOOKING TO THE FUTURE

STRATEGIC POLICY OBJECTIVES

IN THE MEDIUM TERM, THE MAWLR'S STRATEGIC PLAN 2017/18 TO 2021/2022 SEEKS TO ACHIEVE THE FOLLOWING STRATEGIC OBJECTIVES:

- Improved sustainable management and utilization of existing water resources;
- Ensure water security for human consumption, livestock and industrial development; and
- Ensure access to adequate and improved sanitation facilities.

This includes ensuring that wastewater treatment and disposal, as well as minimising the pollution of surface water, continues to contribute to ensuring marine ecosystem health, which is a prerequisite for many of the human uses occurring in the MSP areas.

EXTERNAL PRESSURES AND/OR CONSTRAINTS

The pressures experienced by the sector are not directly spatial, or arising from competition with other sectors over space, but nevertheless important. From the side of the operations, there are challenges relating to illegal discharge of wastewater into sea (discharging without a permit), and companies not complying with effluent standards.

From the regulator's side, the Water Resources Management Act of 2013 is not in force yet, leading to reduced effectiveness in regulating compliance to the current Water Act. Budget cuts, capacity and shortages of staff and a shortage of environmental lawyers are added pressures.

SOCIO-ECONOMIC TRENDS

With the expected population and economic growth, as well as the likely impacts of climate change on the natural availability of water inland, an increase in water demand for industrial purposes and human consumption is expected.[218] This is likely to result in an increased withdrawal of seawater for desalination purposes as well as increase discharge of brine into the ocean. Existing and possible (spatial) conflicts There are no direct spatial conflicts with other human uses that concern the process of MSP.

However, non-spatial conflicts exist in terms of limited access to particular areas or operations may hinder "unannounced" inspections intended to address suspected non-compliance. Other non-spatial conflicts may arise due to un-harmonised legal framework of the different institutions involved (through duplicated and contradictory legislation and departments operating in silos).

EXISTING AND POSSIBLE (SPATIAL) SYNERGIES

No direct spatial synergies exist with other sectors in the MSP areas. However, an indirect synergy exists with those sectors seeking to achieve good environmental status, which will be beneficial in terms of ensuring good quality sea water.

The opportunity to conduct joint inspections and monitoring activities with the municipalities of Walvis Bay and Lüderitz at fisheries operations presents a possible synergy that could further allow for timely response to environmental incidences, and enhance data and information exchange. Also, regular monitoring could also be conducted jointly with MFMR. Currently, good working relationships and cooperation exists with MEFT but can be further strengthened with regards to review of EIAs for development projects impacting the marine environment in the MSP areas.

KEY ISSUES FOR MSP TO CONSIDER

The coast is an important management area for MAWLR as the custodian of all water resources in Namibia. Of particular interest are the human settlements at Walvis Bay, Lüderitz, Swakopmund, Oranjemund and Henties Bay, as well as fishing operations, the desalination plants and salt works that are likely to exert negative impacts on the marine ecosystems. Dedicated and continued monitoring and enforcement of remedial action at these areas is important to ensure marine ecosystem health.

5.2 ENVIRONMENTAL MONITORING AND SCIENTIFIC RESEARCH

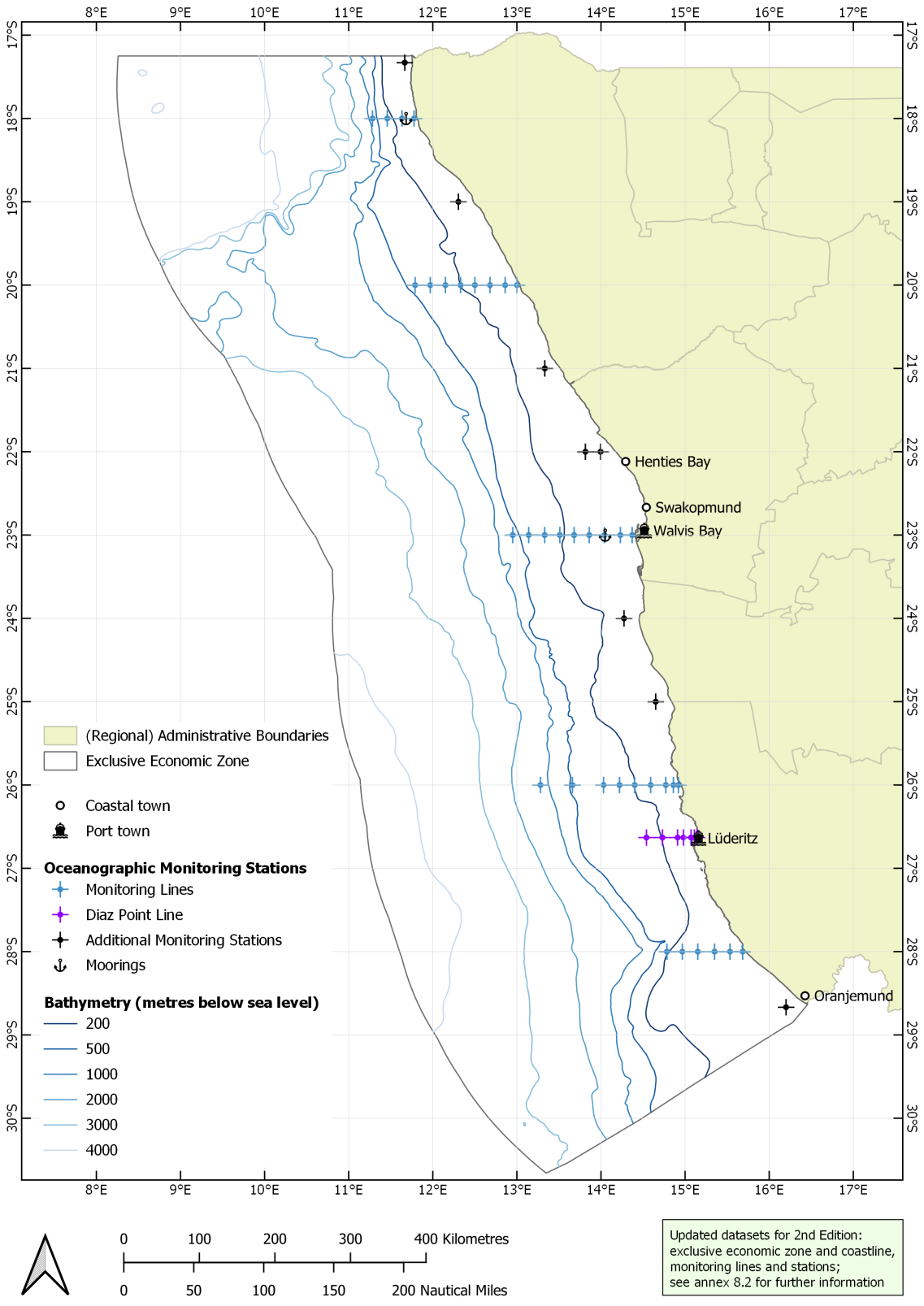
MONITORING

Since Namibian independence in 1990 regular fisheries surveys have been carried out to determine the state of the stock for most commercial fish stocks. A summary of stock assessment surveys can be found in table 7.

TABLE 7:
SUMMARY OF REGULAR FISH STOCK ASSESSMENT SURVEY CONDUCTED BY MFMR

SPECIES	METHOD	MONTH	AREA	COMMENTS
Hake	Swept area survey, fixed stations	January /February	Entire Namibian coast, ±90m to ±700m bottom depth	
Horse Mackerel	Hydro-acoustic	February/ March	North of 25°S, coast to ±500m bottom depth	
Orange Roughy	Swept area survey/ Hydro-acoustic	July	On known aggregations	No surveys done between 2007 and 2016
Crab	Swept area survey	August	Northern Namibia	
Sardine	Hydro-acoustic	October	North of 25°S, extending into Angolan waters, coast to 400m depth	Previously March and October
Monk	Swept area survey, fixed stations	November	Entire Namibian coast, ±100m to ±600m bottom depth	

MFMR is also monitoring environmental and biological parameters like temperature, salinity, oxygen, nutrients, chlorophyll a, phytoplankton and zooplankton during regular environmental monitoring surveys on board the RV Mirabilis and using vessels of opportunity (e.g. German research vessels) at fixed stations along the Namibian coast (map 39 – monitoring stations). Physical and chemical parameters are further collected at monitoring stations during fish stock surveys (map 39 – additional monitoring stations). The MFMR the research centre in Lüderitz conducts regular environmental monitoring along the "Diaz Point Line" (map 39). Currently two fixed moorings with sensors for environmental parameters like temperature, salinity, oxygen, chlorophyll a, turbidity and currents are deployed (map 39) in collaboration with German partners. Due to financial constraints the future of MFMR's monitoring surveys is currently unclear, and some changes to fish stock and environmental monitoring can be expected.



MAP 39:

MONITORING STATIONS (EEZ) (UPDATED FOR 2ND EDITION)

Daily measurement of temperature, salinity, oxygen and chlorophyll are taken at the Swakopmund jetty. MFMR has automatic weather stations fixed to the roof of the National Marine Information and Research Centre in Swakopmund, at Cape Fria and in Lüderitz measuring wind speed and direction.

The Aquaculture Directorate of MFMR has an extensive monitoring programme in the Walvis Bay and Lüderitz harbour areas, summarized in table 8. Sampling addresses variation within a growing area and shellfish species.

TABLE 8:
MONITORING PROGRAMME OF THE SUB-DIVISION MARICULTURE OF MFMR IN THE WALVIS BAY AREA

PARAMETERS SAMPLED	SAMPLING FREQUENCY
Escherichia coli (E. coli, Salmonella) in shellfish flesh	Monthly
Phytoplankton species (focussing on species that can produce marine biotoxins)	Weekly
pH, dissolved oxygen, temperature	Weekly
Diarrhetic Shellfish Poisoning (DSP) and, Paralytic Shellfish Poisoning (PSP) in shellfish flesh	Fortnightly
Cadmium	4 months / year
Amnesic Shellfish Poisoning (ASP)	6 months / year
Arsenic, lead, mercury	Annual
Polychlorinated biphenyls (PCBs)	Annual
Polycyclic aromatic hydrocarbons	Annual
Ostreid herpes virus, Perkinsus species e.g. both P. marinus and P. olsensi from shellfish	Annual
Radionuclides	Every 3 years

Air quality in the coastal areas is monitored under the Strategic Environmental Management Plan (SEMP) for Advanced Air Quality Management for the Erongo Region. A summary of coastal sampling sites and equipment installed is found in table 9.

TABLE 9:
SUMMARY OF SAMPLING SITES AND EQUIPMENT INSTALLED
TO MONITOR AMBIENT AIR QUALITY IN THE ERONGO REGION:

SITE	EQUIPMENT INSTALLED
Swakopmund On the roof of the sewer pump station (22°39'53.23"S 14°32'15.09"E)	BAM 1020 (measuring: PM10) E-Sampler (measuring: PM2.5) Meteorological Station (measuring: Wind Speed; Wind Direction; ; Relative Humidity; Solar Radiation; Rainfall and Pressure)
Walvis Bay On roof of the Civic Centre Building (22°57'31.27"S 14°30'22.04"E)	BAM 1020 (measuring: PM10) E-Sampler (measuring: PM2.5) Meteorological Station (measuring: Wind Speed; Wind Direction; Relative Humidity; Solar Radiation; Rainfall and Pressure)
Henties Bay (22° 6'56.81"S 14°16'59.02"E)	E-Sampler (measuring: PM10) (courtesy Orano)

The Municipality of Walvis Bay is currently collecting weather data at their offices in town. The station measures temperature, rainfall, humidity and wind speed. In Lüderitz such weather measurements are collected by NAMPORT.

The University of Namibia (UNAM) has an observation station for aerosols, which measures the parameters outlined in table 10:[219]

TABLE 10:
DETAILS OF AEROSOL PARAMETERS MONITORED BY UNAM

PARAMETER	INSTRUMENT	TIME RES.	PERIOD
Mass concentration	TEOM (model 1405, R&P)	5-min	2012-
Black carbon concentration	1-λ aethalometer (Model AE-1, Magee Inc)	5-min	2012-
Scattering coefficient	3- λ nephelometer (Model 3596, TSI Inc)	5-min	2015-
Aerosol sampling	Partisol (Model 2205, Thermo Inc)	Bimonthly, 9-h	2015-
Ozone mixing ratio	UV-Analyser (Environment SA)	5-min	2012-
Wind speed and direction	Davis Vantage Pro (Model 6160C)	5-min	2012-
Aerosol Optical depth and column Optical properties	Sunphotometer (CIMEL, AERONET/Photons)	5-min	2011-

Monitoring of seabirds, cetaceans, penguins and seals in the NIMPA is done by MFMR. NGOs are supporting MFMR in collecting data and publishing findings on cetaceans, some seabirds and marine turtles. The Namibian Dolphin Project surveys Bottlenose dolphins, Benguela dolphins (Heaviside's), Southern right whales, and marine turtles in the central coastal area. The Namibian Dolphin Project carries out ad hoc surveys on stranded cetaceans and turtles and collects information and reports sent in by the public on stranded marine mammals and turtles.

The Directorate of Scientific Services (DSS) of the MEFT, supported by the Coastal Environmental Trust of Namibia (CETN) and UNAM, does bi-annual bird counts at coastal Ramsar sites and Important Bird Areas (Walvis Bay, Sandwich Harbour, Swakopmund Salt Works and Cape Cross). The data gathered is shared with MFMR and in addition feeds into a database housed at Wetlands International in the Netherlands and is used to produce water bird population estimates every three years.

The Albatross Task Force (ATF), supported by the Namibia Nature Foundation (NNF), monitors bird bycatch on fishing vessels. The African Penguin Project and Damara Tern Project, supported by various local businesses, NGOs and tour operators are long term monitoring projects looking at breeding areas, foraging and population trends in the NIMPA and at the central coast.

The Department of Environmental Affairs (DEA) under MEFT conducts regular inspections and compliance monitoring for activities that may not be undertaken without EIAs on coastal developments, especially mining, tourism and infrastructure development, storage of hazardous substances and sand mining (figure 33). The EIAs may also be used to indicate the rate of development along the coastline and in the ocean. In the course of one financial year from April 2020 to March 2021 in total 1067 Environmental Assessment Reports were submitted. Out of these the Environmental Management Plan of 479 was approved and the Environmental Clearance Certificate issued. 587 reports are pending (under review / referred back) as of June 2021 and 1 was declined.

UNAM has a programme monitoring physical and biological parameters of the water, sediment and fish within the Walvis Bay lagoon and in surrounding waters.

The MEFT and MAWLR further inspects and monitors industries but also discharge of wastewater and effluents by salt works, the desalination plants and municipalities.[220]

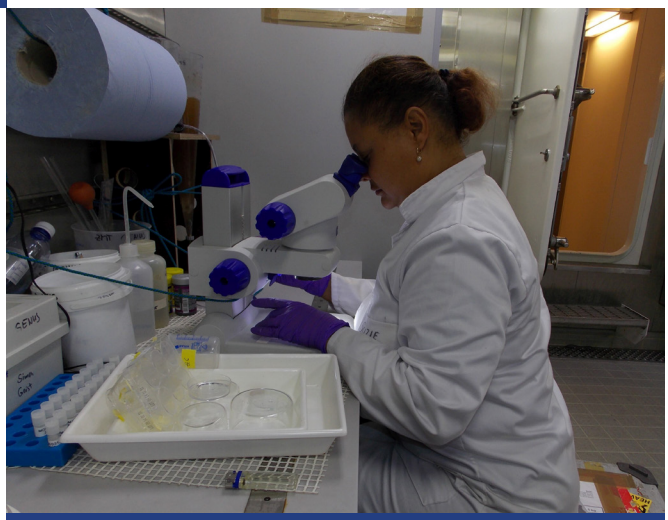


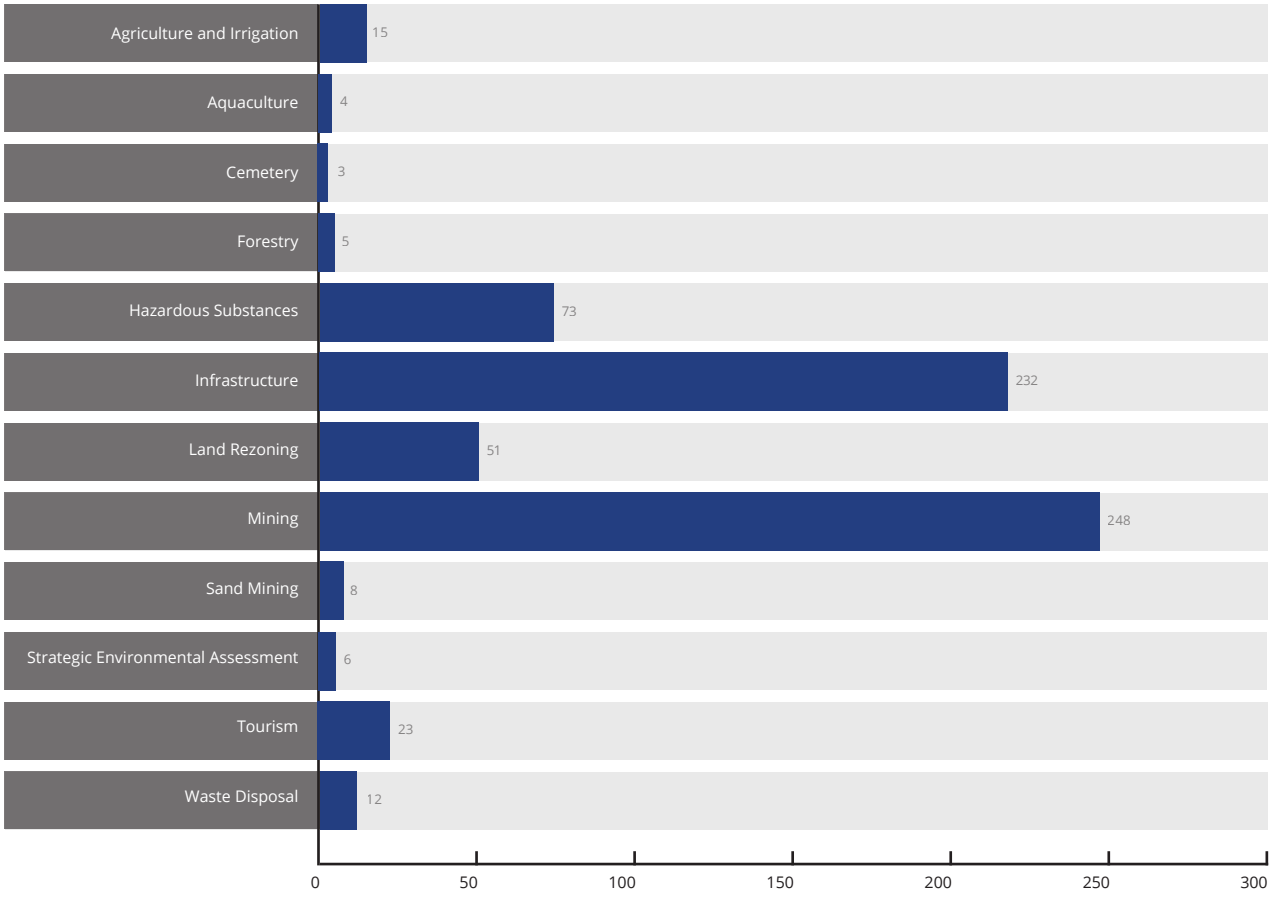
FIGURE 32:
RESEARCH LAB (© MFMR)

RESEARCH

As MFMR surveys are mainly targeted at commercial species, the non-commercial species are generally poorly surveyed. However, continued international collaboration with countries like Norway and Germany allows for sampling of non-commercial living marine resources. The Norwegian research vessel Dr Fridtjof Nansen has done many research cruises in collaboration with Namibian scientists in Namibian waters. Several German and Spanish research vessels have done research cruises focusing on many different aspects of oceanography and marine biology and collaboration with international partners is ongoing. In collaboration with international partners MFMR has further deployed temporary moorings measuring temperature, salinity, dissolved oxygen and currents.

