



WWF

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THE THREAT OF MINING AND OIL & GAS TO OUR MARINE HERITAGE

Assessing the Presence of Extractives Industries in
Marine Protected Areas and Ecologically Significant
Areas in the South West Indian Ocean.

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WWF-Norway is working to safeguard nature both in Norway and in other countries.

In Norway, WWF works to preserve nature values and biological diversity in the seas and coastal areas, in the forests, in lakes and rivers, and in the mountains.

Internationally WWF is supporting conservation and development projects in several African countries and in China. This work is carried out in cooperation with local communities, local organisations and governments. The global WWF network, World Wide Fund for Nature, is one of the world's largest independent environmental organisations with more than 5 million supporters, as many as 25 million followers in social media, offices in more than 80 countries, over 6.000 employees and more than 1.000 active conservation projects.

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PREFACE WWF

Worldwide our oceans are under threat. WWF's Living Blue Planet Report estimates that the populations of marine vertebrates have decreased by 50 per cent since 1970.



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As three billion people get more than 20 per cent of their protein intake from fish, and more than 12 per cent of the world's population depend on the ocean for their livelihood, the degradation of marine ecosystems can severely undermine efforts to create sustainable development globally.

Recently, the offshore oil and gas activity in Kenya, Tanzania and Mozambique has dramatically increased. This development can potentially put some of the most important marine biodiversity hotspots in the world at risk – areas that are home to vulnerable and endangered species such as the dugong and the hawksbill turtle. Not the least, livelihoods dependent on these areas will also be put at risk.

This report intends to outline and demonstrate such a potential conflict by examining any overlaps between licenses for extractive industries (including mining, oil and gas) and areas of conservation importance in the South West Indian Ocean. By using the Government Pension Fund of Norway as a case study to show the overlaps, the report indeed finds a major overlap of oil and gas concessions and areas of conservation importance.

The potential risks that the oil and gas investments pose to the region are showcased together with 15 recommendations for how adverse biodiversity and development impacts of the extractive activities can be reduced or avoided. National governments and investors have a responsibility for avoiding these potentially detrimental impacts and contribute to the achievement of the UN Sustainable Development Goals.

Bård Vegar Solhjell, CEO, WWF-Norway

THIS REPORT EXAMINES ANY OVERLAPS BETWEEN LICENSES FOR EXTRACTIVE INDUSTRIES (INCLUDING MINING, OIL AND GAS) AND AREAS OF CONSERVATION IMPORTANCE IN THE SOUTH WEST INDIAN OCEAN.

OIL AND GAS ACTIVITY IN KENYA, TANZANIA AND MOZAMBIQUE CAN POTENTIALLY PUT SOME OF THE MOST IMPORTANT MARINE BIODIVERSITY HOTSPOTS IN THE WORLD AT RISK



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EXECUTIVE SUMMARY

The recent offshore discoveries of oil and gas deposits in the East-African countries bordering the Indian Ocean – namely Mozambique, Tanzania and Kenya – have significantly changed the general view of the sea.

It has also dramatically increased extractive activities in an area that hosts some of the most important biodiversity hotspots in the world and are home to several vulnerable and endangered species.

The extractive industry, and particularly oil and gas, can have serious consequences for both wildlife and communities in the South West Indian Ocean region (SWIO) who rely on coastal habitats, particularly those who depend on fisheries for a living. The impacts of a major spill event could be immense, particularly for some of the poorest communities in the world. Species living in these areas are also negatively affected by both the exploration and development phase of the extractives activities. In this regard, a detailed risk and impact study was carried out as part of preparations for the World Bank's project "Western Indian Ocean Islands Oil Spill Contingency Planning" showing clearly that in all countries there are real risks of small operational spills occurring on a regular basis, and that there have been many such incidents in recent years.

Considering the increased interest in oil and gas in the region, WWF has developed this report to examine whether there is any overlap between oil and gas concessions and areas of conservation interest.

There is indeed a major overlap of oil and gas concessions and Ecologically or Biologically Significant Areas (EBSA) (28.1%) and Marine Protected Areas (MPA) (8%) in the SWIO-region, particularly in the Northern Mozambique Channel, although the region has a very low proportion of MPAs yet.

To showcase how we can use financial data to look at the investments that are done in the region, we have used the Norwegian Government Pension Fund (Statens Pensjonsfond Utland) as a case study. Not because the fund has the biggest investments or impact in the SWIO-region, but because the data from the fund is publicly available. Our results show investments in companies with oil and gas concessions in both EBSAs (10) and MPAs (7) in the SWIO region.

Putting aside WWF's strong concerns about the climate change implications of new and existing oil and gas developments and the serious harm climate change is already causing in this region, at the very least specific obligations should be put in place for industries operating in marine and coastal environments within the SWIO.

28,1 %
OVERLAP OF OIL AND GAS CONCESSIONS AND ECOLOGICALLY OR BIOLOGICALLY SIGNIFICANT AREAS

ACTIONS TAKEN BY THE COUNTRIES IN THE REGION SHOULD INCLUDE:

- Protect critical habitats and high value conservation areas and important ecosystem services in the region
- Develop and promote renewable energy alternatives
- Establish "no go" areas for risky and/or damaging industry to protect other economically important sectors and environments
- Introduce in all countries in the region systems and tools such as strategic environmental assessments, environmental and social impact assessments and sensitivity mapping prior to consideration of issuing concessions
- Identify ecosystems, habitats, wildlife and populations potentially affected by the proposed activities
- If no previous "baseline data" on that environment or habitat is available, it should be the responsibility of the proponent to collect that data and make sure that an adequate and qualified assessment of the original state of the environmental resources in question can be made
- Identify the likely or possible impacts of the proposed activities on the surrounding environment and the people who rely on the resources in that environment;
- Identify measures that can be taken to mitigate or minimise the potential impacts and identified risks, and ensure readiness to reject proposals that cannot identify such measures
- Design and implementation of a monitoring programme to measure the impacts of the exploration or development activities on the surrounding environment and local populations, and to adjust mitigation measures accordingly if negative impacts are detected
- Ensure that oil and gas companies have adequate insurance in the event of a spill and can cover clean-up costs and compensation for loss of livelihoods
- Sign and ratify all International Maritime Organisation (IMO) conventions relevant to oil and gas exploration, shipping and transportation of oil
- Review legal mandates to ensure that compensation for damages caused by marine-based energy companies are streamlined
- Adhere to the conditions of the Nairobi Convention, which offers a regional legal framework and coordinates the efforts of the member states to plan and develop programmes that strengthen their capacity to protect, manage and develop their coastal and marine environment sustainably
- Promote regional coordination on trans-boundary issues such as oil spill contingency, piracy and security, as well as cross-border developments
- Promote a precautionary approach for new and already present industry activities in the area.

ACRONYMS

BP	British Petroleum
CBD	Convention on Biological Diversity
EBSAs	Ecologically or Biologically Significant Marine Areas
EIA	Environmental Impact Assessment
FAO	Food and Agriculture Organization of the United Nations
GNP	Gross National Product
GPFG	Government Pension Fund Global
GPFN	Government Pension Fund Norway
HDI	Human Development Index
IMO	International Maritime Organization
IUCN	International Union for Conservation of Nature
MPAs	Marine Protected Areas
NOK	Norwegian Krone
O&G	Oil and gas
SEA	Strategic Environmental Assessment
SWIO	South West Indian Ocean
SWIOFC	South West Indian Ocean Fisheries Commission
UNEP	United Nations Environment Programme
UNEP-WCMC	UN Environment World Conservation Monitoring Centre
US	United States
WDPA	World Database on Protected Areas
WWF	World Wide Fund for Nature

THREE BILLION PEOPLE GET MORE THAN 20 PER CENT OF THEIR PROTEIN INTAKE FROM FISH



BACKGROUND AND OBJECTIVES

The extractive industry, and particularly oil and gas, can have serious consequences for both wildlife and communities in the South West Indian Ocean region (SWIO) who rely on coastal habitats, particularly those who

depend on fisheries for a living. The impacts of a major spill event could be immense, particularly for some of the poorest communities in the world as well as the vulnerable and endangered marine species residing in the region.

