

MAPPING THREATS TO OCEAN BIODIVERSITY

A HIGH-LEVEL ANALYSIS OF SECTOR-SPECIFIC THREATS TO OCEAN BIODIVERSITY IN THE SOUTH WEST INDIAN OCEAN, WITH A FOCUS ON THE NORTHERN MOZAMBIQUE CHANNEL

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ABOUT WWF

WWF is an independent conservation organization, with more than 38 million followers and a global network active through local leadership in over 100 countries. Our mission is to stop the degradation of the planet's natural environment and to build a future in which people live in harmony with nature by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

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ABOUT THIS REPORT

The South West Indian Ocean is one of the most biodiverse and productive marine regions on Earth.

The region is also experiencing significant sectoral developments: a study published in 2024 found that the greatest portions of financing to the region is being directed towards large-scale commercial activities that could undermine marine biodiversity.¹ Moreover, few financiers in the South West Indian Ocean (SWIO) region seem to fully consider their exposure to ocean-related risks when making investments and loan decisions, and the national financial regulations of the SWIO countries (Kenya, Tanzania, Mozambique, South Africa and Madagascar) are currently insufficient to protect people and the environment from the resulting externalized costs of these decisions.

WWF, in collaboration with partners and other non-governmental organizations working in the region, developed this report to identify the threats to marine biodiversity in SWIO and the Northern Mozambique Channel posed by three rapidly growing blue sectors: industrial fishing; shipping; and oil and gas. In conjunction with the 2024 study on the financial flows in the SWIO region, this high-level analysis will help inform national and international policymakers in the region, as well as investors, about the conservation and ecosystem services values that are at risk due to industrial expansion.