UNAM has institutions focused on marine research and various activities maintain databases of marine related topics.

FIGURE 33:
ENVIRONMENTAL CLEARANCE CERTIFICATES ISSUED PER CATEGORY IN THE FINANCIAL YEAR 2020/2021[221]



6. ANALYSIS

This section outlines the results of an analysis of the evidence provided in the above sections 2 and 3, and particularly sections 4 and 5.

6.1 SUMMARY OF SPATIAL NEEDS AND CLAIMS

The previous sections demonstrate that sectors are making use of the marine environment in different ways. While some, such as fisheries, are directly using the resources provided by the ocean, others are merely using the sea surface (such as shipping); still others (such as mining) are extracting resources from the seafloor for exploration and, in future, exploitation purposes. This emphasises the multi-dimensional nature of the ocean, and the need for MSP to account for activities taking place in a four-dimensional environment: at different times, and possibly with different intensities at times, on the sea surface, in the water column, and on the seafloor.

The previous sections also illustrate that every sector has spatial needs in the Namibian ocean. In some cases, it is not easy to precisely locate and delineate these claims as some marine uses need to respond to the variability of the natural environment (especially fisheries). There are qualitative differences in what the various sectors and activities require from the sea in "their" ocean space. Shipping, for example, only requires space in the sense of uninhibited access routes to ports, and does not depend on a particular ecological status of the marine environment. Fishing and mariculture, on the other hand, strongly depend on good environmental status for their continued existence. Recreation and tourism also rely on a particular quality of the marine environment, benefiting from qualities such as clean water and the presence of certain species such as dolphins, whales, fish, or birds. Hence, while it is important for MSP to allocate sufficient space to the various sectors, it is also important to consider the quality of that space, e.g. in terms of its resource potential such as biodiversity or geological resources. Here, MSP requires the support of relevant policies and strategies such as those dedicated to water quality or environmental protection, and related legislation.

When considering the needs of the various sectors, it is important to not restrict this to their area of activity in the ocean, or suitable marine areas where they could theoretically take place. Spatial needs also encompass aspects such as access (e.g. the ability of fishing vessels to reach important fishing grounds), or economic and practical factors (e.g. distance from the coast, proximity to landing facilities, ability and capacity to monitor and survey).

Moreover, the sector descriptions make clear that spatial needs are not restricted to the sea: In some cases, it is just as important to make available appropriate space on land, e.g. landing facilities, storage, processing and transport. This emphasises the intimate connections between land and sea and therefore, MSP and terrestrial (land use) planning.

6.2 SUMMARY OF MAIN TRENDS AND DRIVING FORCES

Although there are few specific policy targets that could be directly translated into marine spatial needs, all of Namibia's marine sectors are expected to remain stable or grow, at least in the medium term. One of the most prominent driving forces is the national policy of economic growth (set out e.g. in NDP5). A central interest here is to achieve direct and indirect job creation in the "blue" sectors, which is linked to a general policy of "namibianisation". Initially, such growth is expected to concentrate on the central coast of Namibia and thus the central MSP area. Depending on the economic success of the sectors, this policy could lead to a need for more ocean space to enable the sectors to accommodate growth either by expanding spatially or intensifying their activities.

Wider economic and/or market trends clearly influence the ability of sectors to grow. Several sectors strongly depend on global markets and trends, such as tourism which is dependent on global travel patterns and preferences, and mining where investment decisions to exploit specific resources depend on commodity prices. The ability of sectors to grow also depends on a safe and secure marine area. Military surveillance is important for safeguarding Namibian ocean space, and sufficient spatial provisions need to be made to enable the navy to train for various security scenarios.

It is important to point out that all sectors are committed to the principle of sustainability. All are aware of the importance of a healthy marine environment for maximising the benefits that can be obtained from the ocean. In support of this, the environmental conservation sector is implementing a range of multi-lateral environmental agreements and national objectives concerning sustainable development and conservation, driven in part by greater public awareness of conservation issues. A clean and healthy marine environment is also understood to benefit tourism as one of the country's key industries.

One of the key trends that will shape the future use of Namibia's ocean is climate change. Although the precise impacts and timescales are difficult to predict, it is likely there will be changes in species and habitat distribution, with direct impact on the fishing and conservation sector. There will also be changes in rainfall patterns and freshwater supply, leading to a growing need for desalination and with this indirect impacts on ocean space. Predicted sea level rise could additionally impact coastal settlements and the natural environment of the coast. At the same time, the need to mitigate climate change also leads to growing interest in renewable energies. Given the conditions of the marine environment, wave energy could be one of the first technologies to be implemented.

One of the key trends outside the marine environment but closely linked to its use is rapid coastal development and urbanisation. Particularly in central Namibia, around Swakopmund and Walvis Bay, coastal settlements are expanding significantly both for residential and tourism purposes, leading to increasing urban encroachment on park land. Coastal urbanisation also leads to more pollution and water demand, fuelling the need for desalination plants, with impacts back on the marine environment.

Technology is another key trend as it will enable mining of mineral resources in deeper waters and possibly with less impact to the marine environment gradually. New and better technology will also improve options for monitoring of human activities further offshore and in terms of the marine environment.

Given the growth targets for most of the sectors, there is the possibility for increasing conflicts between sectors (that may suddenly compete for the same ocean space, for example), or increasing conflicts between sectors and the environment. Although there is commitment to the principle of sustainability, goal conflicts between economic growth on the one hand and environmental protection on the other could become more pronounced in future than already evident. An important part of the MSP process will be to come to a shared interpretation of what this should imply, and where and when precedence may be given to one over the other – and at what costs.

THIS CONFIRMS THE FOLLOWING AS CENTRAL TASKS FOR MSP IN NAMIBIA:

1 To balance socio-economic benefits and ecological sustainability, and to do so both in the short and long term;

2 To support the ability of sectors to make use of opportunities – in other words, make provisions for their sustainable expansion if and when such opportunities arise; and

3 To plan for those ocean uses that are only beginning to emerge, or may play a more significant role in the future (renewable energy generation is an example for this).

This emphasises the relevance of all of the planning principles of the Namibian MSP process as outlined in the National MSP Framework, one of which is the precautionary use of marine areas. This takes account of the fact that ocean space is a valuable resource and needs to be used wisely.

6.3 SPATIAL COMPATIBILITIES

Although Namibia's marine area is extensive, there are a number of overlapping uses, as indicated in maps 40.

Some of these are active uses, while others are dormant uses in the sense that rights have been awarded, but there is no current utilisation.

The mere overlap of activities does not automatically imply they are in conflict. Some activities can gladly coexist in the same marine area – they simply do not interfere with each other. Others cannot occupy the same space at the same time and are mutually exclusive, leading to conflict. Still others actually benefit from each other if they are located in the same space.

Figure 34 highlights that conflicts and synergies represent different ends of a scale. Coexistence at the centre is more or less neutral, turning into passive synergy where activities benefit each other without much intervention. Synergies that require pro-active promotion can be classed as cases of active coexistence. Conflicts, in turn, arise where coexistence turns negative and leads to mutual exclusion. Examples for synergies might be fishing and tourism, both of which benefit from nature conservation; examples for conflicts might be seabed mining and the preservation of seafloor habitats for fishing and/or biodiversity interests.

Figure 34 also shows that achieving synergies usually requires some active planning and understanding of the benefits, in contrast to conflicts which are characterised by unplanned, mutual disadvantages. The greater the level of synergy that is achieved between marine activities, the more leadership in MSP is usually required and the greater the efficiency in marine resource use that can be achieved.

Ideally, MSP seeks to promote efficient resource use. It should also highlight situations of "negative coexistence", that is, conflicts where they occur, and suggest ways of resolving them. This might mean giving precedence to one use over another in a certain area, or defining the conditions under which a particular activity can take place, or imposing temporal restrictions on certain activities in certain areas. In line with the efficiency principle, MSP would also proactively seek to encourage co-use (the "level 2" in figure 34), i.e. the multiple use of sea spaces wherever possible.

Figure 35 is an assessment of the spatial compatibility of the activities taking place in the central MSP areas. "Compatibility" is understood here as the theoretical ability of the respective activities to take place in the same area at the same time. The table shows a preliminary, general assessment. The ratings shown are ratings in principle; they do not imply that these activities will necessarily occur or be in conflict. Once the potential for conflict and the actual spatial conflicts in the MSP areas are known, spatial management measures can be designed to mitigate these conflicts.

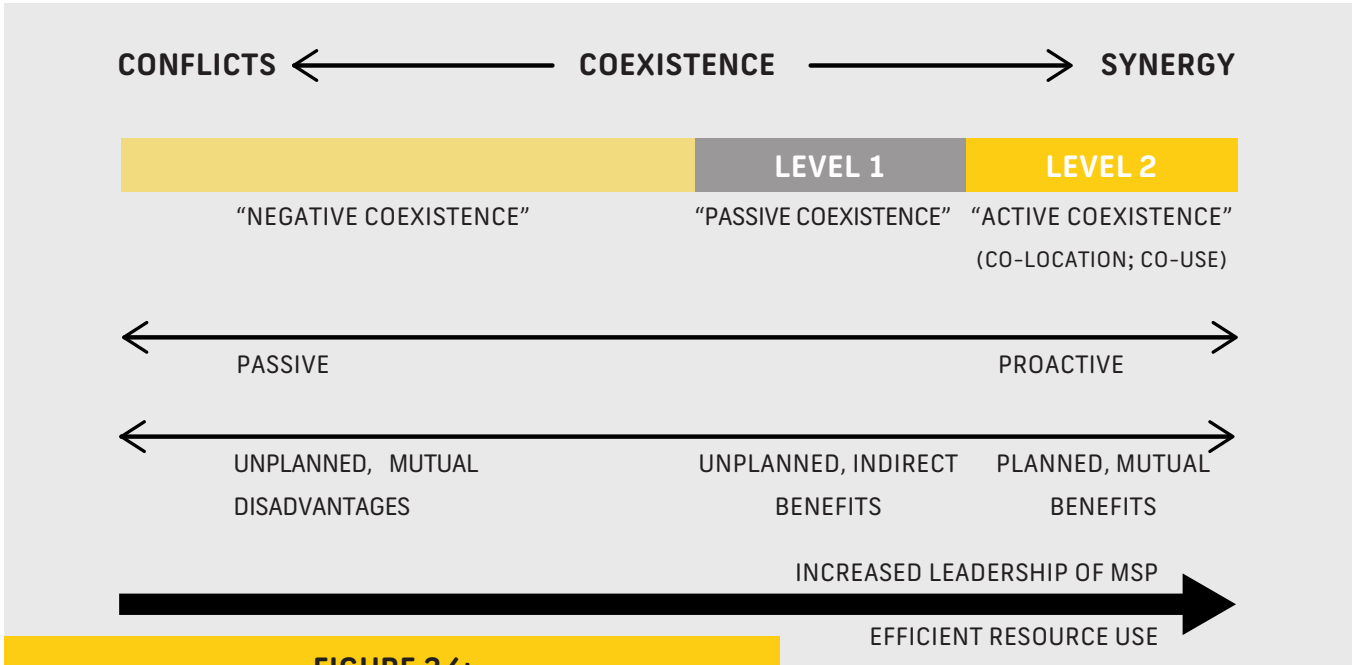
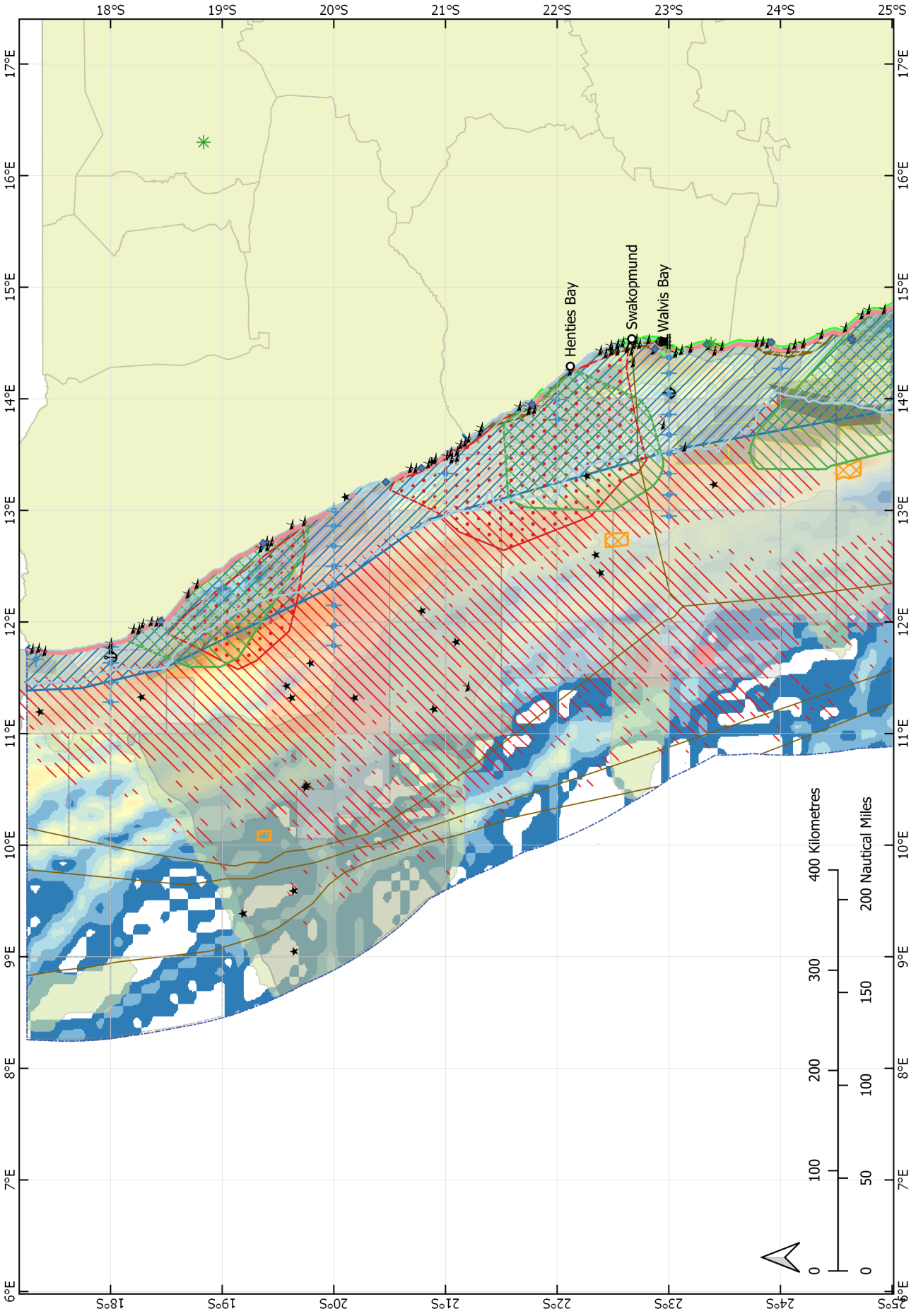


FIGURE 34:
THE RANGE OF CONFLICTS AND SYNERGIES IN MSP[222]