Considering the increased interest in the extractives sector in the region, WWF-Norway has, with the review and support of other WWF offices and NGOs, developed this report. It aims to examine whether there is any overlap between licenses for extractive industries (including mining, oil and gas) and areas of conservation interest. Studies of this nature inform national policy makers in the region as well as investors about the conservation values being put at risk from extractive industry expansion.

The methodology and tools used in this report provide a first step of the mapping of environmental consequences of offshore investments and can be further developed and operationalized by investors that aim to reduce their negative environmental impact and ensure their investments are in line with the UN Sustainable Development Goals. In this report, The Norwegian Government Pension Fund is used as a case study illustrating the link between investments and extractive concessions in conservation areas.

The report aims at assessing the threat of extractive licenses over coastal and Marine Protected Areas (MPAs) and Ecologically or Biologically Significant Marine Areas (EBSAs) in the SWIO region.

The recent offshore discoveries of oil and gas deposits in the East-African countries bordering the Indian Ocean – namely Mozambique, Tanzania and Kenya – have dramatically changed the general view of the sea. The US Energy Information Administration (EIA) in 2013 stated that Tanzania, Kenya, Mozambique, Uganda and Madagascar are set to become the new oil and gas economies in the world.

Still, the interest in the sea is not limited to offshore oil and gas only. The lucrative and capital-intensive extractive industry is also turning its attention into the international seabed. This interest in the deep sea is due to known reserves of polymetallic sulphides, nodules and ferromanganese crusts said to contain platinum, gold, diamonds, nickel, titanium, copper, molybdenum and other rare earth metals.

It is of paramount importance to identify in advance the potential extent and environmental impacts of the extractive industry in a region that shows some of the most important marine and coastal ecosystems in the world in terms of biodiversity and productivity, and where millions of lives depend on the health of the sea and its resources.

THE IMPACTS OF A MAJOR SPILL EVENT COULD BE IMMENSE

GEOGRAPHICAL SCOPE

The geographical scope of the present study is illustrated in Figure 1 below and it includes all countries that share the Western Indian Ocean (Comoros, France, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, Tanzania and the Republic of South Africa).

The SWIO region is illustrated in the map below, which was obtained from the Food and Agriculture Organization (FAO) of the United Nations, and represents the official South West Indian Ocean Fisheries Commission (SWIOFC). The area includes all the Contracting Parties of the Nairobi Convention, which entered into force in 1996 and is part of United Nations Environment Programme's Regional Seas Programme.

The SWIO region has a combined coastline exceeding 15,000 km (including those of the island states) and a total continental shelf area of about 450,000 km². The SWIO region as per the figure below has a surface of about 23 million km².

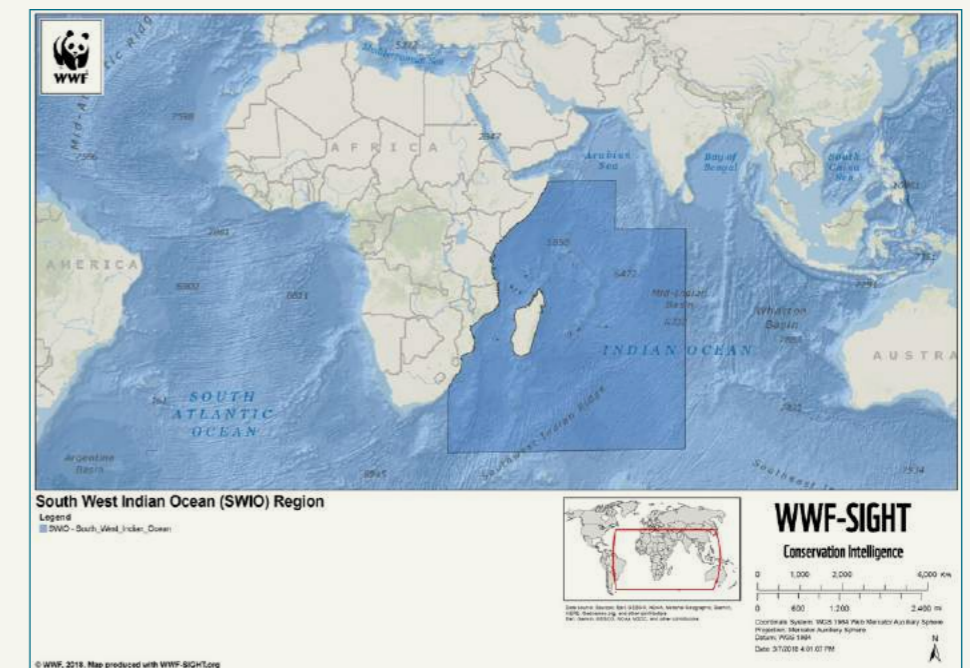


FIGURE 1. The South West Indian Ocean (SWIO) Region

The region is characterised by a wide diversity of habitats, including: sandy beaches, sand dunes, coral reefs, estuarine systems, mangroves and seagrass beds. The coral reefs in the SWIO cover a surface area of approximately 12,913 km². Most coral reefs in the region are fringing carbonate reefs found along the length of the coastline, particularly in areas where there is no river drainage. Atolls and patch reefs are common in the island states and the offshore islands along the East African continental margin. In the SWIO region, coral reefs play an important role in the socio-economic well-being of the people, as many are dependent on them for work and subsistence. Coral reefs are probably the most biodiverse marine ecosystem in the SWIO, having more than 300 coral species.

The total area of mangroves in the SWIO is estimated to be 10,000 km², representing about 5.0 per cent of the total global mangrove coverage. The region also includes 12 seagrass species, comprising about a fifth of the world's total, and it is estimated that it hosts some 2,200 species of fish, about 15 per cent of the global total marine fishes. This richness is due to the large variety of habitats and oceanographic conditions of the region. Among the most important landmark species in the region that might be directly affected by oil and gas developments are the Humpback whale (*Megaptera novaeangliae*), the Green turtle (*Caretta caretta*), the Dugong (*Dugong dugong*) and the Coelacanth (*Latimeria chalumnae*).

In 2015, the 10 countries of the South West Indian Ocean had a population of 220 million, an increase of 280 per cent since 1975. The population is projected to grow to 306 million by 2030 (an increase of nearly 50 per cent), quadruple to 818 million by 2100, and continue to increase into the next century.

The socio-economic characteristics of coastal regions of the SWIO are strongly influenced by the availability and patterns of natural resource utilization. Numerous coastal communities depend on these resources for their livelihoods, particularly for acquisition of food, fuel, shelter and income, while the condition of these resources determines the social and economic status of these communities. Some states in the region are amongst the poorest in the world, based on per capita Gross National Product (GNP) and a low Human Development Index (HDI).

According to Obura et al (2017) the economy that directly depends on a healthy sea in the region generates over 20.8 bn US\$ every year, which makes the WIO the 4th largest economy in the region. Moreover, the value of the assets that create the shared wealth fund of the SWIO are equal to over 333.8bn US\$. Of critical importance are also the food and livelihood benefits that the ocean provides but which are not captured in the economic analysis.

It is evident from the analysis that the protection of the marine resources is of paramount importance, also for the economy of the region and for the livelihoods of the local population, as well as the marine areas themselves and the species residing there.

**12,913 KM²
OF CORAL REEFS
AT POTENTIAL
RISK**

MARINE PROTECTION AND AREAS OF CONSERVATION IMPORTANCE IN THE SWIO

Marine Protected Areas (MPAs) in the SWIO region are more than 70 and cover a total area of 17,186 km² corresponding to 4 per cent of ocean shelf. The region is therefore far from achieving the conservation targets set by the Convention on Biological Diversity (Aichi Target 11), and this is particularly alarming, considering the large presence of important biodiversity hotspots in the region.

According to IUCN's definition, a protected area "is a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values." MPAs involve the protective management of natural marine areas so as to keep them in their natural state. MPAs can be conserved for a number of reasons including economic resources, biodiversity conservation, and species protection.