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THIS REPORT AIMS TO



HIGHLIGHT
key ecological
and development
assets within the
SWIO region



ANALYSE
sectoral overlaps
with ecological
assets



PROVIDE
recommendations
for both national
and international
policymakers

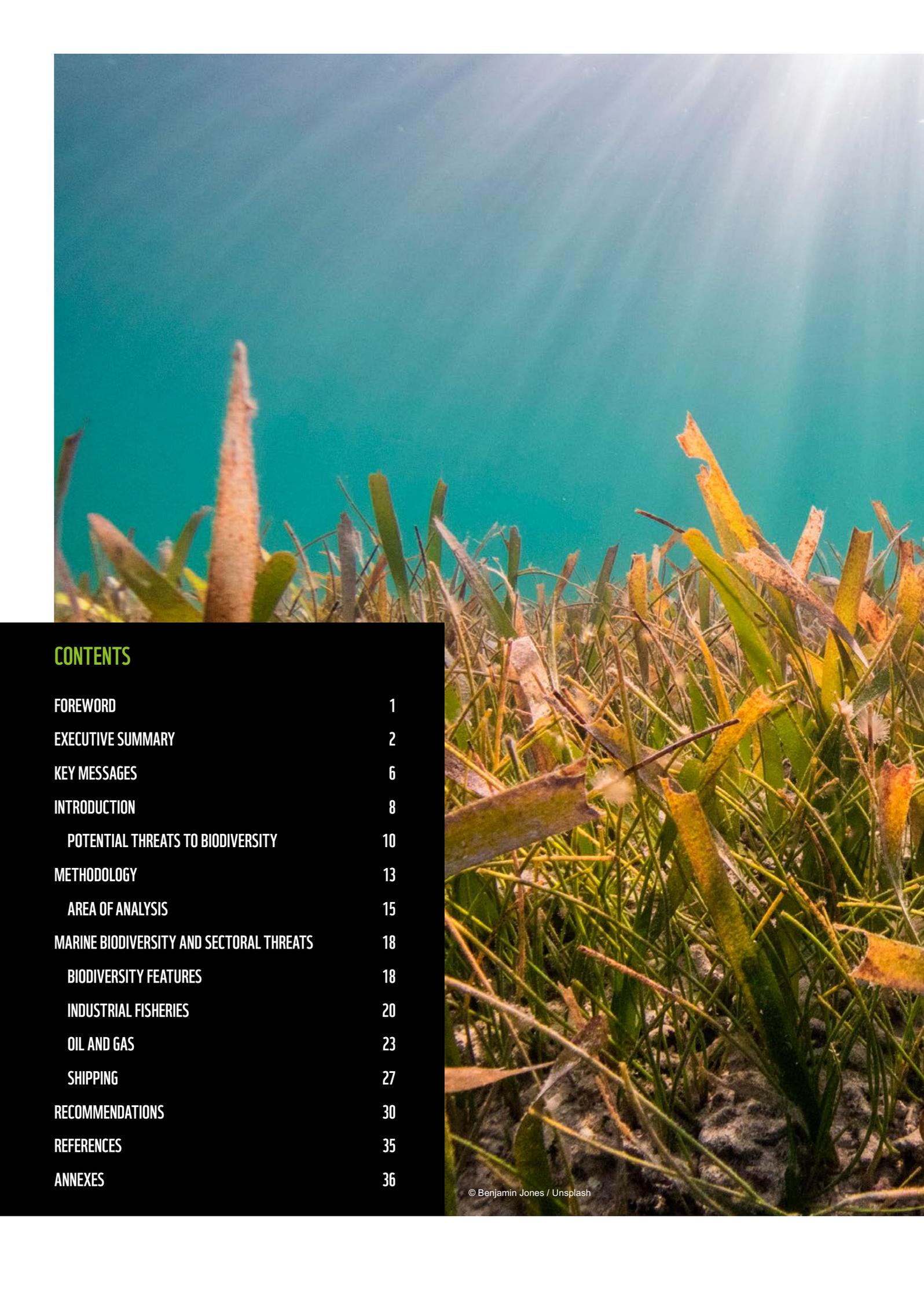


SUPPORT
sustainable
investment in the
SWIO region



INFORM
the marine spatial
planning process for the
Northern Mozambique
Channel

¹ WWF and Profundo Research and Advice. 2024. *Assessing financial flows within the South West Indian Ocean Blue Economy*. Gland, Switzerland: WWF.



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ACRONYMS

AIS	Automatic identification system
CORDIO	Coastal Oceans Research and Development – Indian Ocean
dFAD	Drifting fish aggregating device
EBSA	Ecologically or biologically significant marine area
EEZ	Exclusive economic zone
ETP	Endangered, threatened or protected (species)
IMF	International Monetary Fund
IOTC	Indian Ocean Tuna Commission
IUCN	International Union for Conservation of Nature
IUU	Illegal, unreported and unregulated (fishing)
KBA	Key biodiversity area
MPA	Marine protected area
NMC	Northern Mozambique Channel
OECM	Other effective area-based conservation measures
SDG	Sustainable Development Goal
SWIO	South West Indian Ocean
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
VMS	Vessel monitoring system
WIOMSA	Western Indian Ocean Marine Science Association





FOREWORD

The South West Indian Ocean, and the Northern Mozambique Channel subregion in particular, represent globally significant reservoirs of biodiversity, encompassing vast extents of coral reefs, mangrove forests, seagrass beds and critical migratory routes.

These ecosystems underpin the food security, livelihoods and cultural heritage of millions of coastal residents across the South West Indian Ocean (SWIO). However, as this report compellingly demonstrates, escalating industrial pressures – particularly from oil and gas exploration, shipping and industrial fisheries – are converging with these vital habitats, creating complex spatial overlaps that threaten the integrity of the region’s marine biodiversity and highlight the need for urgent ecosystem-based integrated management interventions.

The findings of this report strongly reinforce the ongoing work WWF’s SWIO Regional Programme and its link to the Nairobi Convention framework. Notably, the report supports implementation of priorities articulated in the Decisions of the Eleventh Conference of Parties (COP11), the approved Convention’s 2025–2028 Work Programme, and the work of the NoCaMo Project on advancing marine spatial planning (MSP) in the Northern Mozambique Channel (NMC).

The findings of the sector-specific analysis serve multiple functions.

First, they advance the efforts on MSP implementation by providing robust geospatial evidence of the extensive overlap between sectoral developments and critical biodiversity areas. This supports implementation of the WIO Regional Marine Spatial Planning Strategy and ongoing efforts to establish a harmonized and transboundary MSP process in the NMC.

Second, the findings strengthen the case for expanding marine protected areas and systematically identifying new conservation priorities in line with regional commitments under the Global Biodiversity Framework, especially through systematic conservation planning and the recognition of community-led or locally managed marine areas as other effective area-based conservation measures, or OECMs.