18°S
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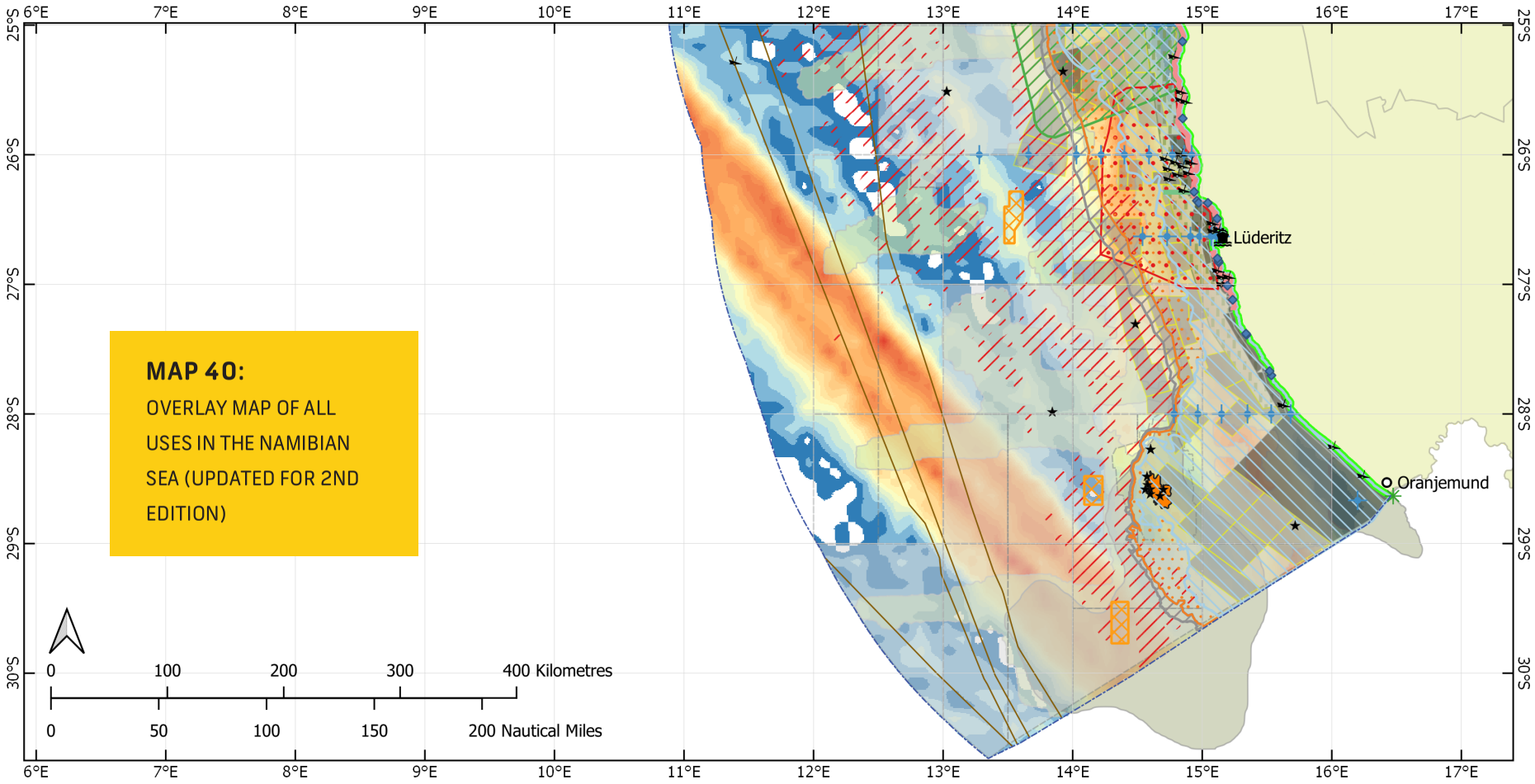
10°E
9°E
8°E
7°E
6°E
Henties Bay
Swakopmund
Walvis Bay
400 Kilometres
200 Nautical Miles
0
100
200
300
0
50
100
150



(Regional) Administrative Boundaries
Exclusive Economic Zone
Coastal town
Port town

Conservation Areas
Ramsar Sites
Seal Colonies
Important Bird Areas

Ecologically or Biologically Significant Marine Areas (EBSAs)
Ecological Support Areas
Namibian Islands' Marine Protected Area

Spawning Areas
Hake
Kob
Monk
Orange Roughy

Pelagic Fish

Defence
Military Restricted Areas I
Military Restricted Area II

Fisheries
Fishing Area

Restricted Areas
No Fishing for Recreational Purposes

Rock Lobster Sanctuary
No Freezer Trawlers
No Hake Trawlers
No Trawling and Longlining

Heritage
Shipwreck

Mining
Wellheads
Gas Fields

Exclusive Prospecting Licence (Sep 2020)
Active Mining Licence (Sep 2020)
Active Petroleum Block
Inactive Petroleum Block

Ocean Monitoring
Monitoring Stations
Moorings

Transport and Infrastructure
Underwater Communication Cables

Shipping Intensity
Low
High

FIGURE 35:

COMPATIBILITY MATRIX OF MARINE ACTIVITIES OCCURRING IN THE MSP AREAS

	Military training (activity)	Mariculture (area)	Marine catamaran tours (activity)	Kayak tours (activity)	Angling (ski boats and beach based)	Mid-water trawling (activity)	Bottom trawling (activity)	Pole and line fishing (activity)	Sea water abstraction/desalination (area)	Seismic exploration (activity)	Non-seismic exploration (activity)	Mining exploitation (activity)	Species conservation (activity)	Habitat conservation (area)	Shipping routes (area)	Anchorage areas (area)	Marine heritage sites (shipwrecks) (area)	Underwater cable (area)
Military training (activity)		-2	-2	-2	-2	-2	-2	-2	0	-2	-2	-2	-1	0	-2	-2	0	0
Mariculture (area)			+1	+1	-2	0	0	0	-2	0	0	-2	-1	+2	-2	-2	0	0
Marine catamaran tours (activity)				0	0	0	0	0	0	0	0	0	+2	0	-2	+2	+2	0
Kayak tours (activity)					0	0	0	0	0	0	0	0	+2	0	-2	+2	+2	0
Angling (ski boats and beach based)						0	0	0	0	-2	0	-2	-1	0	-2	0	0	0
Mid-water trawling (activity)							0	-1	0	-2	0	-2	-2	0	-2	-2	0	0
Bottom trawling (activity)								-1	0	-2	-2	-2	-2	-2	-2	-2	-2	-2
Pole and line fishing (activity)									0	-2	0	-2	-1	0	-2	-2	0	0
Sea water abstraction/desalination (area)										0	0	-2	-1	-1	0	0	0	0
Seismic exploration (activity)											0	-2	-2	-1	-2	-2	-2	0
Non-seismic exploration (activity)												-2	0	-2	-2	-2	-2	-2
Mining exploitation (activity)													-2	-2	-2	-2	-2	-2
Species conservation (activity)														+2	-1	-1	+2	0
Habitat conservation (area)															0	-1	+2	0
Shipping routes (area)																-2	0	0
Anchorage areas (area)																	-2	-2
Marine heritage sites (shipwrecks) (area)																		-2
Underwater cable (area)																		

	More knowledge needed	0	Neutral
-2	Strongly incompatible	1	Compatible
-1	Incompatible	2	Strongly compatible/mutually supportive

The compatibility analysis differentiates between “activities” and “areas”. This is based on the assumption that certain activities or uses are more spatially definitive than others. Shipping, for example, could be understood as the simple passage of a ship, which could, in theory, occur anywhere in ocean space. In practice, however – for economic reasons for example – ships will prefer the use of certain (shorter) routes, or will need to be assigned certain routes for reasons of safety (e.g. approaches to the harbour, in the form of TSSs).

The activity of shipping and the passage of individual ships have therefore been separated from shipping lanes as the spatial expression of shipping activity, acknowledging that shipping lanes are also recognised by international organisations such as IMO and a long-standing concept in this sector. The same applies to nature conservation, where a distinction has been made between habitat conservation (based on the assumption that habitats will occupy a certain area) and species conservation (which, in the case of mobile and migratory species for example, is less spatially distinct and more like an activity in that sense). Mariculture is also understood as requiring a certain area for its operation, as are underwater cables and heritage sites that also occupy a distinct place in the sea. In a sense, this classification differentiates between activities that are more fleeting and less place-bound, and activities that are more permanent or requiring the use of a certain place.

Figure 35 indicates that many activities and uses are actually neutral, meaning they could theoretically coexist with many other activities or uses in the same space. Non-seismic exploration, for example, usually has a very small spatial (and, in fact, temporal) footprint, which is why it has been classed as not excluding other activities. At the same time, it has also been classed as a neutral activity in the sense that no clear synergies exist with other uses. The same applies to midwater trawling and bottom trawling which can take place in the same space but which do not support each other.

Tourism and recreational activities (specifically, catamaran and kayak tours) and marine heritage and species/habitat conservation were also found to be spatially compatible. As long as this type of tourism is sustainable and responsible it can even be synergetic with nature conservation and maritime heritage as shipwrecks and the presence of key species can serve as attractions. Mariculture sites and kayaks and catamaran tours can also use the same space to some degree; the same applies to kayaks and catamaran tours and anchorage areas. Again, some synergies are conceivable in the sense that mariculture installations and ships lying at anchor can serve as tourist attractions, as is the case in the Walvis Bay area. Non-spatial synergies may also result, as tourists can sample local produce and thereby support the local industry. Species and habitat conservation are also mutually supportive, as are habitat conservation and marine heritage in that the latter may provide artificial reefs.

Spatial incompatibilities also exist. The most obvious example is the seismic exploration and exploitation of geological resources which is incompatible with most other activities due to its environmental impacts, related to its extractive nature and large scale. Operations would also exclude some of the more fleeting activities such as recreational boating and most types of fishing, although temporal management measures could be conceivable here. Without appropriate management, shipping lanes are incompatible with all those activities that impede the flow of traffic or represent a safety concern. Shipping lanes near the port could have a negative effect on mammals if traffic increases significantly, but are unlikely to have more than a passing effect on fish and mammals further out at sea where there is only a minimal risk of occasional ship strikes. Anchorage areas are incompatible with shipping lanes and also with underwater heritage and subsea cables as anchors could cause damage, and underwater cables are incompatible with underwater heritage for the same reason. Seismic exploration has a detrimental effect on fish and mammals: it cannot take place at the same time as angling, mid-water and bottom trawling, and pole and line fishing. In addition, it should not take place at the same time as the Southern right whale breeding season, other whale migration times and during hake spawning season (late June to November). Desalination cannot coexist with mining exploitation, and there may be some incompatibilities with species and habitat conservation depending on the impacts of brine on species and habitats.

Military training taking place on the water surface is an activity which is incompatible with most other uses except for those that take place on the seafloor. At the same time, military activity does not always take place, so temporal restrictions on other activities are conceivable. Pole and line fishing is incompatible with some species conservation areas, but this depends on which species are to be protected.

In some cases, not enough information is available to rate compatibilities with a fair amount of certainty. These assessments, marked blue, should therefore be read with caution, although a precautionary principle has been applied here. More research is needed, for example, on the local impacts of desalination (brine effluent) on fish species. More research is also needed on the impacts of mid-water trawling on species and habitat conservation, and on the effects of seismic exploration on bottom-dwelling species.

6.4 SPATIAL CONFLICTS AND SYNERGIES IDENTIFIED

Based on the above, current and possible conflicts and synergies between activities were identified. Table 11 illustrates the range of activities occurring and the impacts of these activities on other activities and the environment. It also lists the basic requirements that enable each activity to take place.

TABLE 11:
CURRENT AND POTENTIAL CROSS-SECTORAL CONFLICTS

ACTIVITY	REQUIREMENTS	OTHER ACTIVITIES AFFECTED AND NATURE OF IMPACT
Geological resource exploration: ■ Geophysical surveys	■ Presence of geological resources (seafloor) ■ Access to the resource /seabed	■ Fishing: Seismic surveys affect fish species ■ Conservation: seismic surveys affect fish (large pelagics) and mammal species
Geological resource exploitation: ■ Extraction (dredging, drilling, etc.) ■ Pipelines for oil exploration	■ Presence of geological resources (seafloor) ■ Unrestricted access to the resource ■ Safe operating environment	■ Other sectors using the seabed: Pipelines create exclusion areas ■ Fishing: physical exclusion ■ Fishing and conservation: habitat destruction, contamination and nutrient removal and disruption ■ Affecting other marine species
Military exercises	■ Unrestricted access to & use of exercise area	■ Spatially excludes the following activities: Shipping, mining activity, fishing, research activities ■ Impact on conservation: species and habitats (more research needed)

	■ A healthy resource, including spawning, nursery, foraging & migration areas (dependent on healthy ecosystem) ■ Access to the resource ■ Flexibility to move with the resource	■ Conservation: bottom trawling causes habitat destruction; all types of fishing cause bird bycatch, other species bycatch
	■ Free and unhindered passage (UNCLOS) ■ Efficient routes ■ Ports infrastructure and safe port operating environment (incl. anchorage areas)	■ Conservation: impacts of underwater noise on mammals and fish, ship strikes, pollution from ships ■ Spatial incompatibility with geological resource exploitation ■ Fishing: vessels can destroy long lines ■ Underwater heritage and sea cables can be damaged by ships anchoring
	■ Suitable environmental conditions for placing ■ renewable energy structures ■ Cable connections to the mainland ■ Maintenance ■ A safe operating environment	■ May affect tourism due to visual impacts ■ May affect conservation as a result of displacement effects and impacts on habitats and species ■ Incompatible with shipping ■ Incompatible with geological resource exploitation ■ Incompatible with military exercises ■ May be incompatible with fishing (trawling)

(Regional) Administrative Boundaries
Coastal town
Port town

Conservation Areas
Seal colonies
No fishing for recreational purposes
Important Bird Areas
Wetland of International Importance (Ramsar Site)
Ecologically or Biologically Significant Marine Areas (EBSAs)
Ecological Support Areas

Spawning Areas
Kob

Defence
Naval Infrastructure Area

Heritage
Shipwreck

Infrastructure
Power Lines
Road Network
Railway Network
Water Supply Lines
Underwater Communication Cables
Townlands

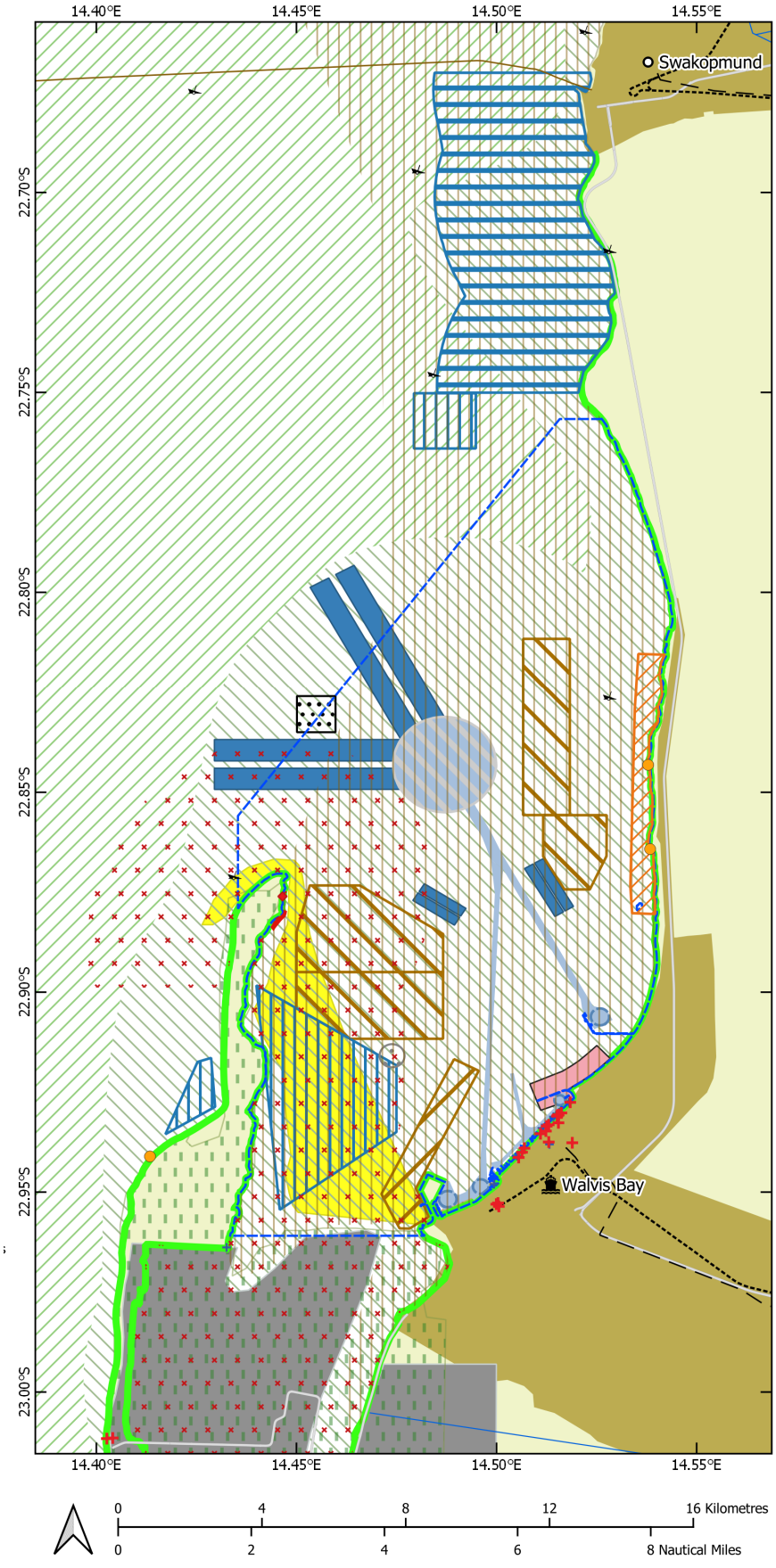
Mariculture
Mariculture Farms

Mining
Mining Licence (Activ Sep 2020)

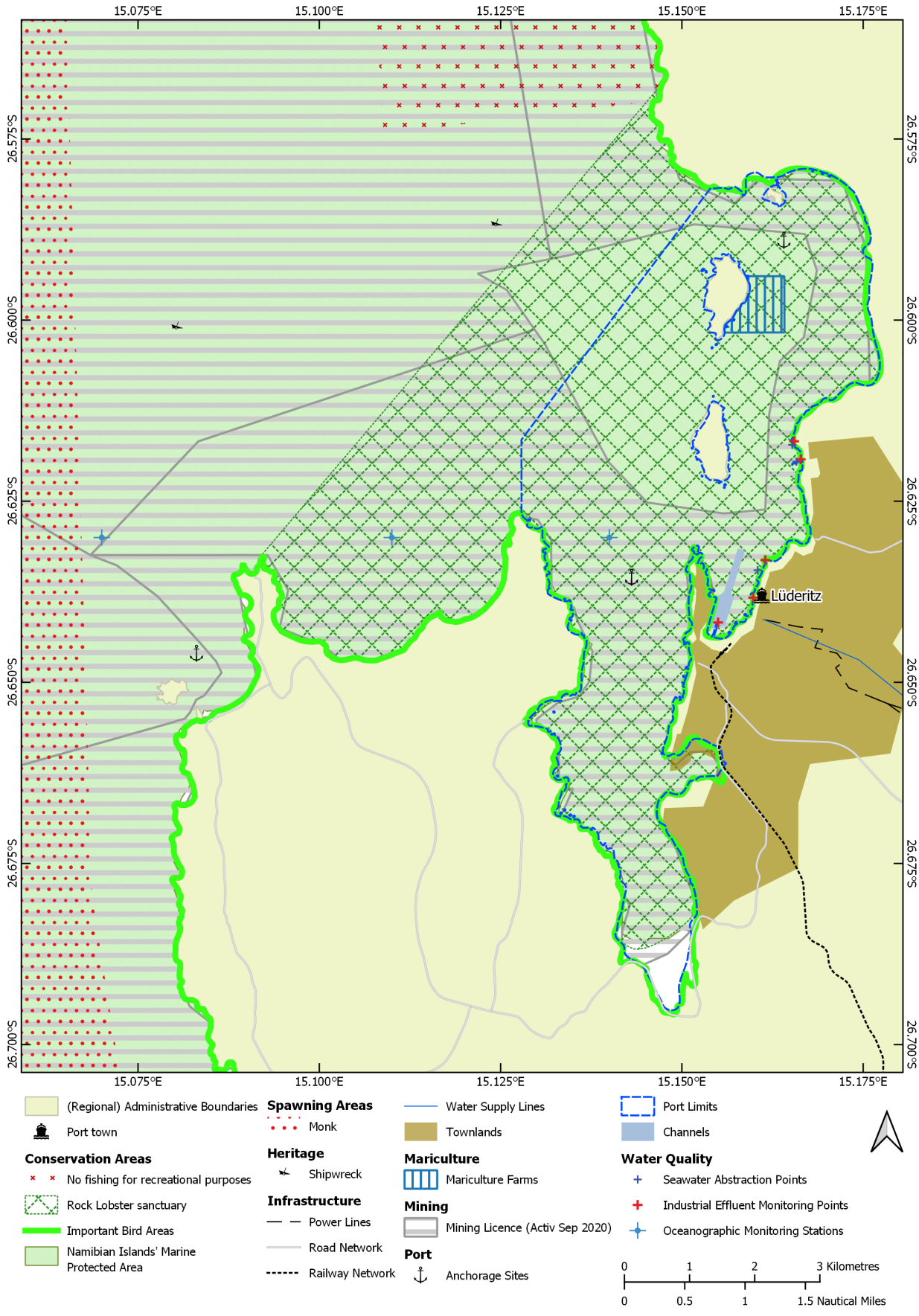
Port
Port Limits
Spoilground
Inactive Spoilground
Anchorage Areas
Recreational Crafts Anchorage Area
Traffic Separation Scheme
Fairway
Turning Basin
Channels