The present study also addresses the pressures of the extractive industry on Ecologically or Biologically Significant Marine Areas (EBSAs). These are special areas in the ocean, identified under the framework of the Convention on Biological Diversity (CBD), that serve important purposes, in one way or another, to support the healthy functioning of oceans and the many services that it provides. EBSAs are assessed based on the following scientific criteria: uniqueness or rarity, special importance for life history stages of species, importance for threatened, endangered or declining species and/or habitats, vulnerability, fragility, sensitivity or slow recovery, biological productivity, biological diversity and naturalness. The Western Indian Ocean encompasses 35 EBSAs, which include large areas such as the Agulhas Front, the Mozambique Channel, the Walters Shoal, and the Mahe, Alphonse and Amirantes Plateau, among others.

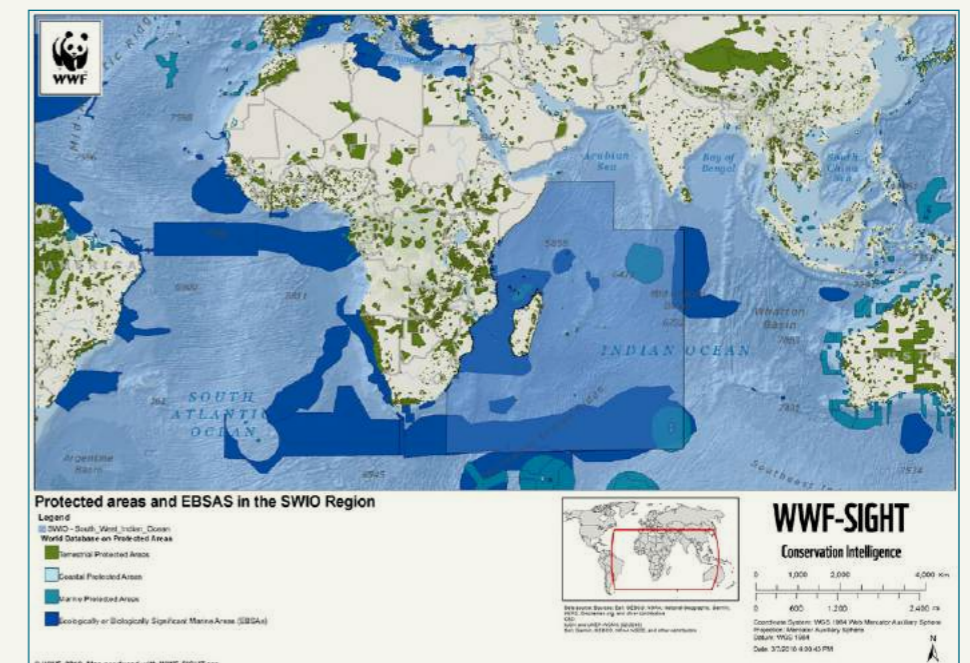


FIGURE 2. MPAs and EBSAs in the Southwest Indian Ocean Region

METHODOLOGY

The methodology used for the analysis in this report is based on WWF-SIGHT, a platform and approach developed by WWF to map major

sectoral developments, understand their risks and link them to companies in the investment portfolios of financial institutions.

The first step has been to perform an overlap analysis to calculate the extent of extractive activity – oil, gas and mining – within Marine Protected Areas (MPA) and Ecologically or Biologically Significant Marine Areas (EBSAs). A “threat” occurs when an extractive contract overlaps the area of an MPA. When there is no overlap, this study assumes marginal or no threat, even though specific impact from the extractive sector (i.e. spills, noise from exploration surveys) could potentially transgress boundaries and affect sensitive areas.

The second step has been to perform an “ownership” analysis to establish the link between extractive concessions within MPAs and EBSAs and companies in the portfolios of financial institutions. Seeing that their investment portfolios are publicly available, WWF-Norway has chosen the Norwegian Government Pension Fund Global (GPF Global) and the Government Pension Fund Norway (GPFN, also called Folketrygdfondet) as a case study to perform the ownership analysis.

An extractive “concession” (also referred to as “contract” or “claim”) is a licence issued by a government to permit a company to explore for and/or extract oil, gas, or mineral resources. It is important to underline that concessions do not necessarily result in extractive activity occurring, but they are a prerequisite of activity and an indication of intent. Even when a concession expires or a company commits not to operate within MPAs or EBSAs, the risk of extractive activity occurring remains, as concessions can be reissued or sold to a third party.



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THE ANALYSIS IS BASED ON THE FOLLOWING DATA LAYERS:

1. Marine Protected Areas: all protected areas that include the word “Marine” in the IUCN and UNEP-WCMC World Database on Protected Areas (WDPA). Accessed November 2017. Cambridge, UK: UNEP-WCMC.
2. Ecologically or Biologically Significant Marine Areas (EBSAs): special areas in the ocean that serve important purposes, in one way or another, to support the healthy functioning of oceans and the many services that it provides. Accessed November 2017.
3. SWIO region digitised from the FAO Southwest Indian Ocean Fisheries Commission (SWIOFC).
4. Mining concessions covering 76 countries: data sourced from the SNL Metals & Mining, an offering of S&P Global Market Intelligence (accessed November 2017). Claims indicate an area that has been leased for an activity to take place, such as exploration, production or infrastructure leases.
5. Oil and gas contracts covering 173 countries: data sourced from the DrillingInfo, Inc dataset (accessed November 2017). These include exploration and production.

It is important to note that mining data was not available for the following countries in the South West Indian Ocean region: Comoros, Europa & Bassas (France), Juan De Nova Island (France), Kenya, Mozambique, Seychelles, Somalia and South Africa. As such, results on mining in this study should be considered as not being fully representative of the mining sector in the SWIO region.

Both mining and oil and gas datasets were filtered by removing all contracts not assigned to any company, not active (i.e. with status “open” or “pre-awarded”), expired before 01.12.2017 and with an overlap area smaller than 1 km² for mining and 5 km² for oil and gas.

In the ownership analysis, WWF attempted to identify the ultimate parent companies of the subsidiary companies holding the concessions. The holding lists used for this study do not represent the total portfolio of the investors analysed, they only include all listed stocks and all corporate bonds:

- Government Pension Fund Global: stocks and bonds per 31.12.2016.
- Government Pension Fund Norway: stocks and bonds per 30.06.2017.

**A LARGE NUMBER OF VULNERABLE AND
ENDANGERED MARINE SPECIES ARE
RESIDING IN THE SOUTHWEST INDIAN
OCEAN REGION**



RESULTS AND CASE STUDY

The results section is divided into two main areas: 4.1) Results from the overlap between extractive licenses, MPAs and EBSAs in the SWIO region, and 4.2) Results from the case study which focuses on linking investments and extractives activities in areas of high biological value.

4.1. RESULTS OF THE OVERLAP BETWEEN EXTRACTIVE LICENSES, MPAs AND EBSAs IN THE SWIO REGION

4.1.1. MINING LICENSES OVERLAPPING EBSAs

EBSAS NAME	EBSAS AREA (KM2)	MINING OVERLAP (KM2)	%	# OF LICENSES	COUNTRY
Mozambique Channel*	2,579,620.90	106.80	0.004 %	11	Madagascar and Tanzania
Northern Mozambique Channel	829,994.35	21.85	0.003 %	5	Madagascar and Tanzania
Southern Madagascar (part of Mozambique Channel)	110,123.65	56.17	0.051 %	2	Madagascar
Rufiji - Mafia- Kilwa	27,937.60	98.91	0.354 %	3	Tanzania
Zanzibar (Unguja) - Saadani	10,145.42	15.41	0.152 %	4	Tanzania
GRAND TOTAL	2,617,703.92	299.14	0.011 %	25	

*plus part of the Northern Mozambique Channel equalling 253,886 km2

OTHER FACTS:

- The Majority of the mining licenses are reported as active (i.e. under exploration or mining) except for three licenses under application.
- Two of the most common commodities in offshore mining in Madagascar are phosphorite and limestone. Others are ilménite, zircon and rutile.
- In Tanzania, main commodities are sand and limestone, as well as some gold.
- About half are exploration licenses and the other half are mining licenses.