Tourism
Surf Spots
Important Areas for Boat Tour Operators
Important Areas for Skiboat Operators
Dolphin Sanctuary
Important Area for Kayak Tours

Water Quality
Seawater Abstraction Points
Industrial Effluent Monitoring Points



MAP 41:
OVERLAY MAP OF ALL USES IN THE WALVIS BAY AREA (UPDATED FOR 2ND EDITION)



MAP 42: OVERLAY MAP OF ALL USES IN THE LÜDERITZ BAY AREA (UPDATED FOR 2ND EDITION)

In addition to spatial conflicts, the following existing or potentially mutually beneficial relationships were identified:

TABLE 12:
CURRENT AND POTENTIAL CROSS-SECTORAL SYNERGIES

ACTIVITY	SYNERGY
Conservation	Benefits for fishery in terms of preserving key habitats and related marine resources (in areas closed to fisheries)
Sustainable marine tourism	Benefits from conservation in that tourists appreciate a healthy natural environment
Military exercise	Benefits for conservation as closed training areas may act as de facto nature conservation areas
Mining	Tidal energy as a future option; deserted coastal diamond areas for tourism and possibly mariculture
Marine cultural heritage	Benefits for conservation as shipwrecks represent artificial reefs; areas may be closed to other extractive or destructive activities

As a future option, co-use between mining and tidal energy could be explored.

6.5 WALVIS BAY AND LÜDERITZ BAY AREAS: IN NEED FOR MORE DETAILED ANALYSIS

Human uses are particularly concentrated in the area surrounding Walvis Bay, Lüderitz Bay and within the respective ports limits (map 41).

This is due to the specific combination of natural environmental conditions (a sheltered bay) and infrastructure, in particular the Walvis Bay port with its associated land-based facilities and transport connections to the hinterland. The port is currently undergoing significant expansion, which is likely to lead to growth in other sectors; this in turn is likely to place new pressures on the environment and increase competition for marine space. Given that space in the Walvis Bay area is limited, and given the various competing interests, MSP needs to pay particular attention to this area and develop more detailed, finer-grained analysis.

Up and beyond the ocean itself, land-sea interactions are particularly relevant for the Walvis Bay area. Currently the port area lacks space for infrastructure that would allow a range of sectors to expand. This affects fishing (lack of public jetty), mariculture (processing facilities), mining (storage facilities), military (the ability to expand the military base), and tourism (facilities on land). planning solutions. A more detailed analysis will be necessary to facilitate an adequate planning process. A general overview of issues identified for this area is presented in table 13.

TABLE 13:
CURRENT AND POTENTIAL CROSS-SECTORAL CONFLICTS IN THE WALVIS BAY AREA

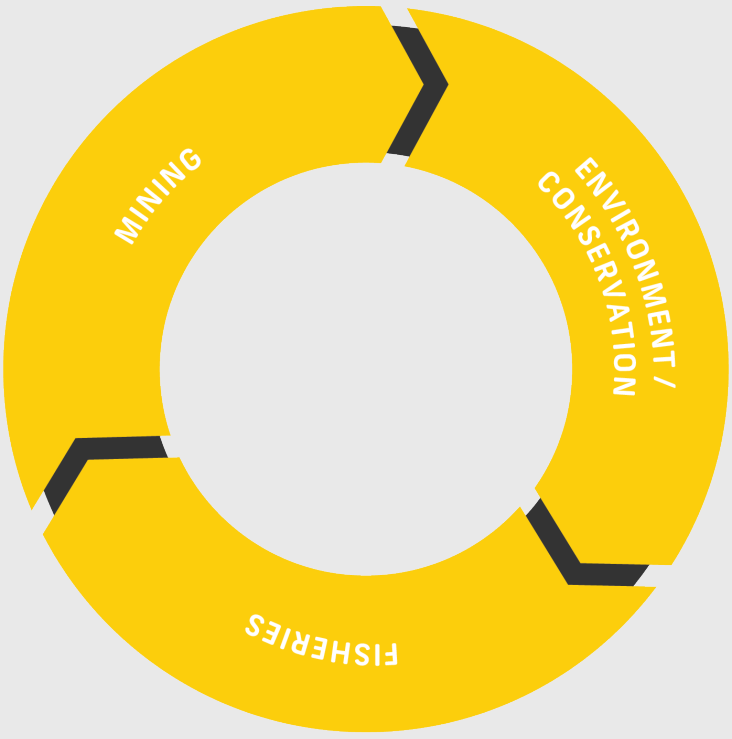
ACTIVITY	REQUIREMENTS	OTHER ACTIVITIES AFFECTED AND NATURE OF IMPACT
Port development	■ Space for expansion on land ■ Space for expansion in the sea: □ Infrastructu re (jetty) □ Larger ships □ Higher shipping frequency ■	■ Mariculture: Shipping and construction encroach on areas potentially suitable for mariculture ■ Conservation: More land reclamation reduces areas available for conservation ■ Military: Reduces area available for marine training and naval base expansion ■ Fishing: if the lack of a public jetty persists
Anchorage areas	Space in shallow and sheltered areas close to the port	■ Conservation: possible impact on marine mammals (displacement) and possible environmental impact through pollution from vessels ■ Mariculture: anchorage areas preclude expansion and encroach into designated mariculture sites ■ Military: anchorage areas and military training areas are mutually exclusive
Tourism: ■ Kite surfing / wind surfing ■ Catamaran tours	■ Unrestricted areas for kite surfing near the coast ■ Presence of marine wildlife ■ Access to port and jetty for embarking ■ Marina for anchoring leisure boats	■ Irresponsible tourism impact on marine wildlife
Desalination	■ Space on land for the required infrastructure	In the case of a new plant being constructed (not imminent): ■ Impact on the coastal environment ■ Negative aesthetic effects on coastal residents and tourists ■ A detailed analysis for the Lüderitz area will be carried out once the process for the development of the southern marine spatial plan is initiated.

6.6 ISSUES FOR MARINE SPATIAL PLANNING

THE FOLLOWING GENERAL CONCLUSIONS CAN BE DRAWN FROM THE PRECEDING OVERVIEW AND THE INITIAL ASSESSMENT OF CURRENT ACTIVITIES:

1. Generally, current levels of use are relatively low throughout Namibian ocean space, with the exception of hotspots of use surrounding the relatively small Walvis Bay and Lüderitz areas.
2. EBSAs have been identified with high spatial resolution, allowing important areas to be identified and assessed with respect to their susceptibility to pressures. MSP can be a useful tool for reducing pressure on their ecological or biological features of significance.
3. Fishing requires the greatest spatial flexibility due to the mobile nature of its resource. Spatial management measures can be helpful in protecting key fish habitats and resources and also for securing key fishing areas if required.
4. Mining is spatially very extensive activity as it is determined in its feasibility by the availability and accessibility of the resource. Exploitation depends on economically viable quantities of the respective resource; provisions need to be made to allow such exploitation to take place in areas where concessions have already been awarded. Mining exploitation is likely to occur, but not immediately, and is unlikely to affect underwater heritage and cables as there is no spatial overlap in those areas that would be most suitable for immediate exploitation.

THE KEY SPATIAL CONFLICTS MSP IN NAMIBIA AND THE THREE MARINE SPATIAL PLANS CAN AND SHOULD ADDRESS THEREFORE EXIST BETWEEN MINING, CONSERVATION AND FISHERIES:



Tourism and the environment, as well as mariculture and transport (shipping and dredging) are the main conflicts the central marine spatial plan should address in the Walvis Bay area. The area is physically constrained, which limits the possibility for locating some of these activities elsewhere. Mariculture does not overlap with fishing or mining exploitation, nor does it currently take place in habitat conservation areas in the central MSP area or near the subsea cables, meaning the only and most immediate conflict is with the planned port expansion. Anchorage areas are incompatible with shipping routes in principle, but this will only become an issue if anchorage areas need to be moved. The routes of the marine tourism operators in the bay need to be agreed and adhered to in order to minimize impacts on the marine environment.

Activities that are unlikely to be an issue in the near future include catamaran and kayak tours (which stay close to the shore and are therefore not in potential mining areas or fishing areas), desalination and new cables.

APART FROM DEALING WITH CONFLICTS, MSP IN NAMIBIA AND IN PARTICULAR THE CENTRAL AND SOUTHERN MARINE SPATIAL PLANS SHOULD ALSO ADDRESS OPPORTUNITIES, IN PARTICULAR:

- Supporting the development of the Walvis Bay and Lüderitz ports by enabling maritime transport;
- Designating (a) military training area(s);
- Enhancing the synergies between fisheries management and biodiversity conservation by exploring opportunities for strengthening protection of areas that are of particular biological or ecological importance for both uses;
- Allocating space for future uses, such as renewable energy development; and
- Highlight opportunities for tourism development (e.g. in conjunction with heritage).

6.7 KNOWLEDGE GAPS AND LESSONS LEARNED

THE FOLLOWING (CURRENT) KNOWLEDGE GAPS WERE IDENTIFIED:

- Environmental impact of trawling (commercial fisheries) on species and habitats and the (in-) compatibility of these uses with the interests to conserve species and habitats;
- Environmental impact of mariculture on species and the possible (in-) compatibility of the use with the interests to conserve species;
- Environmental impact of brine effluent caused by sea water abstraction on fisheries and marine living resources as well as species and habitats and the possible (in-) compatibility of the use with recreational angling, and to conserve species and habitats; and
- Environmental impact of seismic exploration on habitats and the possible (in-) compatibility of the use with the interests to conserve species.

Evaluation of the MSP process is critical to monitor progress, identify lessons learned, overcome difficulties and strengthen opportunities to build on and improve successes.

THE FOLLOWING LESSONS LEARNED HAVE BEEN IDENTIFIED ON THE BASIS OF THE PROCESS UNDERGONE SO FAR:

- Political leadership and support is crucial to achieving results;
- Initiating MSP and establishing structures (e.g. the MSP-NWG) takes time and requires the creation of a common understanding of the approach and its purpose;
- A clear and transparent stakeholder engagement approach enriches the process and is an essential ingredient for achieving a collaborative, participatory and integrative approach that engages all stakeholders concerned (marine users and regulators) to ensure and enable a process through which they cooperate in working towards an agreed marine spatial plan;
- The willingness of the NWG members to contribute to implementing MSP, the interest and commitment is high and the trust among the sector representatives are key enablers for a successful MSP process;
- Knowledge and exchange of experiences with other countries and planners as well as technical support in initiating MSP is both beneficial and crucial to informing the Namibian process and achieving the envisaged goals;
- Developing the plan is just the beginning of the journey: It needs to be implemented to make MSP a success;
- MSP therefore needs to be anchored in legislation. The marine spatial plan(s) should guide decisionmaking in sectors and must therefore be statutory and legally binding;
- Evaluation and revision will be important to accommodate new developments and adapt to the changing climate; and
- MSP cannot and should not exist without good coastal management – land and sea are closely linked and depend on each other.

7. THE NEXT STEP IN THE PLANNING PROCESS

ON THE BASIS OF THE CURRENT STATUS ASSESSMENT AND THE CONCLUSIONS DRAWN, THE FORTHCOMING PROCESS WILL ENTAIL THE FOLLOWING NEXT IMMEDIATE AND KEY STEPS OF, FOCUSING ON:

1

VALIDATING THE ASSESSMENT THROUGH STAKEHOLDER INPUT

2

DEVELOPING SMART SECTOR OBJECTIVES IN LINE WITH CONFLICTS AND OPPORTUNITIES IDENTIFIED AND THE OVERALL MSP GOALS

3

DRAFTING THE THREE MARINE SPATIAL PLANS, BEGINNING WITH THE CENTRAL PLAN AND FOLLOWED BY THE NORTHERN PLAN AND THEN THE SOUTHERN PLAN, INCLUDING THROUGH STAKEHOLDER INPUTS

8. ANNEXES

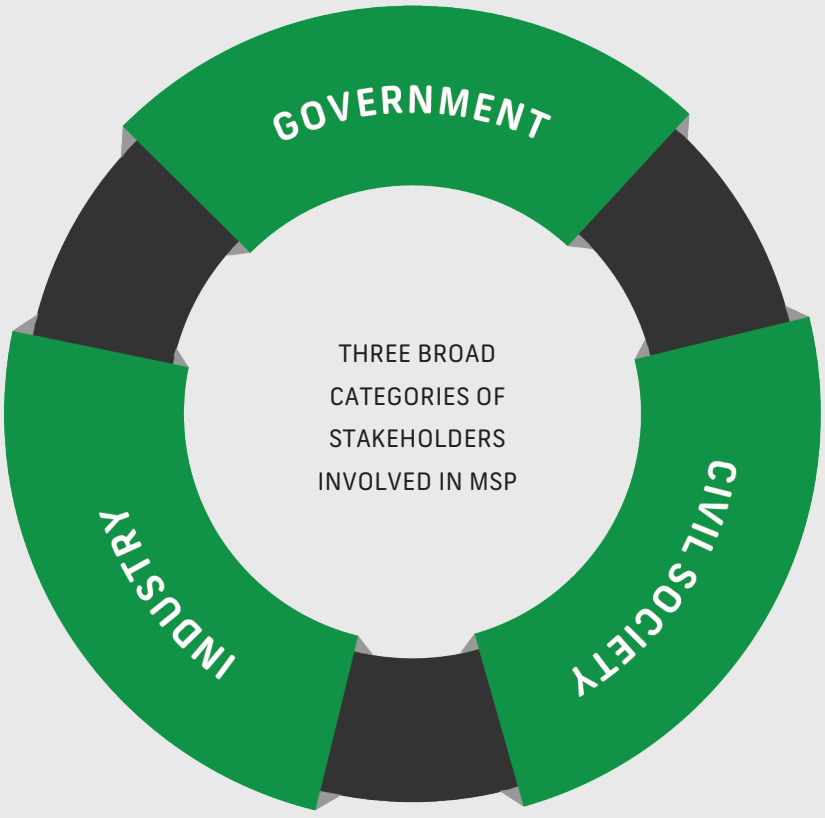
8.1 THE STAKEHOLDER ENGAGEMENT STRATEGY

PURPOSE OF THE STRATEGY

This strategy sets out how and when the Namibian Marine Spatial Planning National Working Group (MSP-NWG) will engage with government, industry and civil society stakeholders during the Namibian MSP process. It helps to ensure that the MSP process is transparent, coordinated and that stakeholders understand how they can be involved, contribute and influence the plan's development. To ensure adaptability to the process, this strategy will be updated regularly.

Stakeholders represent three broad categories as illustrated in the figure below:

- Government decision-makers: government stakeholders including ministries and state agencies
- Private sector: stakeholders representing the key marine sectors operating in the respective MSP areas
- Civil society: Stakeholders representing non-governmental and public interests



BACKGROUND

WHAT IS MARINE SPATIAL PLANNING?

Marine Spatial Planning (MSP) is a participative decision-making process that guides where and when human activities occur in marine spaces. It provides for comprehensive, integrated and complementary planning and management across all sectors and for all ocean uses in order to enable sustainable ocean development.

MARINE SPATIAL PLANNING IN NAMIBIA

Namibia is a maritime nation with a rich ocean wealth and an ocean area that is about 540,000 km2, which is approximately 2/3 the size of its terrestrial area. There is a growing range of industries in the Namibian ocean space. These need to be managed in a coordinated way, to avoid conflicts between marine uses and conflicts with the environment. Namibia is therefore implementing MSP to facilitate integrated management of human uses in the ocean.

The Namibian Marine Plan(s) will contain text and maps that set out which activities are encouraged in each of the respective MSP areas.

WHO IS RESPONSIBLE FOR MARINE SPATIAL PLANNING IN NAMIBIA?

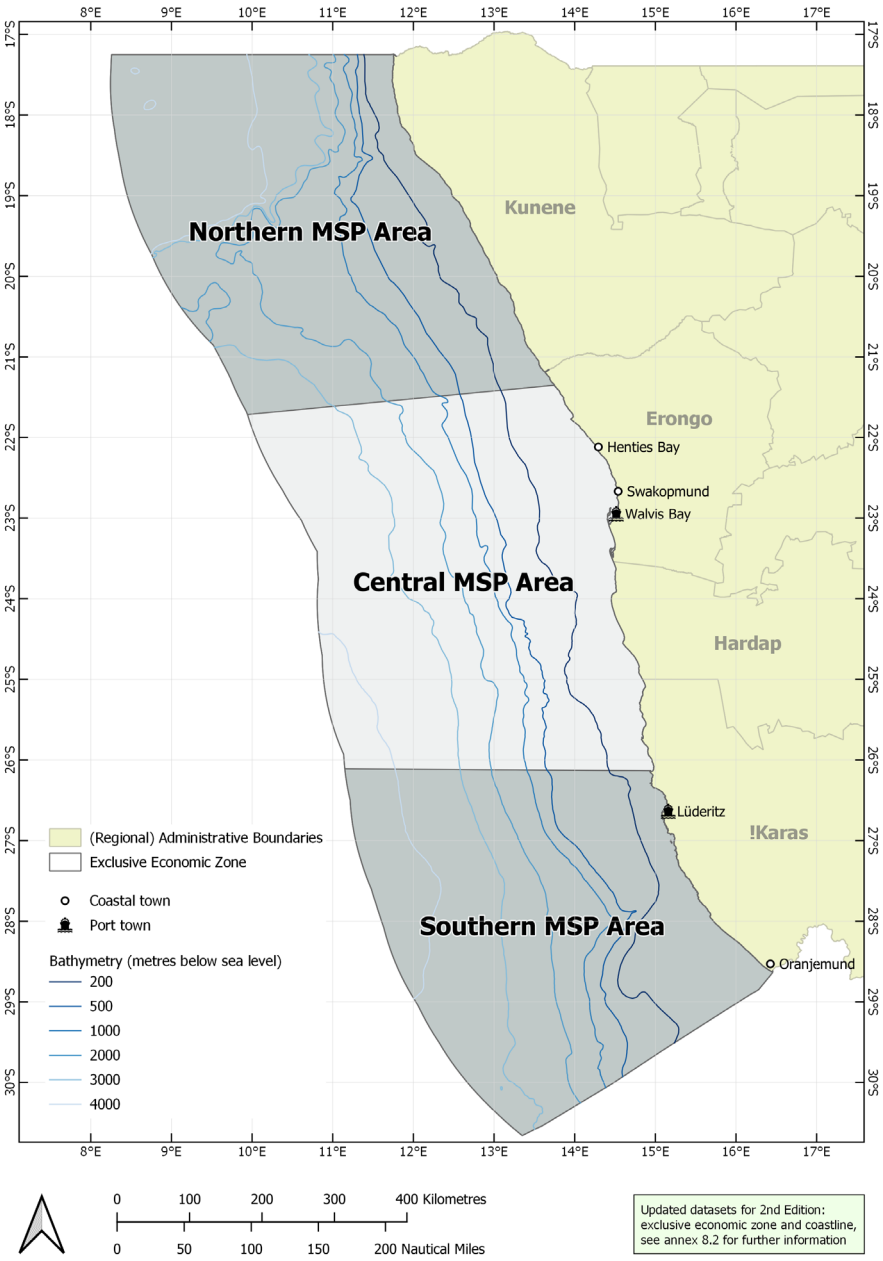
Cabinet, through the National Biodiversity Strategy and Action Plan 2 and the National Development Plan 5, has tasked the Ministry of Fisheries and Marine Resources (MFMR) to coordinate the MSP process in Namibia through an inter-ministerial working group.

THIS NATIONAL MSP WORKING GROUP (MSP-NWG) CONSISTS OF REPRESENTATIVES FROM THE FOLLOWING MINISTRIES AND INSTITUTIONS:

- Ministry of Fisheries and Marine Resources
- Ministry of Mines and Energy (MME)
- Ministry of Works and Transport (MWT)
- Ministry of Environment, Forestry and Tourism (MEFT)
- National Planning Commission (NPC)
- Ministry of Defence and Veteran Affairs MoDVA)
- Ministry of Urban and Rural Development (MURD)
- Ministry of Agriculture, Water and Land Reform (MAWLR)
- National Commission on Research Science and Technology (NCRST)
- University of Namibia (UNAM)
- Namibia University of Science and Technology (NUST)
- Ministry of Industrialisation and Trade (MIT)

THE NAMIBIAN MSP AREAS

In order to implement MSP in a manageable and meaningful way, the waters under Namibian jurisdiction have been divided into three sub-national planning units: the northern, central and southern ocean space. These planning areas are based on administrative considerations, the distribution of ecosystem types and key biodiversity areas, as well as the distribution of existing uses and emerging interests. The central Namibian sea has been chosen as the planning area for the country's first marine spatial plan. The planning area is bound northwards by the Ugab River Mouth and southwards by Hottentots Bay. The northern and southern MSP areas cover the remaining marine areas under Namibian jurisdiction whereby the northern Namibian sea has been identified as the planning area for the second marine spatial plan to be developed. The inward planning boundary is the high-water mark. The outward boundary of the area is the outer limit of Namibia's marine area, as determined by the limit of its Exclusive Economic Zone (200 nautical miles) (EEZ).



STAKEHOLDER ENGAGEMENT APPROACH

THE NAMIBIAN MSP AREAS

OBJECTIVES OF STAKEHOLDER ENGAGEMENT

WE SEEK TO ENGAGE WITH STAKEHOLDERS FOR THE FOLLOWING REASONS:

- Create awareness on the MSP process, its purpose and benefits;
- Encourage ownership of the marine spatial plans and trust among stakeholders and decision-makers by ensuring that stakeholder views are considered;
- Encourage voluntary compliance with rules and regulations of the marine spatial plans;
- Gain a better and shared understanding of the complexity (e.g. spatial, temporal) and the human influences in the planning area;
- Examine existing and potential synergies and conflicts of multiple-use objectives of the planning area jointly with stakeholders; and
- Deepen our mutual and shared understanding about the problems and challenges in the planning area in order to develop joint solutions as much as possible.

PRINCIPLES OF STAKEHOLDER ENGAGEMENT

WE WILL:

- Involve relevant stakeholders early on and encourage as much participation as possible throughout the planning process;
- Be flexible in the means of communication and engagement to suit different stakeholder needs (e.g. different languages where needed, plain non-technical language, link with other engagement processes);
- Be transparent in how we engage stakeholders and communicate with them throughout the MSP process (information sharing);
- Encourage dialogue across stakeholders/sectors to help come to joint solutions; and
- Commit to implementing the strategy and revising it as needed.

STAKEHOLDER ANALYSIS TO-DATE (IDENTIFIED INTERESTS AND USES RELEVANT FOR MSP)

WE ARE COMMITTED TO COMMUNICATING AND ENGAGING WITH A RANGE OF USERS AS FAR AS PRACTICALLY POSSIBLE. THESE INTERESTS INCLUDE BUT ARE NOT NECESSARILY RESTRICTED TO:

- Defence
- Environmental monitoring and scientific
- Environmental Protection
- Fisheries
- Geological Resource mapping and exploitation
- Infrastructure
- Mariculture
- Marine and coastal tourism
- Maritime Transport and ports
- Sea water abstraction
- Wastewater treatment and disposal

As the MSP process evolves, new stakeholders will be identified and their interests and views will be taken into account.

WHOM WILL WE ENGAGE?

WITHIN THE INTERESTS IDENTIFIED, THE FOLLOWING RELEVANT STAKEHOLDERS WILL BE ENGAGED IN THE MSP PROCESS:

- GOVERNMENT
  - Central government
  - Regional councils
  - Local authorities
  - State owned enterprises
- CIVIL SOCIETY: Stakeholders representing non-governmental and public interests
  - Non-governmental organisations (NGOs)
  - Research and educational institutions
  - Local community groups and traditional authorities
  - Traditional authorities
  - Unions
  - Citizen and other community-based organisations
- PRIVATE SECTOR: Stakeholders representing the key marine sectors operating in the areas
  - Industry associations
  - Enterprises

HOW AND WHEN WILL WE ENGAGE?

METHODS OF COMMUNICATION AND ENGAGEMENT:

Throughout each stage of the MSP planning cycle (figure below), the MSP-NWG will be communicating with stakeholders by text message, post, fax, apps, email, a dedicated website, social media (e.g. Facebook, Twitter), newspaper articles, radio and TV broadcasts as appropriate and suitable. The MSP-NWG will be also actively engage with stakeholders through a series of meetings, workshops and conferences.

The MSP-NWG has identified the activities to be carried out in the various phases of the MSP process phases (see table below).

THE TIMETABLE OF STAKEHOLDER ENGAGEMENT ACTIVITIES:			
MSP PHASE	ACTIVITY	WHO	HOW AND WHERE
Preparatory phase	Current Status Report Describing the context for MSP in Namibia Establish human uses of the planning areas Drawing up strategic and specific objectives for MSP	Government, industry and civil society	Focused stakeholder meetings in Windhoek and at the coast
	Receive feedback on draft Current Status Report		Multi-sector stakeholder-workshop
	Public launch event of Current Status Report		Media event
Drafting phase	Develop and agree objectives and preferred spatial option	Government, industry and civil society	To be decided
	Develop the draft plans		
	Finalise and adopt the plans	Government, industry and civil society	To be decided
Implementation phase	Implement, monitor and evaluate the plans	Government, industry and civil society	To be decided

IMPLEMENTATION AND REVISION

MSP is a dynamic process. It is possible that changes will be made to this strategy to reflect the views of stakeholders and ensure their full participation in achieving the overall aims of MSP in Namibia. The MSP-NWG will therefore ensure that this strategy caters for the adaptive nature of the MSP process.

POINT OF CONTACT (EMAIL/ MSP WEBSITE)

PLEASE CONTACT THE NWG FOR MORE INFORMATION:	
CHAIRPERSON	VICE-CHAIRPERSON
Dr. Anja Kreiner Chief Fisheries Biologist *Tel:* 064 410 1158 *Email:* Anja.Kreiner@mfmr.gov.na	Mr. Sylvester Kamwi Chief National Development Advisor *Tel:* 061 2834058 *Email:* skamwi@npc.gov.na

The MSP-NWG will develop a webpage to communicate and engage stakeholders and the link to the website will be provided to the stakeholders.

GLOSSARY OF TERMS	
Relevant stakeholder	A stakeholder that has an interest in the ocean and that is identified to be engaged in specified activities related to the MSP process.
Exclusive Economic Zone	An area of the ocean extending to 200 nautical miles prescribed by the United Nations Convention on the Law of the Sea over which Namibia as a state hasspecial user rights.
Stakeholder engagement	The process through which relevant stakeholders are engaged directly in a dialogue with government throughout the MSP to ensure that their concerns and aspirations are understood and considered in decision-making and plan implementation.
Stakeholder consultation	The process through which relevant stakeholders provide comments and feedback to government decision-makers on potential decisions and alternatives in relation to MSP.
Blue Economy	Marine-based economic development that leads to improved human well-being and social equity, while significantly reducing environmental risks and contributing to a healthy ocean.

8.2 METADATA OVERVIEW

MAP NR	LAYER	
1	ADMINISTRATIVE BOUNDARIES	**DESCRIPTION:** Gazetted constituency boundaries as per the Delimitation Commission of 2013.
		DATA SOURCE: Ministry of Land Reform, available via NSDI
		METHODS: Boundaries captured by the Delimitation Commission in 2013, constituencies were dissolved into regions
		DATE: 2013
	COASTAL TOWNS	**DESCRIPTION:** Coastal towns of Namibia
		DATA SOURCE: De Cauwer, V. 2007. Mapping of the BCLME shoreline, shallow water and marine habitats. Final report for the BCLME project BEP/BAC/03/02
		METHODS: The position and names of cities, towns and settlements were collected from Atlas of Namibia + colour orthophotos.
		DATE: 2007
	COASTLINE	**DESCRIPTION:** Digitized coastline based on Google Earth satellite imagery.
		DATA SOURCE: Harris, L.R. 2012. Shoreline mapping of the Benguela Current Large Marine Ecosystem 2011: Undertaken for the Benguela Current Commission (BCC) project "Spatial Biodiversity Assessment (BCC-SBA) and Spatial Management, including Marine Protected Areas". Nelson Mandela Metropolitan University, Port Elizabeth, South Africa.
		METHODS: Aerial imagery of the Namibian coast from Google Earth© 2011 was saved as series of georeferenced images using the Shape2Earth plugin for the open-source programme MapWindow GIS (available at: http://shape2earth.com). Images were captured at a consistent scale (Google Earth scale bar at 900 m), although some exceptions to this were necessary because of the varied quality and resolution of the Google Earth imagery. The captured images were imported into ArcMap 10 (ESRI), and served as the baseline that the coastal-habitat shapefiles were digitized onto. Digitizing was generally performed at a 1:8000 scale, although, as above, the varied resolution of the imagery occasionally necessitated zooming in or out from this base scale. The WGS84 (Universal Transverse Mercator) projection was used for all shapefiles. The coastline was dissolved and the new Walvis Bay container terminal added manually.
		DATE: 2020
	EEZ AND TERRITORIAL WATERS	**DESCRIPTION:** The United Nations Convention on Law of the Sea (UNCLOS) indicates that the exclusive economic zone (EEZ) of a coastal state extends 200 nm from the baseline. Within this area, the coastal nation has sole exploitation rights over all natural resources. Namibia has ratified this convention.
		DATA SOURCE: Flanders Marine Institute (2019). Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (200NM), version 11. Available online at http://www.marineregions.org/. https://doi.org/10.14284/38

1	EEZ AND TERRITORIAL WATERS	**METHODS:** Normally, a sea baseline follows the low-water line, but when the coastline is deeply indented, has fringing islands or is highly unstable, straight baselines may be used (Wikipedia, 2007b). In that case, the baseline – or part of it - is defined by a set of points: the baseline points. The maritime boundaries and areas from marineregions.org are calculated from the baselines. In the Maritime Boundaries dataset, the baselines used were a combination of a coastline as a proxy for the low-water line (the normal baseline described in UNCLOS) and straight or archipelagic baselines. The source for the straight baselines was primarily the United Nations repository of all the claims from UNCLOS's signatories. In addition to this main source, others were also used to complete the straight baselines database such as national legislation on maritime delimitations, agreements, treaties, among others. The ESRI Countries 2014 was the primary source for the Maritime Boundaries v11 baseline. For more information visit https://www.marineregions.org/eezmethodology.php
		DATE: 2019
	BATHYMETRY	**DESCRIPTION:** Bathymetric depth contours for the world oceans from the General Bathymetric Chart of the Oceans (GEBCO) includes a seamless, global, digital set of the basic contours (200m, 500m, and at 500m intervals thereafter) with contours at intermediate depths also included in some areas, where available. GEBCO is published by the British Oceanographic Data Centre (BODC) on behalf of the Intergovernmental Oceanographic Commission (IOC) of UNESCO and the International Hydrographic Organization (IHO).
		DATA SOURCE: https://www.gebco.net/data_and_products
		METHODS: Shapefile downloaded
		DATE: 2003
2	MARINE SPATIAL PLANNING AREAS	**DESCRIPTION:** The three Marine Spatial Planning areas in the Namibian sea.
		DATA SOURCE: Marine Spatial Planning National Working Group
		METHODS During inter-sectoral discussions the relevant uses and interests in the ocean were considered to separate the complete Namibian EEZ into areas manageable in the planning process.
		DATE: 2019
4	SEAFLOOR GEOMORPHIC FEATURES	**DESCRIPTION:** Bathometry features found in Namibian sea, prominent by Walvis Ridge, few canyons and seamounts.
		DATA SOURCE: Harris, P.T., Macmillan-Lawler, M., Rupp, J., Baker, E.K. 2014. Geomorphology of the oceans. Marine Geology, 352: 4-24. GEBCO (General Bathymetric Chart of the Oceans) Available at http://www.gebco.net/data_and_poducts/gridded_bathymetry_data/. Geomorphology map from www.bluehabitats.org
		METHODS: Slight manual revision of the Blue Habitats / Harris 2014 global geomorphology map.
		DATE: 2014
5	NATIONAL PARKS	**DESCRIPTION:** National Parks along the Namibian coast
		DATA SOURCE: Mendelsohn J, Jarvis A, Roberts C and Robertson T. 2002. Atlas of Namibia: A portrait of the land and its people. David Philip Publishers, Cape Town, South Africa. http://www.the-eis.com/

5	NATIONAL PARKS	**METHODS:** Created based on government gazettes. Where possible, boundaries were created from coordinates provided in the gazettes. Where landmarks had no specific coordinates, other shapefiles were used (e.g. farms shapefile, rivers shapefile, 1:250000 maps etc.).
		DATE: 2002
	DOROB NATIONAL PARK	**DESCRIPTION:** Dorob National Park delineation
		DATA SOURCE: MET, 2012. Namibia's Coast: ocean riches and desert treasure. Authors: Robertson T., Jarvis A., Mendelsohn J and Swart R. Department of Environmental Affairs, Ministry of Environment and Tourism, Windhoek, Namibia.
		METHODS: Created based on government gazettes. Where possible, boundaries were created from coordinates provided in the gazettes. Where landmarks had no specific coordinates, other shapefiles were used (e.g. farms shapefile, rivers shapefile, 1:250000 maps etc.).
		DATE: 2012
	NAMIBIAN ISLAND MARINE PROTECTED AREA	**DESCRIPTION:** The Namibian Islands and Marine Reserve consists of all islands, marine resources and marine areas as described in the Government Gazette of the Republic of Namibia, 16 February 2009. This layer only includes the outer borders of the entire Marine Reserve as well as the line fish and rock lobster sanctuaries, not the islands and islets.
		DATA SOURCE: Government Gazette 4210, February 2009.
		METHODS: Shapefile created from gazetted coordinates.
		DATE: 2009
	NAMIB SAND SEA	**DESCRIPTION:** World Heritage Site Namib Sand Sea
		DATA SOURCE: UNEP-WCMC and IUCN (2020), Protected Planet: The World Database on Protected Areas (WDPA) [Online], September 2020, Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net.
		METHODS: Downlaoded shapefile
		DATE: 2020
6	SEAL COLONIES	**DESCRIPTION:** Locations of the twenty- six seal colonies along the coastline.
		DATA SOURCE: BCLME project BEHP/BAC/03/03. Original data from NatMIRC
		METHODS: GPS point location converted to shapefiles, Sylvia Hill seal colony coordinates updated in 2021
		DATE: 2007
7	SPAWNING AREAS	**DESCRIPTION:** Generalised distribution of commercially important fish species
		DATA SOURCE: Hake, Monk, Orange roughy and Pelagic fish: NatMIRC/MFMR Kob: Mendelsohn J, Jarvis A, Roberts C and Robertson T. 2002. Atlas of Namibia: A portrait of the land and its people. David Philip Publishers, Cape Town, South Africa. http://www.the-eis.com/