4.1.2. MINING LICENSES OVERLAPPING COASTAL AND MARINE PROTECTED AREAS

NAME OF THE PROTECTED AREA	DESIGNATION	IUCN CATEGORY	CRITERIA	COUNTRY	AREA OF THE PROTECTED AREA (KM2)	AREA OF PROTECTED AREA OVERLAPPED BY MINING LICENSE IN KM2 AND %	# OF MINING LICENSES
Unknown (Mangrove) No.19	Forest Reserve	Not Reported	Not Applicable	Tanzania	25.52	4.29 16.8 %	1
Îles Barren	Ramsar Site, Wetland of International Importance	Not Reported	(i) (ii) (iii) (iv) (vii) (viii)	Madagascar	4,656.97	23.06 0.5 %	4
Mafia Island	Marine Park	VI	Not Applicable	Tanzania	900.60	7.75 0.9 %	2
Maintimbato	Locally Managed Marine Area	Not Reported	Not Applicable	Madagascar	1.92	1.48 77.4 %	1
Rufiji-Mafia-Kilwa	Ramsar Site, Wetland of International Importance	Not Reported	(i) (ii) (iii) (iv) (v) (vi) (vii) (viii)	Tanzania	5,191.76	52.57 1.0 %	1
Tahosoa	Locally Managed Marine Area	Not Reported	Not Applicable	Madagascar	163.11	4.12 2.5 %	2
GRAND TOTAL					10,939.87	93.29 0.9 %	16

OTHER FACTS:

- All licenses are reported as active, except for one under application.
- Main commodities include phosphorite and limestone in Madagascar and gold and sand in Tanzania.
- About half are exploration licenses and the other half are mining licenses.

4.1.3. O&G LICENSES OVERLAPPING EBSAS

EBSAS NAME	COUNTRY	EBSAS AREA	O&G OVERLAP (KM2)	%	# OF LICENSES
Delagoa shelf edge, canyons and slope	South Africa	31,732.36	96.29	0 %	1
Lamu-Kiunga area	Kenya	12,085.29	1,429.33	12 %	3
	Somalia	12,085.29	12.38	0 %	1
Mahe, Alphonse and Amirantes Plateau	Seychelles	214,567.98	10,218.31	5 %	3
Mozambique Channel*	Europa & Bassas (France)	2,579,620.90	56,152.54	2 %	2
	Juan De Nova Island (France)		28,179.91	1 %	1
	Madagascar		19,963.47	1 %	2
	Mozambique		4,498.35	0 %	4
	South Africa		24,298.71	1 %	1
	Tanzania		2,058.87	0 %	1
Northern Mozambique Channel (part of the Mozambique Channel)	Comoros	829,994.35	35,428.26	4 %	5
	Madagascar		17,857.57	2 %	2
	Mozambique		5,090.94	1 %	8
	Tanzania		509.46	0 %	1
Pemba Bay - Mtwara (part of the Mozambique Channel)	Mozambique	20,877.02	2,631.98	13 %	6
	Tanzania	20,877.02	421.92	2 %	3
Natal Bight	South Africa	12,550.30	8,672.46	69 %	2
Pemba-Shimoni-Kisite	Tanzania	8,780.40	3,971.58	45 %	4
Protea Banks and sardine route	South Africa	13,854.48	3,069.66	22 %	1
Rufiji - Mafia- Kilwa	Tanzania	27,937.60	5,125.50	18 %	5
Save River to San Sebastian	Mozambique	12,431.21	2,581.26	21 %	1
Watamu Area	Kenya	246.87	243.73	99 %	1
Zanzibar (Unguja) - Saadani	Tanzania	10,145.42	6,673.64	66 %	2
GRAND TOTAL		2,977,792.13	239,186.14	8 %	60

*plus part of the Northern Mozambique Channel equalling 253,886 km²

OTHER FACTS:

- The majority of the contracts are in exploration stage.
- About half of the concessions are exclusively for gas, the rest are a mix of oil and gas concessions.

OTHER FACTS (NEXT PAGE):

- Majority of contracts are in exploration stage.
- About half of the concessions are exclusively for gas, the rest are for both oil and gas.

4.1.4. O&G LICENSES OVERLAPPING COASTAL AND MARINE PROTECTED AREAS

NAME OF THE PROTECTED AREA	DESIGNATION	IUCN CATEGORY	CRITERIA	COUNTRY	LOCATION	PA AREA (KM2)	O&G OVERLAP (KM2)	%	# OF LICENSES
Ankarea	Locally Managed Marine Area	Not Reported	Not Applicable	Madagascar	Shelf/Deep-water	379.13	346.00	91.3 %	1
Ankivony	Locally Managed Marine Area	Not Reported	Not Applicable	Madagascar	Shelf/Deep-water	344.70	162.44	47.1 %	1
Name Unknown (Mangrove) No.18	Forest Reserve	Not Reported	Not Applicable	United Republic of Tanzania	Land/Shelf/Deepwater	17.74	17.74	100.0 %	1
Name Unknown (Mangrove) No.19	Forest Reserve	Not Reported	Not Applicable	United Republic of Tanzania	Land/Shelf/Deepwater	25.35	13.31	52.5 %	1
Iles Barren	Ramsar Site, Wetland of International Importance	Not Reported	(i) (ii) (iii) (iv) (vii) (viii)	Madagascar	Shelf/Deep-water	4,627.74	164.58	3.6 %	1
Kiunga Marine Conservancy	Community Nature Reserve	Not Reported	Not Applicable	Kenya	Land/Shelf/Deepwater	287.68	159.06	55.3 %	1
Mafia Island	Marine Park	VI	Not Applicable	United Republic of Tanzania	Land/Shelf/Deepwater	894.76	623.93	69.7 %	1
Malindi	Marine National Reserve	Not Reported	Not Applicable	Kenya	Land/Shelf	163.31	163.18	99.9 %	1
	Marine National Park	II	Not Applicable	Kenya	Land/Shelf	6.31	6.31	100.0 %	1
Mangroves (Mikindani)	Forest Reserve	Not Reported	Not Applicable	United Republic of Tanzania	Land/Shelf/Deepwater	18.72	8.54	45.6 %	1
Mangroves de Tsiribihina	Ramsar Site, Wetland of International Importance	V	(i) (ii) (iii) (v) (vi) (vii) (viii)	Madagascar	Shelf/Deep-water	470.69	82.71	17.6 %	1
Menai Bay	Conservation Area	VI	Not Applicable	United Republic of Tanzania	Land/Shelf/Deepwater	492.62	427.07	86.7 %	1
Misali Island	Conservation Area	VI	Not Applicable	United Republic of Tanzania	Land/Shelf/Deepwater	22.68	21.61	95.3 %	1
Mnazi Bay-Ruvuma Estuary	Marine Park	VI	Not Applicable	United Republic of Tanzania	Land/Shelf/Deepwater	550.45	198.51	36.1 %	3
Mombasa	Marine National Park	II	Not Applicable	Kenya	Land/Shelf/Deepwater	9.99	7.70	77.1 %	1
	Marine National Reserve	Not Reported	Not Applicable	Kenya	Land/Shelf/Deepwater	194.64	8.67	4.5 %	1
Pate Marine Community Conservancy	Community Nature Reserve	Not Reported	Not Applicable	Kenya	Land/Shelf/Deepwater	192.35	11.25	5.8 %	1
Pemba Channel Conservation Area	Conservation Area	Not Reported	Not Applicable	United Republic of Tanzania	Land/Shelf/Deepwater	931.65	781.73	83.9 %	2
Pondoland Marine Protected Area	Marine Protected Area	Not Reported	Not Applicable	South Africa	Shelf/Deep-water	1,237.09	347.42	28.1 %	1
Rufiji-Mafia-Kilwa	Ramsar Site, Wetland of International Importance	Not Reported	(i) (ii) (iii) (iv) (v) (vi) (vii) (viii)	United Republic of Tanzania	Land/Shelf/Deepwater	5,158.21	2,141.41	41.5 %	2
					Shelf	5,158.21	244.92	4.7 %	3
Watamu	Marine National Park	Not Reported	Not Applicable	Kenya	Land/Shelf	11.05	11.04	99.9 %	1
	Marine National Reserve	Not Reported	Not Applicable	Kenya	Land/Shelf	31.93	10.37	32.5 %	1
GRAND TOTAL						21,227.00	5,959.51	28.1 %	29

THE NORWEGIAN GOVERNMENT PENSION FUND: AN EXAMPLE OF HOW TO USE FINANCIAL DATA

As an illustration of the link to investments, WWF has analysed the link between companies with extractive licenses in MPAs and EBSAs in the SWIO-region, and the investments of the Norwegian Government Pension Fund.

The main reason for choosing the Fund is that the entire investment portfolio is publicly available, and not because the fund has a particular large role or impact in the SWIO-region. The fund is divided into two entities: 1) The Government Pension Fund Global (GPFG), which is world's largest sovereign fund with almost \$1 trillion invested in stocks, bonds and real estate, and 2) The Government Pension Fund Norway (GPFN), which is a smaller fund invested only in Norway, Sweden, Denmark and Finland.



WWF'S ASSESSMENT SHOWS THAT:

- Neither the GPFG nor the GPFN have investments in companies with mining licenses overlapping MPAs and EBSAs in the SWIO region.
- The GPFG has 110 billion NOK (around 12 billion U.S. dollars) invested in 10 companies (linked to 15 subsidiaries) with oil and gas licenses in 10 EBSAs in the SWIO.
- The GPFG has 28 billion NOK invested in 3 companies with oil and gas licenses in 7 MPAs in the SWIO.
- The GPFN has 21 billion NOK invested in 1 company with oil and gas licenses in 3 EBSAs and in 1 MPA separately.

THE LICENSES ARE OVERLAPPING THE FOLLOWING 10 EBSAs:

- Lamu-Kiunga area
- Mozambique Channel
- Natal Bight
- Northern Mozambique Channel
- Pemba Bay - Mtwara (part of the Mozambique Channel)
- Pemba-Shimoni-Kisite
- Protea Banks and Sardine Route
- Rufiji - Mafia- Kilwa
- Save River to San Sebastian
- Zanzibar (Unguja) - Saadani

... AND THE FOLLOWING 7 MPAS:

- Îles Barren
- Mafia Island
- Mangroves (Mikindani)
- Mangroves de Tsiribihina
- Mnazi Bay-Ruvuma Estuary
- Pondoland Marine Protected Area
- Rufiji-Mafia-Kilwa

THE RESPONSIBILITY OF GLOBAL ACTORS

A variety of actors are involved in and consequently exposed to the risks related to extractive activities in conservation areas. One example is global investors. Long-term global investors that are invested in a wide range of sectors, such as pension funds, are often called universal owners because they have a financial interest in the wellbeing of the economy as a whole. Their portfolios are exposed to costs from environmental damage. For example, an oil spill not only negatively affects the company that causes it but can also negatively affect fisheries and the tourism sector. A typical global, long-term investor is invested in all these affected sectors.

By using the Norwegian Government Pension Fund as a case study, this report showcases how global investors should assess their investment in the SWIO-region. A large oil spill or any activity with a potential negative impact on valuable resources, such as fisheries, coral reefs, mangroves and seagrasses, but also beach pollution, that could compromise the tourism sector in the region, bears a potential economic risk. Hence, it is in the interest of global investors to reduce or avoid adverse biodiversity and development impacts of the extractive activities in the SWIO region.



ANALYSIS AND DISCUSSION

5.1. ANALYSIS OF THE REGIONAL ASSESSMENT

The results show that there is a clear overlap of oil and gas concessions and EBSAs in the SWIO region, particularly in the Northern Mozambique Channel. Some MPAs seem to be particularly affected, namely the Rufiji Mafia Kilwa Marine Reserve, Barren Islands, Mayotte and Gloriosaes Marine Nature Parks and the Primeras and Segundas archipelago in Mozambique. MPAs along the coast of Tanzania and Kenya are the most affected compared to Mozambique and other countries in the region.

Mafia is one of the world's richest marine habitats - home to a marine reserve run by the Tanzanian government with support from WWF. As well as fish (more than 400 species including the whale shark, listed as 'endangered' on the IUCN Red List of threatened species) and other marine life, from dolphins to both green and hawksbill turtles, the area is home to many species of birds, including black kites and lilac-breasted rollers. There are also said to be dugongs (sea cows), among the world's rarest mammals, in these islands.

The Rufiji - Mafia-Kilwa Ramsar site is a complex of coastal and marine habitats, comprising the delta of the Rufiji River, Mafia Island (about 25km offshore and surrounding smaller islands, sandbars, and coral reefs), the Songo-Songo Archipelago to the south, and adjacent waters, i.e. the Mafia Channel and waters between Mafia and Songo-Songo. A large part is composed of mangrove forests (an estimated 55,000 ha) as well as extensive intertidal flats, seagrass beds, and sandbars, all thought to be ecologically interlinked with the flow of the river.

Songo-Songo has a highly diverse and extensive coral assemblage with records of 49 genera of hard and 12 genera of soft corals. Five species of globally threatened marine turtles have been recorded, including Green and Hawksbill turtles, as well as a small population of dugong. A count in the delta alone in 2001 recorded 40,160 waterbirds of 62 species at a minimum.

The delta's artisanal fishery of about 7,000 fishers produces about 4,500 tonnes of finfish per annum, as well as prawns, and thousands of families in Songo-Songo and on Mafia similarly make their livings from fishing. Fishing and extraction of other coastal and mangrove resources, as well as cultivation (especially rice), seaweed farming, and tourism are the major activities within the site. The potential impacts from the oil and gas sector on such ecosystems could be major, both with normal business operations and in an acute oil spill situation.

400
FISH SPECIES
ARE FOUND IN
THE REGION

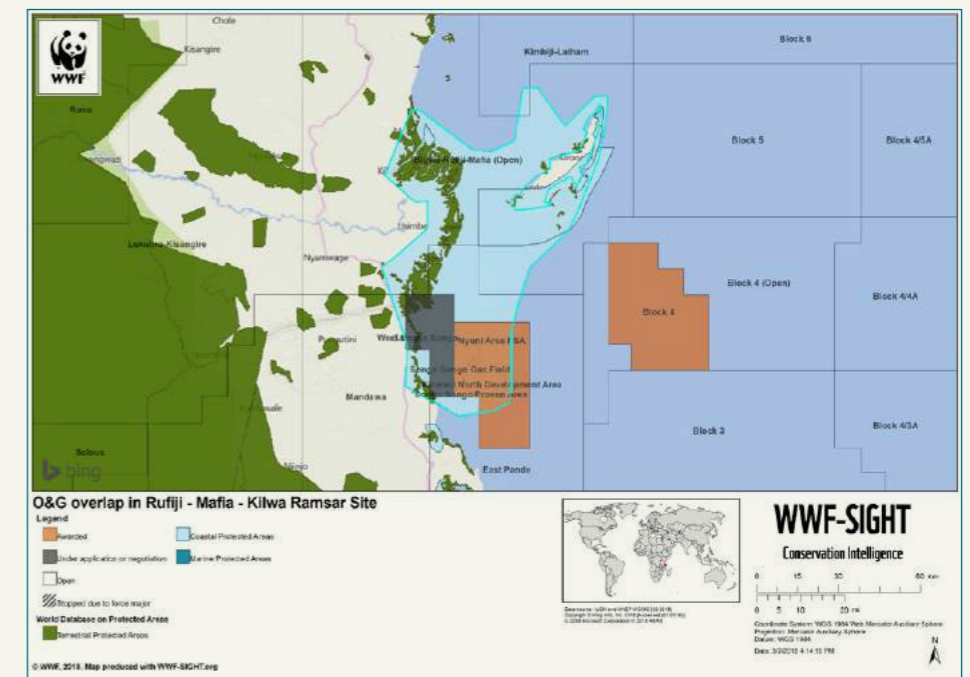


FIGURE 3. Oil and gas concessions overlapping marine protected areas in Rufiji - Mafia - Kilwa Ramsar Site (Tanzania).