7	SPAWNING AREAS	METHODS: Hake, Monk, Orange roughy and Pelagic fish: Egg and larvae data as well as gonad stages collected during scientific surveys. Kob: Adapted from a map provided by the Geological Survey of Namibia for the Atlas of Namibia.
		DATE: Hake, Monk, Orange roughy and Pelagic fish: 2020, Kob: 2002
8 - 18, 20	CATCH LOCATIONS	DESCRIPTION: Catch locations of different fish species
		DATA SOURCE: NatMIRC/Ministry of Fisheries and Marine Resources
		METHODS: Catch locations are recorded on log sheets by captains of the fishing vessels and submitted to MFMR.
		DATE: 2018
19	FISHING INTENSITIES	DESCRIPTION: Fishing intensity of different fishing vessels
		DATA SOURCE: Walvis Bay Inspectorate/MFMR
		METHODS: · VMS point location data for all vessels in each of the nine fisheries were collated for the period 2014 – 2017. The data were cleaned, including removal of clear errors (e.g. points on land) and clipped to the study area. · Points were converted into a raster density layer, using a kernel density approach. This used a 0.005° cell size and a 0.075° search distance using planar units. · Density layers were then iteratively explored using a quantile based approach to identify the cut-off for very low density use areas and areas used for transit only, which for all industries identified the bottom 10% - 15% of used areas as being low use or transit only. The calibration was done on an expert basis. It identified the mean density of transit only zones, and then rounded this value up to the next 5 percentile mark. For the next steps only values above this threshold were evaluated. · Remaining areas were then split into 10 quantiles, from lower intensity use to highest intensity use. · The raster was then converted to a polygon layer. · Isolated port and anchorage polygons (which would have had high intensity values as vessels are often found there) were manually identified and exclude from the datasets. · The above approach gives a set of 10 intensity of use categories from lower intensity use (1) to highest intensity use (10). The areas deliberately exclude very low use areas.
		DATE: 2019
21	PROHIBITED AREAS	DESCRIPTION: Areas restricted for certain activities
		DATA SOURCE: De Cauwer, V. 2007. Mapping of the BCLME shoreline, shallow water and marine habitats. Final report for the BCLME project BEP/BAC/03/02 Government Gazette 2657, December 2007 (The areas restricted to trawling and longlining have been published in Government Gazette 5721, April 2015, before they were a condition attached to fishing licences). Areas prohibited for shore-based recreational fishing and boat-based line fishing (as per Gazette 2657) were redrawn in 2020 by the MARISMA project.
		METHODS: Shapefiles created from coordinates
		DATE: 2000 & 2020
22	IMPORTANT AREAS FOR SKI BOAT OPERATORS	DESCRIPTION: Areas along the central Namibian coast which are important operating areas for ski boats launching in Swakopmund

22	IMPORTANT AREAS FOR SKI BOAT OPERATORS	**DATA SOURCE:** Mr Henry Loubser
		METHODS: Coordinates positions of northern and southern boundaries of areas described were obtained from the African Marine Atlas. A buffer of two nautical miles was created from the coastline offshore between the described locations.
		DATE: 2018
	RECREATIONAL FISHING AREAS	**DESCRIPTION:** Areas permitted for shore-based recreational fishing and boat-based line fishing (as per Gazette 2657) were redrawn in 2020 by the MARISMA project.
		DATA SOURCE: MARISMA Project
		METHODS: Shapefiles created from coordinates
		DATE: 2020
23	NAVAL DEFENCE	**DESCRIPTION:** Areas of interest or reserved for naval defence, including military training areas, ammunition dumping area and naval infrastructure area.
		DATA SOURCE: Namibian Navy
		METHODS: Digitised using coordinates provided by the Namibian Navy
		DATE: 2020
24	NAMIBIAN ISLAND MARINE PROTECTED AREA	See Map 5
	ECOLOGICALLY OR BIOLOGICALLY SIGNIFICANT MARINE AREAS	**DESCRIPTION:** Ecologically or Biologically Significant Marine Areas (EBSA) are regarded as priority areas with ecological properties within our ocean space and require special management of human activities.
		DATA SOURCE: MARISMA Project
		METHODS: EBSA methodology uses Systematic Conservation Planning as a spatial prioritisation tool that supports decision-making about actions (usually with limited resources) that optimise benefits for biodiversity at the least cost to society. The methodology is documented in MARISMA EBSA Workstream, 2020. Ecologically or Biologically Significant Marine Areas in the Benguela Current Large Marine Ecosystem: Descriptions, status assessment and management recommendations for new and revised EBSAs in Namibia, Technical Report. MARISMA Project. Namibia.
		DATE: 2017
	ECOLOGICAL SUPPORT AREAS	**DESCRIPTION:** Ecological Support Areas (ESA) are regarded as second priority areas after the EBSAs.
		DATA SOURCE: MARISMA Project
		METHODS: EBSA methodology uses Systematic Conservation Planning as a spatial prioritisation tool that supports decision-making about actions (usually with limited resources) that optimise benefits for biodiversity at the least cost to society. The methodology is documented in MARISMA EBSA Workstream, 2020. Ecologically or Biologically Significant Marine Areas in the Benguela Current Large Marine Ecosystem: Descriptions, status assessment and management recommendations for new and revised EBSAs in Namibia, Technical Report. MARISMA Project. Namibia.
		DATE: 2018

24	NIMPA	See Map 5
	NATIONAL PARKS	See Map 5
25	IMPORTANT BIRD AREAS	**DESCRIPTION:** Important bird areas along the Namibian coast. IBAs are selected according to a set of criteria (standards) determined by BirdLife International (www.birdlife.org)
		DATA SOURCE: BirdLife International, 2020. Important Bird and Biodiversity Area (IBA) digital boundaries: September 2020 version. BirdLife International, Cambridge, UK.
		METHODS: Shapefile created along the coastline of Namibia where IBAs are adjacent
		DATE: 2020
	RAMSAR SITES	**DESCRIPTION:** Ramsar wetlands are wetlands of international importance listed under the Convention on Wetlands. The aim of the convention is to halt the worldwide loss of wetlands and to conserve those that remain.
		DATA SOURCE: Mendelsohn J, Jarvis A, Roberts C and Robertson T. 2002. Atlas of Namibia: A portrait of the land and its people. David Philip Publishers, Cape Town, South Africa and World Database on Protected Areas (WDPA)
		METHODS: Shapefile downloaded
		DATE: 2002
	SEAL COLONIES	See Map 6
	NAMIBIAN ISLAND MARINE PROTECTED AREA	See Map 5
26	PHOSPHATE DEPOSITS	**DESCRIPTION:** Mineable deposit of phosphate as they are spatially located at the ocean floor within the Namibian marine environment mostly found at the mouth of Kunene river and the area between Swakopmund and Lüderitz.
		DATA SOURCE: MME
		METHODS: Geological mapping data converted into shapefiles
		DATE: Updated shapefile version available on monthly basis
27	GEOLOGY	**DESCRIPTION:** Geophysical and geoscientific research have been done in the area like the shelf edges and transects from east to west of Namibian ocean space to create knowledge, discoveries and development of mineral resources and to understand the earth system and geology within Namibian EEZ.
		DATA SOURCE: Ministry of Mines and Energy
		METHODS: Geological mapping data converted into shapefiles
		DATE: Updated shapefile version available on monthly basis
28	EXCLUSIVE PROSPECTING LICENCES	**DESCRIPTION:** Spatial allocation of exclusive prospecting licences within Namibian ocean space. Where an EPL is awarded it is assumed that prospecting is carried out.
		DATA SOURCE: MME

28	EXCLUSIVE PROSPECTING LICENCES	**METHODS:** Shapefiles generated from coordinates
		DATE: 2020 (updated shapefile version available on monthly basis)
29	ACTIVE MINING LICENCES	**DESCRIPTION:** Spatial allocation of mining licences within the Namibian ocean space.
		DATA SOURCE: MME
		METHODS: Shapefiles generated from coordinates
		DATE: 2020 (updated shapefile version available on monthly basis)
30	GAS FIELD	**DESCRIPTION:** Spatial allocation of hydrocarbons (gas) licences within the Namibian ocean space. Licences are granted as predetermined blocks.
		DATA SOURCE: MME
		METHODS: Shapefiles generated from coordinates
		DATE: 2017
	PETROLEUM EXPLORATION BLOCKS	**DESCRIPTION:** Spatial allocation of hydrocarbons (petroleum) licences within the Namibian ocean space. Licences are granted as predetermined blocks.
		DATA SOURCE: MME / National Petroleum Corporation of Namibia
		METHODS: Shapefiles generated from coordinates
		DATE: 2020
	WELLHEADS	**DESCRIPTION:** Drill well positions within the Namibian ocean space
		DATA SOURCE: MME
		METHODS: PS positions converted into shapefiles
		DATE: 2017
31	GAS FIELD	See Map 30
	WELLHEADS	See Map 30
	EXCLUSIVE PROSPECTING LICENCES	See Map 28
	ACTIVE MINING LICENCES	See Map 29
	PETROLEUM EXPLORATION BLOCKS	See Map 30
32	MARICULTURE AREAS	**DESCRIPTION:** Areas delineated for mariculture
		DATA SOURCE: South African Navy Hydrographic Office
		METHODS: Coordinates extracted from nautical charts
		DATE: 2020

33	SHIPWRECKS	**DESCRIPTION:** Shipwrecks along the coast of Namibia
		DATA SOURCE: Gunter von Schumann
		METHODS: Coordinated of known shipwrecks converted to shapefile
		DATE: 2018
34	MARITIME TRANSPORT	**DESCRIPTION:** Areas delineated for maritime transport in the Walvis Bay and Lüderitz Bay areas, including anchorage areas, anchorage sites, inactive and active spoilgrounds, traffic separation schemes, fairway, turning basin, channels, inshore traffic zone and port limits.
		DATA SOURCE: South African Navy Hydrographic Office
		METHODS: Coordinates extracted from nautical charts
		DATE: 2020
	RECREATIONAL CRAFTS ANCHORAGE AREA	**DESCRIPTION:** Area reserved for anchorage of recreational crafts
		DATA SOURCE: NAMPORT
		METHODS: Coordinates extracted from Port of Walvis Bay Jurisdiction Plan
		DATE: 2018
35	PORTS	**DESCRIPTION:** Ports of Namibia
		DATA SOURCE: De Cauwer, V. 2007. Mapping of the BCLME shoreline, shallow water and marine habitats. Final report for the BCLME project BEP/BAC/03/02
		METHODS: The position and names of cities was collected from Atlas of Namibia + colour orthophotos.
		DATE: 2007
	SHIPPING INTENSITY IN NAMIBIAN SEA	**DESCRIPTION:** Shipping is an important use of marine areas in Namibia. Associated impacts from shipping are underwater noise pollution, oil spillage and other pollutants, propeller and wake damage in shallow areas, dumping of waste (especially plastic) into the ocean, direct strikes on cetaceans, invasion pathways for alien species and associated infrastructure (ports and anchorages).
		DATA SOURCE: Halpern, B.S., Frazier, M., Potapenko, J., Casey, K.S., Koenig, K., Longo, C., Lowndes, J.S., Rockwood, R.C., Selig, E.R., Selkoe, K.A. and Walbridge, S., 2015. Spatial and temporal changes in cumulative human impacts on the world/'s ocean. Nature communications, 6. Halpern, B. S. et al. A global map of human impact on marine ecosystems. Science 319, 948-952 (2008). Walbridge, S. Assessing ship movements using volunteered geographic information Master of Arts thesis, University of California, (2013).
		METHODS: Underlying method by Halpern: Vessel identity and location information was obtained using two approaches. (1) Over the past 20 years, 10-20% of the vessel fleet has voluntarily participated in collecting meteorological data for the open ocean, which includes location at the time of measurement, as part of the Volunteer Observing System (VOS). (2) In order to improve maritime safety, in 2002 the International Maritime Organization SOLAS agreement required all vessels over 300 gross tonnage (GT) and vessels carrying passengers to equip Automatic Identification System (AIS) transceivers, which use the Global Positioning System (GPS) to precisely locate vessels. In the previously developed shipping layer1, a single year sample of the VOS data was used for analysis. These data ignored vessel type, and included observations from only 12% of the vessel fleet. The ships included are a spatially- and statistically-biased sample of the population, making the modelled results

35	SHIPPING INTENSITY IN NAMIBIAN SEA	somewhat misleading. Here, we have instead adopted the model outputs developed elsewhere 15. We collapsed down the detailed analysis from that study into eight broad classes of vessels: authority, cargo, fishing, high-speed, passenger, pleasure, support, tanker and an 'other' class. The vessel classes which move globally (cargo, tanker, and passenger) are required to carry AIS transceivers, and in these three classes 60-70% of the total vessel fleet was observed using AIS. The resulting data layer is primarily composed of these vessel classes in both the AIS and VOS data sources, and is almost exclusively these ship types in the open ocean. We used a simple linear average of the two data sources, producing a final model resolved for the whole ocean at a resolution of 0.1 decimal degrees (~11km). Both the AIS and VOS data have limited observation frequency, leading to gaps that when directly interpolated with geodesic paths, create invalid routes which cross land masses. We used a routing model to create a visibility graph of the oceans, creating valid potential movement paths. These movement paths are based on the assumption that mariners will prefer great circle distances when possible. Each ocean location was treated as a node in the visibility graph, and shortest distance paths were computed using the A* search algorithm15. The resulting graph contains 6.5M vertices (valid ship locations) and 17M edges (connections between locations). These methods are different from the ones developed previously 1, thus precluding temporal comparisons of this data layer. Final processing: The global values were normalized to the range found in Namibian waters (i.e. n/ nmax). 1 is the highest shipping intensity and 0 lowest.
		DATE: 2015
36	TOURISM ACTIVITIES (Surf spots, Boat tours, Dolphin Sanctuary, Kayak Tours, Important Areas for Ski boat operators, Birding)	**DESCRIPTION:** Tourist sites in the area of Walvis Bay and Swakopmund
		DATA SOURCE: Local knowledge and Namibia Tourism Board
		METHODS: Coordinates of tourism activities and sites were converted into shapefiles based on a combination of expert knowledge and local consultation.
		DATE: 2018
	RIVERS	**DESCRIPTION:** Locations of rivers in Namibia
		DATA SOURCE: Directorate of Hydrology, Ministry of Agriculture, Water & Forestry, available via NSDI
		METHODS: The shapefile was obtained from the HYMNAM project and amended to fit the country borders used in the Atlas of Namibia. Main rivers were separated from minor rivers based on the original Geological Survey river data set. One addition was made i.e. omuramba owambo. One exclusion was made i.e. Sechomib.
		DATE: 2002
	ROAD NETWORK	**DESCRIPTION:** Outlines all gazetted main, disctrict and trunk roads for all 14 Regions in Namibia.
		DATA SOURCE: Roads Authority, Road Management System Division, available via NSDI
		METHODS: Downloaded shapefile **DATE:** 2019
	AIRPORTS	**DESCRIPTION:** Airports along the central Namibian coast
		DATA SOURCE: Mendelsohn J, Jarvis A, Roberts C and Robertson T. 2002. Atlas of Namibia: A portrait of the land and its people. David Philip Publishers, Cape Town, South Africa. (www.the-eis.com)

36	AIRPORTS	**METHODS:** Downloaded shapefile
		DATE: 2002
	DUNES	**DESCRIPTION:** Dunes along the coast of Namibia
		DATA SOURCE: De Cauwer, V. 2007. Mapping of the BCLME shoreline, shallow water and marine habitats. Final report for the BCLME project BEP/BAC/03/02
		METHODS: The high sand dune areas in the Namib desert were digitised up to about 50 km inland. Landsat images of 2000 were the main source, the topographic maps were used in a lesser extent and mainly where in doubt on the Landsat images.
		DATE: 2007
37	ORANJEMUND TOWNLAND BOUNDARIES	**DESCRIPTION:** Townland boundaries of Oranjemund
		DATA SOURCE: Namdeb
		METHODS: Captured from SG Diagram No.A336/2005
		DATE: December 2004
	TOWNLANDS	**DESCRIPTION:** Townland area of coastal towns
		DATA SOURCE: MEFT (Dorob Park Data set)
		METHODS: Downloaded shapefile
		DATE: 2008
	AIRPORTS	See map 36
	UNDERWATER COMMUNICATION CABLES	**DESCRIPTION:** West Africa Cable System (WACS), Africa Coast to Europe (ACE) cable system, South Atlantic 3 (SAT-3) and disused South Atlantic 1 (SAT-1) submarine cable.
		DATA SOURCE: South African Navy Hydrographic Office
		METHODS: Coordinates extracted from nautical charts
		DATE: 2020
	POWER LINES	**DESCRIPTION:** The national electricity grid network of Namibia. The national overview map as presented in the Rural compilation: Electricity Distribution Master Plan for Namibia (EMCON. 2000) was used as a reference and framework for this shapefile.
		DATA SOURCE: Obtained from Nampower for the NACOMA project
		METHODS: The data were converted to geographic projection from the original Lambert projected data with the following parameters: Origin = -22 1st parallel = -20 2nd parallel = -26, and Central meridian = 19 E.
		DATE: 2008
	RAILWAY NETWORK	**DESCRIPTION:** The national railway network of Namibia
		DATA SOURCE: Ministry of Land Reform, available via NSDI
		METHODS: Digitized from 0.5 m resolution orthophotos of 2012 for 1: 1000 000 topographic maps
		DATE: 2014

37	WATER SUPPLY LINES (COASTAL)	**DESCRIPTION:** Coastal water supply lines
		DATA SOURCE: NACOMA
		METHODS: Unknown
		DATE: 2008
38	SEAWATER ABSTRACTION POINTS	**DESCRIPTION:** Sites where seawater is abstracted for desalination, salt production or industrial use.
		DATA SOURCE: MAWLR
		METHODS: Coordinates converted to shapefile
		DATE: 2018 (central MSP area) & 2020 (southern MSP area)
	INDUSTRIAL EFFLUENT SITES	**DESCRIPTION:** The DAWF regularly conducts water quality and quantity monitoring throughout the Namibian coastline to ascertain the quality of effluent being discharged into the Atlantic Ocean. Parameters monitored include ammonia, nitrate, dissolved oxygen and dissolved solids.
		DATA SOURCE: MAWLR
		METHODS: Coordinates converted to shapefile
		DATE: 2018 (central MSP area) & 2020 (southern MSP area)
39	MONITORING LINES	**DESCRIPTION:** Oceanographic monitoring stations sampled using the research vessel Mirabilis or other vessels of opportunity. Parameters samples include temperature, salinity, oxygen, phytoplankton and zooplankton.
		DATA SOURCE: MFMR
		METHODS: Coordinates converted to shapefile
		DATE: 2018
	DIAZ POINT LINE	**DESCRIPTION:** Oceanographic monitoring stations sampled on a monthly basis (or more frequently) using the research vessel !Anichab. Parameters samples include temperature, salinity, oxygen, phytoplankton and zooplankton.
		DATA SOURCE: MFMR
		METHODS: Coordinates converted to shapefile
		DATE: 2018
	ADDITIONAL MONITORING STATIONS	**DESCRIPTION:** Oceanographic monitoring stations sampled during hake and monk biomass surveys. Parameters samples include temperature, salinity and oxygen.
		DATA SOURCE: MFMR
		METHODS: Coordinates converted to shapefile
		DATE: 2020
	MOORINGS	**DESCRIPTION:** Oceanographic moorings deployed by the Baltic Sea Research Institute in collaboration with MFMR. Moorings collect data on temperature, salinity, oxygen and ocean currents.
		DATA SOURCE: MFMR
		METHODS: Coordinates converted to shapefile
		DATE:2018

8.3 OVERVIEW OF STAKEHOLDER INPUTS TO THE REPORT

On 19 April 2018, the 1st multi-sector stakeholder workshop on MSP was held to verify the draft current status report, which had been compiled by the NWG on the basis of a national data-gathering exercise and including through single-sector stakeholder meetings. The tables below are comments from the stakeholders participating in the 1st multi-sector stakeholder workshop on the various sections of the current status report (called CSR in brief below) and responses. Numbers in the table refer to the first edition of the CSR from 2018. With the second edition page, map and figure numbers have changed.