In the case of Îles Barren, oil and gas developments may seriously compromise some of Madagascar's healthier and most productive coral reefs. Hard coral cover, a key indicator of reef health, ranges from 36.9 per cent to 68 per cent, and reef fish populations show biomass of up to 6,832 kg/hectare – the highest documented in Madagascar to date. Considering the global trends in coral reefs loss, (over 50 per cent according to recent estimates) the preservation of such ecosystems is of paramount importance. Finally, the Barren Isles serve as a lifeline for traditional Vezo fishers, and the MPA seeks protection as an IUCN Category V 'protected seascape' in which management efforts will focus on sustainable use.

There is an overlap of mining and EBSAs and it mainly occurs in coastal locations, while no deep-sea mining has been identified yet in the region. In total about 0,011 per cent of the EBSAs overlap with active mining activities, half of which include exploration licenses and the other half are mining licenses. All licenses are active in the region. Mining concessions however have been designated in many MPAs particularly in Tanzania and Madagascar, including Mafia Islands, Rufiji Mafia Kilwa Marine Reserve (Tanzania) and Barren Islands (Madagascar). It should be noted that mining data from Comoros, Europa & Bassas, Juan De Nova Island, Kenya, Mozambique, Seychelles, Somalia and South Africa were not available. As such, the results of the mining assessment most probably represent an underestimate of the actual overlap between mining concessions and areas of conservation importance.

5.2. THE SWIO'S VULNERABILITY TO OIL SPILLS

The overall vulnerability of the Southwest Indian Ocean region to oil spill accidents has been noted in the work of many agencies, such as the International Maritime Organization's (IMO) 1994 report on a regional oil spill contingency programme for the island states of the Indian Ocean Region. The IMO report further identifies the need to protect native species and ecosystems, such as the World Heritage Site of Aldabra Atoll, the sea turtle breeding grounds of Île Tromelin, and extensive coral formations, coastal wetlands and sand beaches.

A detailed risk and impact study was carried out as part of preparations for the World Bank's project "Western Indian Ocean Islands Oil Spill Contingency Planning". The aim was to evaluate: a) the likelihood that oil spills will occur, from small operational spills at oil handling facilities (Tier 1) to larger and more serious spills occurring in waters away from oil handling ports and harbours, for which a major response would be required (Tier 3), and b) the damage that would result in the event of an oil spill.

The study clearly shows that in all countries there are real risks of small operational spills occurring on a regular basis, and that there have been many such incidents in recent years. It also shows that Tier 2 events during which up to 500 tons oil are spilled at or near harbours, by vessels going aground or being involved in collisions, would have a serious impact locally and may well negatively affect regional marine ecosystems and marine biodiversity as well as national coastal resources.

The study has examined several accident scenarios in which an outflow of 50,000 tons of oil could occur at different locations within the region (Tier 3 spills). It finds that accidents involving very large vessels carrying crude oil through the region would likely overwhelm the organisation and response arrangements of the countries concerned. This could have devastating impacts on the environment of the region, damaging coral reefs, seagrass beds, mangroves, beaches and shorelines, and devastating populations of dugongs, sea turtles, numerous seabirds and many other rare, threatened and important species of wildlife.

A large oil spill could also severely harm the economies of the small island developing states by damaging fishing grounds, amenity beaches, diving and deep-sea fishing areas for years and years to come; disrupting shipping; and shutting down activities that depend on seawater intakes to aquaria or industrial plants. A somewhat lower level of tanker traffic passes by Mauritius, about 20 million tons per year; however, the potential for an accident still exists.

The region as a whole lacks legislation, equipment and a plan to confront an oil spill emergency, although Seychelles, Mauritius and Reunion have ratified some international conventions and have developed national oil spill contingency plans, which are still untested. Nevertheless, important oil spill response-mechanisms, even where resources are available, are only at best partially effective. These mechanisms are also often causing other negative impacts for species and ecosystems including, for instance, the ones related to the use of toxic dispersants.

**THE REGION LACKS
LEGISLATION,
EQUIPMENT AND A
PLAN TO CONFRONT
AN OIL SPILL
EMERGENCY**

POTENTIAL AREAS OF IMPACT OF THE OIL AND GAS SECTOR

EXPLORATION PHASE (PARTICULARLY SEISMIC IMPACTS):

- Acoustic impacts on marine mammals from sonar and seismic guns
- Impacts on invertebrates and fish species (pressure on otoliths and bladders leading to damage and even increased mortality. Also leading to altered swimming behaviour in fish, having a scaring effect on fish)
- Impact on fishing areas (fishers are prevented to fish in areas where seismic activities are being used).

DEVELOPMENT PHASE:

- Impacts on seabed and benthic organisms from drilling
- Acoustic impacts from drilling on marine mammals
- Discharge from drilling activity (water quality, sedimentation)
- Discharge from lubricants used for drilling (water quality).

PRODUCTION PHASE:

- Disposal of sledge
- Discharge of lubricants (water quality)
- Potential for oil leakage (water quality, oiling of marine organisms)
- Potential for blowout (major environmental catastrophic event – aka BP/Gulf of Mexico)
- Potential for pipeline breakage (depending on how oil and gas are being transported to shore - this is considered higher risk than transporting by vessel)
- Potential for transport vessel (tanker) spill (either from transfer of oil and gas or from collision – aka Exxon Valdez).



THE OVERALL VULNERABILITY OF THE SOUTH WEST INDIAN OCEAN REGION TO OIL SPILL ACCIDENTS HAS BEEN NOTED IN THE WORK OF MANY AGENCIES, SUCH AS THE INTERNATIONAL MARITIME ORGANIZATION

5.3. THE POTENTIAL IMPACTS OF GAS EXTRACTION

Although the risks associated to gas extraction can be considered lower than oil developments, there are still some considerable threats that need to be considered. First of all the construction of pipelines and associated infrastructure can have a major impact, particularly for sensitive ecosystems such as coral reefs. Major accidents, such as blowouts, can also have serious consequences for humans and wildlife alike.

Moreover, before natural gas can be utilised, it must be processed (cleaned) to remove impurities and water. The resulting 'produced water' is usually discharged to sea after removal of hydrocarbons and other chemicals, though low levels remain. Though the quantities of produced water are generally low, the contaminants (which can usually be removed) do nevertheless present pollution threats that can be measured and thus classified as pressure impacts.

Finally, cumulative impacts from methane leaks is a potential major negative aspect of its use as an energy source and represents another pressure indicator. As the utilisation of methane increases, there are concerns that leaks of this gas, a far more potent contributor to climate change than carbon dioxide, will offset any gains from reductions in use of more dirty hydrocarbons like coal and oil. Odourless and clear, tracking leaks from pipelines and drilling is very difficult. Even in the USA, where natural gas is increasingly contributing to energy supplies, the Environmental Defence Fund has not yet determined how much gas is escaping to the atmosphere.

5.4. THE POTENTIAL IMPACTS OF MINING ACTIVITIES

Seabed mining poses a major threat to the oceans. All types of seabed mining will kill whatever that cannot escape the mineral extraction operations. Organisms that grow on the seabed will be smothered because of sediment disturbance and the discharge of waste. The current lack of scientific knowledge on the deep-sea environment, and the lack of knowledge of the technology employed, limits our ability to predict the environmental impacts of mining operations and to determine whether habitats can ever recover from the disturbance.

The analysis performed by Jones et al (2017) that simulated the potential impacts of mining in selected locations in the Pacific show considerable negative biological effects of seafloor nodule mining, even at the small scale of test mining experiments, although there was variation in sensitivity amongst organisms of different sizes and functional groups, which have important implications for ecosystem responses.

Deep-sea communities live in relative silence, and in the dark. Studies have shown that deep-sea fish communicate at low sound frequencies, and are sensitive to acoustic changes to sense food falls – the fall of organic matter that provides an important source of nutrients to the deep sea. Whales rely on sound for communication and navigation, and when encountering increased noise, change their vocalisation patterns and behaviour, and move away to new areas. Studies show that baleen whales experience chronic stress when exposed to increased shipping noise. Low-frequency mining noise could travel far from the mining site, with one estimate suggesting that noise from the Nautilus operation near Papua New Guinea could travel up to 600 km from the site. This could have negative impacts on deep diving whales in the area. Mining will also introduce bright light into an environment that, but for bioluminescence, is constantly dark. This will have an impact on species that are adapted to the darkness, such as deep-sea vent shrimp, which has been shown to be blinded by the lights used by researchers.

ALL TYPES OF SEABED MINING WILL KILL WHATEVER THAT CANNOT ESCAPE THE MINERAL EXTRACTION OPERATIONS

From the above analysis, it seems clear that seabed mining poses some serious environmental risks for the SWIO region and although current developments are limited, this should be taken into account for potential future exploitation projects.

5.5. SOCIO-ECONOMIC CONSIDERATIONS

The extractive industry and particularly oil and gas, can have serious consequences for SWIO communities relying on coastal habitats, particularly those who rely on fisheries for a living.

Seismic exploration can cause temporary displacement of fishing effort and block access to fishing grounds, resulting in significant losses of income and food, or increased costs and risks associated with accessing more remote fishing grounds. Temporary or long-term displacement of regular vessel transport due to seismic exploration or production activities can also result in loss of income or supply of goods to coastal communities.

The creation of fisheries exclusion zones around offshore oil installations once production begins can also result in displacement of fishing effort, incurring higher costs for fishers who have to travel further to new fishing grounds.

In the long term, marine or coastal pollution at any level can have a negative impact on fisheries resources, leading to decreased productivity, lowered income, lack of food, and possible increased pressures on other resources (e.g. increased bushmeat consumption due to loss of fisheries).

Furthermore, certain types of fishing gear and fishing efforts adopted in the region are more than other vulnerable to fouling and damage from oil pollution.

Serious or chronic pollution can lead to social unrest. Fouling of beaches and other coastal habitats can cause loss of income from beach-based tourism (including turtle and whale shark watching) and coastal resorts. Wildlife-watching tourism is an important national revenue earner for many coastal nations in the SWIO region. This potential source of income could be threatened if seismic campaigns or oil spills would displace the animals or cause population declines, with catastrophic impacts for the region's nature based brand.

5.6. CASE STUDIES

Case study 1: The impacts of a large-scale oil spill in the SWIO: the case of the Katina P

On 17th April 1992, the tanker Katina P was hit by a freak wave while transiting the Mozambique Channel. It was carrying 66,700 tonnes of heavy fuel oil en route from Venezuela to the United Arab Emirates. The vessel lost hull plating amidships resulting in a release of approximately 3,000 tonnes of cargo.

The Katina P was intentionally grounded on a sandbar six miles offshore of Maputo Bay to prevent sinking. In an attempt to avoid further coastal pollution, the vessel was towed out to sea for lightering to another tanker. However, while under tow, the vessel broke in two and sank on 26th April, approximately 85 nautical miles off Mozambique, with a further release of oil. Part of the oil released initially stranded on various beaches in and outside Maputo Bay.

Oil that spilled when the vessel sank travelled south on the Agulhas current, with limited amounts of weathered oil stranding on the South African coastline.



© DAVE MAIN
The Katina P accident.

Shoreline clean-up was organised by the Ministry of Public Works with local municipalities using local labour, assisted by excavators, trucks etc. However, work was hampered by limited resources and the ongoing civil war.

The spill had major socio-economic and environmental consequences for Mozambique. The polluted environment was extremely sensitive (bays, mangroves, estuaries, islands and beaches) and home to a major shrimp population and other seafood resources. During the first few weeks following the spill, oil slicks threatened the shores of Maputo Bay, which were being heavily exploited by local populations for food and trade.

On 22 April, the Ministry of Health and Secretary of State for Fisheries announced a fishing ban in Maputo Bay, as well as a ban on bathing and other beach activities, due to risks for human health. On 27 April, in the areas unaffected by the pollution (centre and south of the bay), the fishing ban was lifted. Shellfish in areas affected by the pollution still showed high levels, meaning that they were unfit for human consumption. Salt pans along the Matola River were closed to extraction for some weeks.



© THE INTERNATIONAL TANKER OWNERS POLLUTION FEDERATION LIMITED
Clean up operations along the coast Mozambique

CASE STUDY 2: GALETA OIL SPILL (PANAMA) - LONG TERM IMPACTS ON CORAL REEFS

Once oil comes into contact with corals, it can kill them or impede their reproduction, growth, behaviour, and development. The entire reef ecosystem can suffer from an oil spill, affecting the many species of fish, crabs, and other marine invertebrates that live in and around coral reefs.

On April 27 1986, the failure of an oil storage tank resulted in an estimated 50,000 barrels of medium-weight crude oil spilled into the Caribbean coast of Panama in the area known as Bahía Las Minas. The tank was managed by the Refinería Panamá (a subsidiary of Texaco, Inc.), located on Payardi Island (Lat. 9° 24' N, Long. 79° 49' W) about 12 km northeast of the City of Colón.

Studies of the impacts on corals in the area have shown substantial damage particularly to corals living at 3-6 m depth. Branching corals appeared more susceptible than the massive corals, and recovery has been slow. The cover, size, and diversity of live corals decreased greatly on two oiled reefs compared to their values before the oil spill, while values initially increased on unoiled reefs. These differences persisted from 1988 through 1991, although diminished, even after the occurrence of precipitous, unexplained coral mortality at unoiled reefs between 1986 and 1988 (cover dropped from 28% to 12%). This was the first major oil spill in a coral reef area where considerable baseline information was present prior to the spill.

This was a large spill and much of the oil was distributed into the mangrove sediments. These sediments then slowly released the oil, and coral viability was further depressed due to continual slow leaching. Thus, in this scenario, an acute oil spill can become a long-term chronic contamination problem.



© INTERNATIONAL PETROLEUM INDUSTRY ENVIRONMENTAL CONSERVATION ASSOCIATION
Oil slicks moving towards a coral Reef in Bahía Las Minas (Panama).

The analysis of aerial photographs showed that 64 ha, or roughly 7 per cent of the entire area of mangroves in Bahía Las Minas in 1986, were killed by the oil spill, and smaller but extensive areas of seagrass beds were also killed. Death and injury of these habitat-structuring organisms resulted in physical destruction of habitats. Macroalgae, crustose coralline algae, and sessile invertebrates at and near the seaward edge of the reef flat were directly exposed to oil and suffered heavy mortality, resulting in the lowest cover of these organisms measured in 20 years.

CASE STUDY 3. IMPACTS OF OIL AND GAS EXPLORATION ON BIODIVERSITY IN THE NIGER DELTA (NIGERIA)

The Niger Delta, located in the southernmost part of Nigeria, is the largest river delta in Africa and, in hydrological terms, the third largest in the world. From a coastal belt of swamps, stretching northwards, the land becomes a continuous rainforest gradually merging with woodland and savannah grasslands. It is host to petroleum production activities that have brought an economic boom, but not without problems. Exploration, drilling, extraction, transportation and refining of oil have gone hand in hand with clearing of vegetation, while waste discharge, accidental spills and operational failures, in combination with sabotage, pipeline bunkering and artisanal refining, all contribute to serious environmental pollution.

The result is substantial damage to surface water, drinking water, fish and other fauna as well as other parts of the mangrove ecosystems that make up most of the environment in the Niger Delta zone. This is not only bad news for the people living near pipelines, drilling installations or harbours of the country; it also forms a serious risk in terms of storm and cyclone impact prevention. It is well known that mangroves play a role in coastal defence and disaster risk reduction and this role will be negatively affected by acute and long lasting tree death or reduced system vitality. One of the most important aspects of the depressed mangrove performance and related carbon releases is the chronic character of the damage.