COMMENTS ON SECTIONS 2, 4 AND 5		
NR	COMMENTS AND SUGGESTIONS	COMMENTS AND SUGGESTIONS
1	Protection of cultural heritage should be added to the MSP goals.	The MSP goals are not designed to specifically address aims related to each individual sector but are rather highlevel to address and cover all the various sectors. Protection of cultural heritage delivers social and economic benefits and is therefore covered well under the MSP goals which are meant to contribute to the protection of cultural heritage. The good spatial governance goal is furthermore looking at ensuring integration of interests and sustainable management of marine and coastal resources (see page 1), including protection of cultural heritage.
2	The benefits and values of ship wrecks need to be stated. The benefits should be indicated as local, national or international.	See page 90: The CSR now includes a section on the socio-economic importance of marine and coastal heritage.
3	The spatial conflicts with other sectors (e.g. between ship wrecks trawling) should be indicated.	There are no spatial conflicts perceived. See map 44 on page 88: Trawling occurs far from the coastal waters where most of the ship wrecks are found; throughout the entire coastline of Namibia there are only four ship wrecks in the fish trawling zone and conflicts are therefore very minimal.
4	The MSP goals must have specific timelines (e.g. NDP5 or Vision 2030 timelines).	MSP is aligned with NDP 5, which in turn aims at delivering Vision 2030. See page 2: The ocean vision, which is to be achieved inter alia by MSP, now indicates the link to Vision 2030.
5	Relevant stakeholders and the general public must be able to validate the governance transparency.	The MSP process is designed to promote participation, collaboration, integration and to enhance transparency thereby.

NR	COMMENTS AND SUGGESTIONS	COMMENTS AND SUGGESTIONS
6	The process should include an adequate assessment of the current sector-specific activities and their impacts.	Government representatives of the various sector ministries have produced the various CSR chapters on the respective human uses which assess and cover the current sector-specific activities and their impacts in terms of environmental impacts and with regard to potential synergies and conflicts with other uses (see sections 4 and 5). The chapters were produced on the basis of stakeholder inputs from the various sectors to reflect an adequate assessment.
7	The importance of Environmental Impact Assessments (EIAs) and the significance of enforcement and compliance should be highlighted.	This is mentioned throughout the CSR (see for example, pages 50, and 78).
8	Local, cultural and traditional knowledge and opinions should be considered.	Local stakeholders such as NGOs, scientific societies, local authorities and communities are consulted throughout the process in order to consider their knowledge and opinions. Traditional knowledge and opinions are considered where they exist and brought forward for inclusion in the process.
9	Relevant knowledge of NGOs and small companies should be considered.	A number of NGOs and other relevant stakeholders such as small tourism companies were consulted throughout the process to consider their knowledge (e.g. the Namibian Chamber for the Environment, the Namibian Dolphin Project, the Coastal Environmental Trust of Namibia and tourism operators).
10	Include bio-prospecting in the sector descriptions.	As far as the government is concerned, there are no activities targeting bio-prospecting in the marine environment. It is also not considered a spatially important activity that MSP could deal with as such.
11	Include an inventory and status description of marine and coastal life and habitats (and respective requirements), threats to species and spatial requirements	The purpose of the CSR is not to include such information. The EBSA descriptions, which are currently being finalized by the government, include a detailed summary of the biodiversity features related to each EBSA. The forthcoming Marine Spatial Plan(s) will build on a status assessment of the country's EBSAs and related management recommendations to the largest extent possible.
12	The process should take into account non-governmental stakeholders and ensure capacity for MSP is build both within and beyond government.	A number of stakeholders from the civil society and industry (e.g. NGOs such as the Namibian Dolphin Project, and industries such as the Confederation of Namibian Fishing Associations) were engaged during the process. Capacity for MSP is developed within government (primarily through the ministry representatives serving on the National Working Group on MSP) and outside of government given that universities are also represented in the Working Group. In addition, the MARISMA project has carried out a number of capacity development activities (for further information on the implemented capacity development activities thus far, please contact Ms. Elisabeth Mausolf via elisabeth.mausolf@giz.de and/or Ms. Monica Thomas via monica@benguelacc.org).

NR	COMMENTS AND SUGGESTIONS	COMMENTS AND SUGGESTIONS
13	There is a need to enhance the communication and cooperation among stakeholders e.g. concerning the phosphate conflict.	The MSP process is designed in such way that it brings together different sector stakeholders and interests at one table to achieve integration where possible and to plan human activities in the sea in a pro-active manner and across sectors to avoid conflicts between sectors and between human uses and the environment. See also sections 1 and 2.
14	The wording a) "marine and coastal environment" and b) "maximised" in the Namibian ocean vision should be changed to a) "marine and coastal ecosystem" and b) "optimised".	The word "maximised" has been replaced by "optimised". The "marine and coastal environment" is considered more inclusive than "ecosystem" as it would also embrace humans better and is therefore not changed as proposed.
15	The transfer of skills concerning marine technologies should be considered in MSP.	This is not a spatial matter that MSP can address.
16	MSP should ensure that the mariculture industry can expand in space.	See page 86.
17	The report should indicate how global warming/climate change will affect mariculture.	See page 85.
18	No mention is made of the risk that modern antifouling paints pose to fish farming. Antifouling paints today are self-polishing which means that through movement of the water expired layers are removed and fresh layers with poison, mostly coper based, are exposed and kill anything that want to settle on the hull.	This has been included now. See page 86
19	The "precautionary principle" must not be used as a tool to stop activities but should be based on mutual agreement and available evidence.	The "precautionary principle" is an internationally agreed concept and commonly applied approach in natural resources management with the aim to avoid irreversible harm to humans and their environment. It is not designed to be a tool to "stop activities" but rather serves a tool to err on the side of caution to prevent harm to humans and their environment when sufficient scientific evidence is lacking. As indicated in the report, all decisions to be made during the process will depend on the adequacy of knowledge/evidence available.
20	There should be a mechanism for conflict resolution among different sectors.	MSP provides a platform for the integration of different marine users to plan and communicate their activities with each other. By allocating uses to different areas according to their suitability and available resources it will eventually help to reduce conflicts among different users.
21	Existing legislation should be harmonized to accommodate different users.	See page 1: One of the MSP goals is to achieve "good spatial governance", which covers effective legislation.

NR	COMMENTS AND SUGGESTIONS	COMMENTS AND SUGGESTIONS
22	The process should embrace capacity building for implementation of MSP.	Capacity for MSP is developed within government (primarily through the ministry representatives serving on the National Working Group on MSP) and outside of government given that universities are also represented in the Working Group. In addition, the MARISMA project has carried out a number of capacity development activities (for further information on the implemented capacity development activities thus far, please contact Ms. Elisabeth Mausolf via elisabeth.mausolf@giz.de and/or Ms. Monica Thomas via monica@benguelacc.org).
23	Land based activities and impacts should be considered in MSP.	The process aims for integration of MSP with existing terrestrial planning to achieve integration of the land-sea interface and consideration of land-based impacts on the sea – and vice versa.
24	More stakeholders should be engaged in the coming process (e.g. the Topnaar community, marine mining companies).	Enhanced efforts will be made to get more participation from all sectors and other relevant stakeholders with an interest in the Namibian sea.
25	The government must ensure that MSP is legislated to make it legally binding for all sectors.	This is the intention (see National Framework on MSP).

COMMENTS ON SECTIONS 6		
NR	COMMENTS AND SUGGESTIONS	COMMENTS AND SUGGESTIONS
26	Informative trends are missing. Wider stakeholder consultation is needed.	No clear indication was given as to what kind of more detailed information is missing other than the information provided in section 6.2. Stakeholders were engaged in the process of the report development (see comment responses 8, 9 and 12). The trends identified are based on the various sector trends highlighted in each of the respective chapters.
27	The scale of operations concerning the various human uses should be considered in the compatibility matrix.	The matrix is meant to reflect a generic assessment which cannot consider the scales of specific activities. Scales of activities will be considered in the further process and possible zoning.
28	Compliance regulations and acts should be harmonized.	This is not specifically an issue that MSP can address. However, one of the MSP goals is to achieve “good spatial governance”, which covers effective legislation.

NR	COMMENTS AND SUGGESTIONS	COMMENTS AND SUGGESTIONS
29	Section 6 of the detailed analysis should include cumulative impacts.	As indicated in the analysis (section 6.6), the current levels of use are relatively low throughout the Namibian ocean space and in the planning area. The government is therefore of the view that cumulative impacts are likely to be relatively low as well. However, cumulative impacts assessment will be considered in future as the MSP process progresses. This is nevertheless not a purely technical task that the MSP-NWG can carry out as it requires considerable research and involvement of scientists.
30	The conflicts and synergies should be spatially mapped.	Conflicts are visually presented in maps 54, & 55.
31	Underwater noise should be mapped.	Mapping underwater noise was explored by the team but it was decided that this would not be very different to map 47 &48 on shipping intensity.
32	Impacts from construction activities should be evaluated.	Impacts caused by construction activities differ from project to project and are normally assessed in detail through EIAs rather than MSP.
33	The long term plans of the various sectors should be taken into account during the whole MSP process.	Each chapter on the various human uses covers key trends and policy objectives related to the respective uses (see sections 4 and 5).
34	The private sector should be engaged more in the process.	Enhanced efforts will be made to get more participation from all sectors and other relevant stakeholders with an interest in the Namibian sea.
35	Population growth should be considered.	Population growth is covered as one of the key trends together with coastal development and urbanisation (see page 133). The two are regarded as trends outside of the marine environment but have a considerable impact on the marine environment.
36	MSP and the Environmental Management Act (EMA) should talk to each other.	This will be considered in the further process. MSP will be implemented in accordance with EMA in that a Strategic Environmental Assessment (SEA) will be completed in order to obtain a clearance certificate before plan implementation.
37	There is a lack of knowledge on biodiversity in the Namibian marine environment.	MSP is using the best available data on biodiversity.
38	There is a need to educate people on impacts on the marine environment caused by the different human activities.	This is not an issue MSP can deal with. However, through awareness raising and stakeholder consultations during the process, a side effect will be improving people's knowledge on the subject and the various interrelations between human uses and the impacts of activities on the marine environment.
39	There is a need to include population growth as part of the trends.	See response on the same comment number 34.

NR	COMMENTS AND SUGGESTIONS	COMMENTS AND SUGGESTIONS
40	The evolving trend of better technology should be incorporated.	See page 133: The report now covers this aspect.
41	Detailed information of potential impacts that different stakeholders might have should be identified as these can have financial implications amongst stakeholders.	It is unclear as to what and how the process should consider this comment/suggestion.
42	The legal liability in case of accidents and fatalities should be considered (applicable laws e.g. maritime law for vessel registration vs fishing and tourism).	This is not an issue for MSP to deal with.
43	MSP must provide a vehicle for conflict resolution.	MSP provides a platform for the integration of different marine users to plan and communicate their activities with each other. By allocating uses to different areas according to their suitability and available resources it will eventually help to reduce conflicts among different users.

WRITTEN COMMENTS AFTER THE MULTI-SECTOR STAKEHOLDER WORKSHOP		
NR	COMMENTS AND SUGGESTIONS	COMMENTS AND SUGGESTIONS
44	The impact of desalination plants on fish stocks: the report by Philip Hooks on the water quality at the Erongo desalination plant outlet concluded that there was hardly any effect on the salinity within tens of metres away from the outlet. The divers maintaining the inlet and outlet pipes have taken photos of mussels growing on the pipes. I would say, if there has been no effect on sessile organisms, why should there be one on fish that are mobile enough to just avoid the small area of higher salinity? But of course this needs more scientific confirmation. We have asked Philip to repeat the survey now that the plant is operating at 60% of its full capacity. For the purpose of your report, I would suggest adding a bit more information so that it does not seem as if nobody has made an effort to assess the impact.	We have indicated in the matrix that more research is needed as there is a potential conflict. The study of Phillip Hooks has not looked at the impact on benthic organisms and suggests further studies to better map the salinity signal at greater depths to confirm mixing and dilution effects. The study does not provide any conclusions on possible effects of brine on the ecology
45	Matrix should be re-evaluated in light of new information suggested in first comment above	See point 44.

NR	COMMENTS AND SUGGESTIONS	COMMENTS AND SUGGESTIONS
46	Is the high water mark fixed and surveyed? It seems to me that the coastline is receding along the Swakopmund waterfront and at Mile 4, so the high water is flooding the beach closer and closer to the houses now	That is true, we now clearly refer to the Seashore Ordinance which defines the high water mark and also describes how it is determined (and by whom)
47	Map 3: meaning of 'SV' is not explained.	Explained in a footnote now, page 7.
48	Can one see the double shelf breaks in Map 5?	We have taken out the reference to the map, as the shelf break cannot be seen in the map, page 8.
49	Map 7: Dorob park is not named, map only shows 3 parks, not 4.	Updated map – Cape Cross seal reserve is the 4th park. Dorob National Park is indicated in the map now.
50	Figure 5: Why not include data up to the 2017 inter-census?	The Namibia census only take place every 10 years, 2011 was the last census in the country, page 13.
51	The majority of the current residents are males - is it really the majority?	As per 2011 census data, in the Erongo region there are more male than female residents, page 13.
52	Water for the central coast comes from underground aquifers in the Kuiseb, Omaruru and Swakop River. This is incorrect, Swakop River groundwater is saline in the coastal area and cannot be used for human consumption. The only groundwater sources are the Kuiseb and Omaruru rivers. Kuiseb aquifer resources were completely replenished in 2011/12 and Omdel has not 'become depleted' – the remaining water can only be abstracted at a slower rate than in the past.	Corrected and added that some residents along the Swakop River have boreholes and use water from the river, page 14.
53	Tourism is mentioned as having a "boom and bust" history – is this true? ...foreign visitors to whom the coast's attractions are an export commodity... rephrase this?	Rephrased, page 15.
54	The increase of red dots on the maps in recent years should be explained, i.e. has the number of boats increased, are the same boats targeting a wider area, are more fish being caught?	Added explanation in the text, Page 27-34.

NR	COMMENTS AND SUGGESTIONS	COMMENTS AND SUGGESTIONS
55	second line refers to maps 25 and 26 regarding ski boats, but there are no such maps.	Map 26 updated, page 36.
56	Third bullet …effects on (especially… word missing.	Edited in text, page 36.
57	Fourth bullet: does the sentence mean …that illegally takes place…?	These activties are at times approved by PS/minister, but are against regulations. They are special permissions, not illegal; page 38.
58	In Table 5 the Navy does not specify why they would release radionuclides. From the text one can also not find out what they want to do in the proposed training area(s). This means you cannot assess what the impact of their activities will be on shipping, fishing and the environment. If they only patrol the EEZ there would be little impact, but it looks different if they use live ammunition.	The navy needs areas for shooting exercises etc. and unfortunately, in the interest of national security cannot reveal all their information, page 42.
59	Page 46: 'MDA' is not explained.	Rectified MDA mean Maritime Domain Awareness
60	Salt, gypsum, uranium, diamonds and phosphates – I don't think there is uranium ore on the seabed.	Uranium is found in the seabed, page 77.
61	Smothering of drilling muds by benthic communities – this should be smothering of benthic communities by drilling muds; "toxic" water off the deck – better say polluted or contaminated.	Text edited, page 90.
62	The listed mitigation controls are basically just monitoring, I don't see how this will "ensure minimal environmental damage". Is any action taken or does monitoring show that no action is needed? Point just needs more info.	Shielding of light to avoid attraction of birds to light, removal of fines from drilling muds, minimizing exhaust gases, collection of waste water, sewage and solid waste management, and ensuring helicopter altitude compliance of more than 500m are mitigation measures, not just monitoring, page 90.
63	Mariculture is worth N$30 million – seems too low, if you read further it says N$108,628,858 from oysters (or is that figure incorrect?).	Corrected, page 84.
64	The issue of anti-fouling paint needs clarification – is it still toxic when it comes off the ship? There is a lot of information on the internet that could lead to a more balanced statement, the current wording is quite alarmist.	This concern was raised by industry – we have adapted the wording, page 86.

NR	COMMENTS AND SUGGESTIONS	COMMENTS AND SUGGESTIONS
65	Impact of shipping – I want to add that waste from ships anchored in the bay is a big problem, some of them just throw it into the sea. When I used to regularly clean the beach at Mile 4 at least a third of the volume was domestic waste from ships.	Added this sentence: Domestic waste discarded by ships anchored in the bay of increasing concern and is picked up on a regular basis during beach clean-ups in the Swakopmund area, page 86.
66	Impacts of tourism: Add tracks from vehicles driving on the beach, noise, impact on Damara terns, fishermen leaving behind tangled lines and hooks and other litter.	Added the relevant impact, page 107.
67	Table 6 – make clear that these are the permitted volumes, not the actual abstraction. It would be more informative if a column with the actual figures, say for 2017 could be added. The data should be available because permit holders have to send DWAF annual reports.To show the difference: Westport Resources Namibia (the owners of Valencia Mine) have a quota of 50 million m3, but they do not abstract any seawater because the mine is not in operation. AREVA (now Orano Mining Namibia) has a quota of 60 million m3, of which 31.4 million m3 were used in 2017. I expect it may be similar for many of the other companies.Figure 29 should show the actual abstraction and the accompanying text needs to be updated to reflect the actual status.	Edited figure caption. Actual volumes unfortunately are not available on short notice, page 115.
68	Impacts: Add that proliferation of desalination plants should be avoided by rather expanding existing plants; desalination has a positive impact on the sustainability of the Omdel aquifer (NamWater was able to reduce the abstraction rate), and on the socio-economic development of the Erongo region (by making sufficient water available for industrial development).	Agree that desalination has a positive impact on aquifers. Desalination in general should be encouraged (as opposed to avoid) as a means to augment current water supply given the water scarcity situation in Namibia. If more operations are allowed to desalinate this could reduce over reliance on traditional water supply from already stressed coastal aquifers, page 116.
69	Last sentence refers to figure 35 – actual number is 30. There should be some text explaining figure 30 –are these actual or permitted volumes? Adjust the vertical scale of the graph, delete "Uramin Namibia", this is the same site as "Erongo desalination plant"	Agree that on page 124, Figure 35 should be referring to Figure 30. The reference was omitted altogether given the fact Figure 30 consist of several places and not only Swakopmund and an explanatory sentence added. - Figure 30 refers to actual amounts of industrial wastewater being discharged into the ocean by the various operations listed. Due to the fact that operations discharge all possible wastewater on their sites into the ocean, DWAF does not restrict how much an operation may discharge. Those are actual amounts.

NR	COMMENTS AND SUGGESTIONS	COMMENTS AND SUGGESTIONS
70	"Effluent… generally contains organic matter, oils… - is this effluent from fish factories, surely not the case at the desalination plant or salt refinery? What does "neutralise" mean in this context? Which is 1.7 times higher, chemical or biological oxygen demand?	Effluent being referred to is from fish factories and therefore statement now reads: "Effluent into the ocean from fish factories generally contains organic matter, oils and suspended solids." - Replaced "neutralise" with "treat" - Statement now reads "The average fish factory effluent is 1.7 times higher in chemical oxygen demand and biological oxygen demand than normal sea water". Page 121.
71	"Approximately 17 permits" – surely DWAF should know how many permits they have issued? 8 permits are valid and 4 expired, that makes 12. Next page shows that 10 companies are monitored, possibly those with valid permits?	The correct number is 12 and 17 is a typo. Also deleted "approximately". - DWAF monitors all operations discharging into the ocean, whether in possession of a permit or not. The companies referred to are the ones for which latest effluent quality results (2016) are available. DWAF monitors the following: Walvis Bay Salt Holdings, United Fishing (now closed), Etosha, Tunacor, Seaflower Pelagic, Gendev, Gendor (Deep Ocean Processors), Hangana, Exigrade, Cadilu (now Eembwinda), Seaworks, Salt Company, UNAM, Abroma, Merlus, Pereira, and Namport.. Text was amended. - On page 141 it is stated that 17 monitoring points exists, these points correspond to the number of operations regularly inspected.
72	Effluent from factories is discharged directly into the ocean… - does that mean no treatment is required? What about "neutralising"?	Correct, pre-treatment is required. However, in some cases, seawater is used for cooling and washing and returned into the ocean at the same quality. Also, it needs to be understood that domestic effluent from factories is not discharged at sea, but into the municipal sewer systems; page 121.
73	Does DWAF take action when the effluent quality exceeds the standard? From these pages one could think that they only take note and do nothing.	- According to permit conditions, operations are required to submit effluent quality results on a biannual basis, and parameters of concern are pointed out to such operations accordingly. In most cases, factories are responsive, with a few even going as far as implementing new treatment methods to bring their effluent within compliance limits (Abroma is a case in point). - Secondly, the effluent standards available are derived from potable water consumption. Therefore, if an industrial seawater sample from a factory is to be assessed against such standards it will always be higher in a few parameters, e.g. TDS, Sodium, and Chloride due to its saline nature. Such dynamics are considered, rather than a blanket conclusion that the sample is not compliant. In most cases seawater samples are also taken for comparative reasons. - It is not true that DWAF does nothing because there is continuous engagement between operations and DWAF regarding wastewater management. Text amended. Page 121-125.
74	Is the dissolved oxygen concentration measured in the field? If the figures shown are lab values they will not reflect the actual situation.	- The samples are analysed in the lab after 3 to 4 days of sampling and proper preservation protocol. The values for some parameters as pointed out, e.g. might not be actual, but would give a good indication of the situation. Page 123.

NR	COMMENTS AND SUGGESTIONS	COMMENTS AND SUGGESTIONS
75	Add under external pressures "companies not complying with effluent standard"	Agreed and addressed, page 124.
76	Last sentence...continued monitoring and enforcement of remedial action at these areas.	Agreed and addressed page 124.
77	It would be helpful for non-experts to have some info on how the surveys in Table 7 are carried out.	This would be lengthy information reaching beyond this report as each survey is different and the methods do not really add to the spatial information, page 127.
78	Table 8 – where are these surveys carried out?	Walvis Bay added, page 129.
79	Figure 33 is missing a legend.	Figure changed, page 131.
80	The overlays are very important but unfortunately not readable at this scale.	A3 fold out map will be included in final report.
81	Matrix should be re-evaluated in light of new information suggested in first comment above.	For both we have said more research is needed thus matrix does not need to be updated, page 139.
82	Tourism is missing in Table 12. Renewable energy options are mentioned here, but not in matrix.	As marine tourism is concentrated in the Walvis area, it is mentioned in table 13, page 146.

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[107]This is witnessed by, for example, the following two events: (1) Public protests occurred in opposition to the Namibian government considering an application by a Chinese company to capture live orcas, dolphins, seals and sea birds in 2016. A demonstration took place outside the MFMR building in Walvis Bay where a petition was handed to the Minister of Fisheries and Marine Resources (see, for example: New Era article, October 14 2016, on "Protest planned against capturing whales for China"). (2) The possibility of marine phosphate mining in Namibian waters led to public protests. The Namibian Food and Allied Workers Union (NAFAU), including activists from the "Anti-Plunder Action Group" led demonstrations to denounce the proposed mining practice with a group of protestors marching through the streets of Walvis Bay (see, for example: Windhoek Observer article, 11 November 2016 on "NAFAU relentless anti phosphate mining protest").

[108]Source: Result of an environmental protection stakeholder engagement workshop held in Walvis Bay 22.11.2017.

[109]Source: Result of an environmental protection stakeholder engagement workshop held in Walvis Bay 22.11.2017.

[110]See also: Rice et al., 2012. The role of MPAs in reconciling fisheries management with conservation of biological diversity. Ocean & Coastal Management 69: 217-230.

[111]Source: These issues were also supported by the stakeholders attending an environmental protection stakeholder engagement workshop held in Walvis Bay 22.11.2017.

[112]Clark et al., 1999. Synthesis and assessment of information on the BCLME. Thematic report 3 (Anchor Environmental Report # 1016/1): Integrated overview of diamond mining in the Benguela Current Region: 1-54. Anchor Environmental: Tokai, South Africa.

[113]Coles et al., 2002. The potential for environmentally sound development of marine deposits of potassic and phosphatic minerals offshore, southern Africa. Marine Georesources and Geotechnology 20: 87-110.

[114]www.embassyofnamibia.org.br/en/index.php/namibia/economy

[115]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 8.

[116]MME, 2017. National Renewable Energy Policy. Ministry of Mines and Energy, Windhoek: Namibia.

[117]www.embassyofnamibia.org.br/en/index.php/namibia/economy

[118]Campton, J.S and Bergh, E.W., 2016. Phosphorite Deposits on the Namibian Shelf. Marine Geology 380: 290-314.

[119]The acts furthermore regulate other types of licences not specified here.

[120]Minerals (Prospecting and Mining) Act, 1992. Duration of EPLs: Section 71 (1) (a).

[121]Minerals (Prospecting and Mining) Act, 1992. Duration of EPLs: Section 71 (2).

[122]Minerals (Prospecting and Mining) Act. 1992. Applications for EPLs: Section 68 (c).

[123]Minerals (Prospecting and Mining) Act, 1992. Rights of holders of MLs: Section 91 (c).

[124]Minerals (Prospecting and Mining) Act, 1992. Rights of holders of MLs: Section 90 (1) (a).

[125]Minerals (Prospecting and Mining) Act, 1992. Duration of MLs: Section 94 (1) (a).

[126]Minerals (Prospecting and Mining) Act, 1992. Applications for renewal of MLs: Section 96 (2).

[127]Minerals (Prospecting and Mining) Act, 1992. Applications for renewal of MLs: Section 92 (2).

[128]Petroleum (Exploration and Production) Act, 1991. Duration of ELs: Section 30 (1) (a).

[129]Petroleum (Exploration and Production) Act, 1991. Duration of ELs: Section 30 (1) (b).

[130]Petroleum (Exploration and Production) Act, 1991. Definitions: Section 2.

[131]Petroleum (Exploration and Production) Act, 1991. Obligations of holder of EL: Section 38.

[132]Petroleum (Exploration and Production) Act, 1991. Rights of holders of ELs: Section 29 (1) and (2).

[133]Petroleum (Exploration and Production) Act, 1991. Right of holders of PLs: Section 44; and Application for PLs: Section 46.

[134]Petroleum (Exploration and Production) Act, 1991. Right to apply for PL: Section 43.

[135]Petroleum (Exploration and Production) Act, 1991. Right of holders of PLs: Section 44.

[136]Petroleum (Exploration and Production) Act, 1991. Duration of PLs: Section 45 (1) (a).

[137]Petroleum (Exploration and Production) Act, 1991. Duration of PLs: Section 45 (2).

[138]Petroleum (Exploration and Production) Act, 1991. Obligations of holder of PL: Section 53.

[139]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 28.

[140]Based on 2020 MME records.

[141]Taken from: http://www.chamberofmines.org.na/files/7714/7016/0728/4_Marine_Phosphate.pdf

[142]See for example: Atkinson, L. & Sink, K., 2008. User profiles for the South African offshore environment. SANBI Biodiversity Series 10. South African National Biodiversity Institute, Pretoria: South Africa, p. 6-7 and 12-14.

[143]www.mfmr.gov.na/types-of-aquaculture

[144]Not yet approved by Cabinet.

[145]MFMR, 2015. Namibia Fisheries Policy. Final Draft. November 2015. Ministry of Fisheries and Marine Resources, Windhoek: Namibia.

[146]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 27.

[147]MET, 2014. Namibia's Second National Biodiversity Strategy and Action Plan (NBSAP 2) (2013-2022). Ministry of Environment and Tourism, Windhoek: Namibia, p.22.

[148]Taken from: Monthly production reports by MFMR's Mariculture Division and MFMR's Annual Sectoral Execution Plan. Ministry of Fisheries and Marine Resources, Windhoek: Namibia.

[149]MFMR, 2015. Namibia Fisheries Policy. Final Draft. November 2015. Ministry of Fisheries and Marine Resources, Windhoek: Namibia.

[150]www.mfmr.gov.na/marketing-and-employment

[151]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 27.

[152]MET, 2014. Namibia's Second National Biodiversity Strategy and Action Plan (NBSAP 2) (2013-2022). Ministry of Environment and Tourism, Windhoek: Namibia, p.21.

[153]IAEA Research Contract No. 17851/R0: A short pilot project on this was recently done under a project of the International Atomic Energy Agency (IAEA) – Coordinated Research Project (CRP) k41012: Ocean Acidification and the Economic Impact on Fisheries and Coastal Society. Title of Research Contract: Monitoring of Ocean Acidification in the Northern Benguela Upwelling System off Namibia, with investigation of Lowered pH on Farmed Molluscan Shellfish and Associated Socio-Economic Consequences.

[154]Wells et al., 2015. Harmful algal blooms and climate change: Learning from the past and present to forecast the future. Harmful Algae: 49, 68-93.

[155]The European Union, for example, has a limit of 1ppm (parts per million) for cadmium.

[156]Kinahan, J., 2000. Cattle for Beads: The archaeology of historical contact and trade on the Namib Coast. Studies in African Archaeology 17. Department of Archaeology & Ancient History, Uppsala University, Uppsala: Sweden.

[157]Robertson et al., 2012. Namibia's Coast: Ocean riches and desert treasures. Ministry of Environment and Tourism, Windhoek: Namibia

[158]Carter, R.W.G., 1998. Coastal Environments – An introduction to the physical, ecological and cultural systems of coastlines. Academic Press Limited, London: United Kingdom.

[159]National Heritage Act, 2004. Historic shipwrecks and shipwreck objects: Section 57.

[160]National Heritage Act, 2004. Conservation areas: Section 54.

[161]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 38.

[162]NAMPORT, 2020. Annual Report 2018/2019. Namibian Ports Authority, Walvis Bay: Namibia, p. 23.

[163]Auene, P., 2017. Oil spill risks associated with maritime activities in Namibia. Presentation given at the 7th Annual Science and Governance Forum of the Benguela Current Convention. Windhoek: Namibia.

[164]NAMPORT, Pers. com., 2018.

[165]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 37.

[166]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 38.

[167]As per the 2016/2017 financial year figures of NAMPORT, Pers. Com., 2018.

[168]See also: Andersson et al., 2016. Shipping and the Environment. Springer-Verlag, Berlin and Heidelberg: Germany.

[169]Auene, P., 2017. Oil spill risks associated with maritime activities in Namibia. Presentation given at the 7th Annual Science and Governance Forum of the Benguela Current Convention. Windhoek: Namibia.

[170]MWT, 2017. National Marine Pollution Contingency Plan (NMPCP). Ministry of Works and Transport, Windhoek: Namibia, p. 15.

[171]Sink et al., 2012. National Biodiversity Assessment 2011: Technical Report. Volume 4: Marine and Coastal Component. South African National Biodiversity Institute (SANBI), Pretoria: South Africa.

[172]http://www.imo.org/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Air- Pollution.asp

[173]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 37.

[174]NAMPORT, 2017. NAMPORT Mega Projects. Namibian Ports Authority, Walvis Bay: Namibia.

[175]NAMPORT, 2017. NAMPORT Mega Projects. Namibian Ports Authority, Walvis Bay: Namibia.

[176]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 37.

[177]NAMPORT, 2017. NAMPORT Mega Projects. Namibian Ports Authority, Walvis Bay: Namibia.

[178]Source: Result of a marine and coastal tourism stakeholder engagement workshop held in Walvis Bay 22.11.2017.

[179]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 3, 30-31.

[180]Source: Result of a marine and coastal tourism stakeholder engagement workshop held in Walvis Bay 22.11.2017.

[181]Marine Tourism Association of Namibia, Pers. com., 2017.

[182]Namibian Tourism Board, Pers. com., 2018.

[183]MET, 2016. Tourist Statistical Report. Ministry of Environment and Tourism, Windhoek: Namibia, p. iii.

[184]Source: Result of a marine and coastal tourism stakeholder engagement workshop held in Walvis Bay 22.11.2017.

[185]MET, 2016. Tourism Satellite Account: 5th Edition. Ministry of Environment and Tourism, Windhoek: Namibia, p. 5.

[186]Namibian Tourism Board, Pers. com., 2017.

[187]Based on MET 2017 figures.

[188]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 5.

[189]MET, 2008. National Policy on Tourism for Namibia. Ministry of Environment and Tourism, Windhoek: Namibia, pg. iii.

[190]Molinos et al., 2015. Climate velocity and the future global redistribution of marine biodiversity. Nature Climate Change: 61, 83-88.

[191]Leadley et al., 2010. Biodiversity Scenarios: Projections of 21st Century Change in Biodiversity and associated Ecosystem Services. Secretariat of the Convention on Biological Diversity, Montreal: Canada.

[192]Best, P.B., 2007. Common bottlenose dolphin, Tursiops truncates. In: Horst, D.v.d. (Ed). Whales and dolphins of the Southern African Subregion. Cambridge University Press, Cambridge: UK, p. 174-180.

[193]Source: Result of a marine and coastal tourism stakeholder engagement workshop held in Walvis Bay 22.11.2017.

[194]Source: Result of a marine and coastal tourism stakeholder engagement workshop held in Walvis Bay 22.11.2017.

[195]Source: Result of a marine and coastal tourism stakeholder engagement workshop held in Walvis Bay 22.11.2017.

[196]Source: Result of a marine and coastal tourism stakeholder engagement workshop held in Walvis Bay 22.11.2017.

[197]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 8.

[198]Lattemann, S. & Höpner, T., 2008. Environmental impact and impact assessment of seawater desalination. Desalination (220): 1-3, p. 1-15.

[199]Picture taken from a newspaper article in The Namibian on 26. July 2017: "Coast's water shortage could become "unsurpassable". Retrieved from: https://www.namibian.com.na/public/uploads/images/59787bcd4e07a/1awfcoastalwatercrisis.jpg. Page 6.

[200]MAWF, 2010. Integrated Water Resources Management Plan for Namibia. Ministry of Agriculture, Water and Forestry, Windhoek: Namibia.

[201]MAWF, 2010. Integrated Water Resources Management Plan for Namibia. Ministry of Agriculture, Water and Forestry, Windhoek: Namibia.

[202]This Act has been passed by Parliament, signed by the President and published in terms of the Namibian Constitution, but has not yet come into operation. Regulations to implement the Act are currently under review.

[203]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 36-37.

[204]NPC, 2004. Namibia's Vision 2030. National Planning Commission, Windhoek: Namibia, p. 136-140.

[205]Formerly known as Areva.

[206]Areva Resources Namibia (Pty) Ltd, Pers. com., 2017.

[207]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 36-37.

[208]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 8.

[209]MET, 2012. Management Plan Dorob National Park 2010-2017. Ministry of Environment and Tourism, Windhoek: Namibia, p. 20.

[210]Based on 2017 DWAF records.

[211]This Act has been passed by Parliament, signed by the President and published in terms of the Namibian Constitution, but has not yet come into operation. Regulations to implement the Act are currently under review.

[212]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 36-37.

[213]NPC, 2004. Namibia's Vision 2030. National Planning Commission, Windhoek: Namibia, p. 136-140.

[214]Picture taken from DWAF, 2015, records.

[215]Based on 2017 DWAF records.

[216]NAMWATER, 2016. Chemical Water Analysis Reports DS43892-DS43913 for Ministry of Agriculture, Water and Forestry. Namibia Water Corporation, Windhoek: Namibia.

[217]Based on 2020 DoWA records.

[218]NPC, 2017. Namibia's 5th National Development Plan (NDP5). National Planning Commission, Windhoek: Namibia, p. 8.

[219]Activities can be followed at this website: http://www.hbao.cnrs.fr

[220]See the Wastewater Treatment and Disposal Chapter 6.1.

[221]Based on 2021 MEFT records.

MSP in NAM

MARINE SPATIAL PLANNING IN NAMIBIA

Benguela CURRENT CONVENTION

MARISMA
Benguela Current Marine Spacial Management and Governance Project

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

On behalf of:
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
of the Federal Republic of Germany