Between 1976 and 1997, there were 5,334 reported cases of crude oil spillages, releasing around 2.8 million barrels of oil into the land, swamp, estuaries and coastal waters of Nigeria. Most of these oil-spill incidents reported in Nigeria occurred in the mangrove swamp forest of the Niger Delta region.

Moreover, oil exploration by seismic companies involves surveying, clearing of seismic lines, and massive dynamiting for geological excavations. The explosion of dynamite in aquatic environments leads to narcotic effects and mortality of fish and other faunal organisms. Destabilization of sedimentary materials associated with dynamite shooting causes increases in turbidity, blockage of filter feeding apparatuses in benthic (bottom dwelling) fauna, and reduction of plant photosynthetic activity due to reduced light penetration.

The burying of oil and gas pipelines in the Delta, divides up rich ecosystems such as rainforests and mangroves. Apart from the reduction in habitat area, clearing of pipeline track segregates natural populations, which may in turn distort breeding behaviour. It is a fact that all aspects of oil and gas exploration and exploitation have deleterious effects on the local ecosystem and biodiversity.



IMAGE SOURCE: AFP

Oil pollution in the Niger Delta

EXPLORATION, DRILLING, EXTRACTION, TRANSPORTATION AND REFINING OF OIL HAVE LED TO ENVIRONMENTAL POLLUTION



CONCLUSIONS AND RECOMMENDATIONS

6.1. CONCLUSIONS

Major oil and gas deposits have been identified in the SWIO region, and despite serious concern about impacts on climate change and the risk to the local environment and communities, their development could accelerate very soon.

It is widely accepted that burning fossil fuels such as oil and gas to generate energy has a bigger impact on the atmosphere than any other single human activity. Unburned gas is also a big problem when it escapes. Methane, the main ingredient of natural gas, is the second most important greenhouse gas after carbon dioxide. The massive extraction of oil and gas in the SWIO will represent a further obstacle towards the achievement of the targets of the Paris Agreement, which seeks to keep a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.

Particularly worrying is the large overlap of oil and gas concessions with areas of conservation importance in the region, including MPAs (28 per cent overlap) and EBSAs (8 per cent overlap), which represents a major threat for one of the most biodiversity rich areas in the world. It is important to specify that there are many areas in the SWIO that even if they fall outside MPAs or EBSAs, are still very important for biodiversity and food security (including many important near shore areas with thriving mangroves and coral communities). If the designated EBSAs/MPAs shall increase in the region, in line with international standards, the overlap will increase considerably.

Due to the strong dependency of the SWIO's coastal population on marine resources for subsistence and as a source of income, one of the main concerns that emerged from the analysis is the potentially massive socio-economic risk associated to a large-scale oil spill in the region. Moreover, any activity that could lead to a potentially negative impact on valuable resources, such as fisheries, coral reefs, mangroves and seagrasses, but also beach pollution that could compromise the tourism sector in the region bears a potentially huge risk for the local economy.

It is evident that appropriate policies, plans and legislation are needed in the region to address the extractive sector. Accountability, transparency and public participation are needed for all concessions – mining and oil and gas – particularly if they potentially affect MPAs or EBSAs or any other important ecosystems in the region. The intent to grant a concession should be completely open to public scrutiny and public participation should be sought before decisions are made.

6.2. RECOMMENDATIONS

Putting aside WWF's strong concerns about the climate change implications of new and existing oil and gas developments and the serious harm climate change is already causing in this region, at the very least specific obligations should be put in place for industries operating in marine and coastal environments within the SWIO and should include the following key actions:

- Protect critical habitats and high value conservation areas and important ecosystem
- Develop and promote renewable energy alternatives
- Establish 'no go' areas to protect other economically important sectors and environments
- Introduce in all countries in the region systems and tools such as strategic environmental assessments, environmental and social impact assessments and sensitivity mapping prior to consideration of issuing concessions
- Identify ecosystems, habitats, wildlife and populations potentially affected by the proposed activities
- If no previous "baseline data" on that environment or habitat is available, it should be the responsibility of the proponent to collect that data and make sure that an adequate and qualified assessment of the original state of the environmental resources in question can be made. National governments should put in place regulatory mechanisms that make this responsibility mandatory for the extractive industry. Data collected during this assessment phase should be made available to governments or government-contracted bodies responsible for environmental planning and protection and to third parties. This phase should also take into account existing structures, developments or human activities in the area that may have an impact on the surrounding environment or habitat
- Identify the likely or possible impacts of the proposed activities on the surrounding environment and the people who rely on the resources in that environment. These should consider the possible cumulative nature of impacts combined with previously existing developments or human activities
- Identify measures that can be taken to mitigate or minimise the potential impacts and identified risks and the readiness to reject proposals that cannot identify such measures
- Design and implementation of a monitoring programme to measure the impacts of the exploration or development activities on the surrounding environment and local populations, and to adjust mitigation measures accordingly if negative impacts are detected
- Ensure that oil and gas companies have adequate insurance in the event of a spill and can cover clean-up costs and compensation for loss of livelihoods
- Sign and ratify all International Maritime Organisation conventions relevant to oil and gas exploration, shipping, transportation of oil
- Review legal mandates to ensure that compensation for damages caused by marine-based energy companies are streamlined
- Adhere to the conditions of the Nairobi Convention. The most relevant articles, among others, are: 5 (pollution from ships), 8 (pollution from seabed activities, including oil and gas exploration), 12 (cooperation in combating pollution in cases of emergency) and 16 (liability and compensation)
- Promote regional coordination on trans-boundary issues such as oil spill contingency, piracy and security, as well as cross-border developments to minimize negative impacts and maximize benefits from marine-based energy sources
- Promote a precautionary approach for new and already present industry activities in the area.

**APPROPRIATE
POLICIES, PLANS
AND LEGISLATION
ARE NEEDED**

In addition, WWF believes that financial institutions need to explore how to better integrate biodiversity risks into their investments decisions. Investors should develop tools that allow operationalization of biodiversity related to the marine environment. Financial institutions can play a crucial role in developing stronger investment tools and standards.

WWF PRINCIPLES FOR A SUSTAINABLE BLUE ECONOMY

Despite the high-level adoption of the Blue Economy as a goal of policymaking and investment, there is still no widely accepted definition of the term. To fill this gap, WWF has developed a set of principles for a sustainable Blue Economy. They offer a clear definition of what it means, and they provide guidance on how to manage efforts to achieve it. They also outline a set of actions that stakeholders can take to get there.

Truly integrated maritime policies, adequate economic and legislative incentives, supportive public and private investment and the successful implementation of ecosystem-based marine planning are all important ingredients in the mix.

The Blue Economy can only be sustainable if we also create a sustainable economy on land; that is, an economy that restores, protects and maintains diverse, productive and resilient ecosystems, and that is based on clean technologies, renewable energy, and circular material flows.

WWF urges public, private and civil society actors to use the Principles for a Sustainable Blue Economy as a lens through which to define a sustainable Blue Economy and to assess whether our actions are taking us in the right direction, and set sail for a more prosperous future, for people and nature alike.

<http://wwf.panda.org/?247477/Principles-for-a-Sustainable-Blue-Economy>

FINANCIAL INSTITUTIONS CAN PLAY A CRUCIAL ROLE IN DEVELOPING STRONGER INVESTMENT TOOLS AND STANDARDS



7. LITERATURE CITED

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MINING AND OIL & GAS THREATS OUR MARINE HERITAGE

IMPORTANT HOTSPOT

The South West Indian Ocean hosts some of the most important biodiversity hotspots in the world.

12,913 KM²

of coral reefs in the South West Indian Ocean are at potential risk.



400 FISH SPECIES

are found in the region of the South West Indian Ocean.

THIS REPORT HAS FOUND

a 28,1 % overlap of oil and gas concessions and ecologically or biologically significant areas.



Why are we here?
No more species shall go extinct due to human actions

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