Third, it aligns with the Nairobi Convention’s Regional Oil Spill Preparedness initiative, which underscores the importance of preparedness and response mechanisms in the face of expanding oil and gas activities. The report’s evidence of significant overlap between oil and gas exploration blocks and highly sensitive habitats such as coral reefs, seagrass beds and mangroves forests illustrates the need for strengthened contingency planning and risk mitigation measures.

Fourth, the report’s findings support a focus on community-based natural resources management, as affirmed by recent Nairobi Convention COP Decisions and embedded in the 2025–2028 Work Programme. By highlighting the intense interactions between industrial activities and local ecosystems, the findings reiterate the importance of empowering coastal communities to manage and protect their resources, ensuring equitable benefit-sharing and long-term resilience.

Fifth, the report contributes to advancing a sustainable blue economy in the Western Indian Ocean, in line with the Nairobi Convention’s Work Programme and regional dialogue on transitioning to ocean-based economies that deliver socio-economic benefits while safeguarding ecological integrity.

Lastly, the findings may inform implementation of the WIO Regional Ocean Governance Strategy, which promotes integrated, cross-sectoral governance mechanisms that reconcile competing ocean uses while strengthening the ecological and economic resilience of the WIO region.

In the specific context of the NMC, the report’s evidence base helps build a strong case for accelerating sustainable, regionally harmonized MSP processes that can balance sectoral interests while safeguarding the region’s exceptional biodiversity.



DR SAMANTHA PETERSEN
WWF SOUTH WEST INDIAN OCEAN
REGIONAL PROGRAMME LEAD

EXECUTIVE SUMMARY

The South West Indian Ocean is an oceanic region off the East African coastline that hosts an extraordinary array of ecosystems and cultures.



55 million
people live
along SWIO's
coastline,
of which
10 million
are in the NMC.

Here, coral reefs, mangrove forests, seagrass beds and critical migratory corridors support a rich biodiversity, including many species found nowhere else on the planet. This makes the South West Indian Ocean (SWIO) one of the world's most ecologically valuable seascapes. The region is deep-rooted in maritime traditions, shaped by centuries of connection between people and the sea. Today, it is the lifeblood for many of the roughly 55 million coastal residents in Kenya, Tanzania, Mozambique, South Africa, Madagascar and SWIO's small island developing states (Mauritius, Mayotte, Réunion, Seychelles and Comoros).

At the heart of SWIO lies the Northern Mozambique Channel (NMC), a subregion spanning southern Tanzania, northern Mozambique, the Union of Comoros, southern Seychelles and northern Madagascar. The NMC boasts large stretches of critical habitats and, despite its smaller size, contains 57% of SWIO's mangrove coverage, 36% of the larger region's seagrass beds, and 41% of its coral reefs. About 10 million coastal residents rely on the NMC's coastal and marine resources for their food security, livelihoods and cultural heritage.

At the same time, the SWIO and NMC regions are increasingly the sites of rapidly developing blue sectors, and the sustainable management of these regions' marine resources is at a pivotal juncture. Intensifying pressures from industrial activities – including oil and gas, shipping, fishing and infrastructure expansion – are converging with globally significant biodiversity and vital marine ecosystems. The overlap between sectoral developments and areas of biodiversity significance underscores the urgency for strengthened spatial management and ecosystem-based governance in the SWIO and NMC regions.



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This report summarizes findings from geospatial analyses of the biodiversity-related features in SWIO and the NMC and the sector-specific threats posed by industrial fisheries, shipping activities, and oil and gas industries. Key findings from this report include the following:

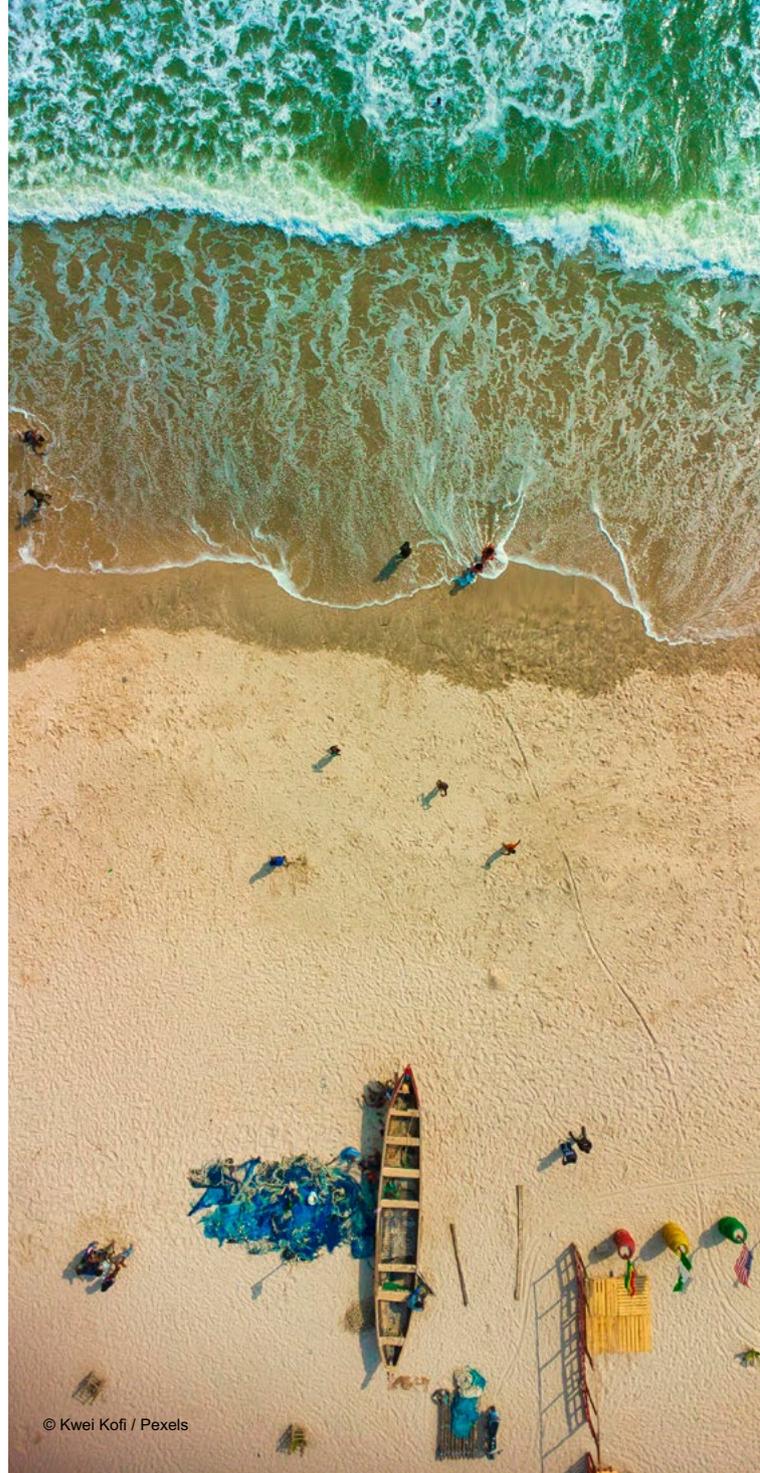
- **Both SWIO and the NMC contain extensive ecologically or biologically significant marine areas (EBSAs).** Nearly the entire NMC and a third of SWIO are recognized EBSAs. The ecological importance of both regions is also reflected in the extent of recognized key biodiversity areas (KBAs) (SWIO: 2.20%; NMC: 8.68%) and important marine mammal areas (IMMAs) (SWIO: 14.21%; NMC: 30.09%), indicating critical conservation priorities.

- **Strict marine protected areas (MPAs) – International Union for Conservation of Nature (IUCN) Category Ia, Ib and II MPAs – remain extremely limited** (SWIO: 21 areas / 0.05%; NMC: 5 areas / 0.30%), whereas less strict protected areas of IUCN Categories IV, V and VI dominate (SWIO: 61 areas / 5.17%; NMC: 26 areas / 12.11%). This reflects a preference for management approaches that target large sustainable management areas with a focus on protecting particular species and habitats rather than full seascape protection. Significant portions of MPAs fall under unclassified or “Other” designations (SWIO: 269 areas / 2.67%; NMC: 11 areas / 13.42%), suggesting classification inconsistencies.

- **Oil and gas exploration is extensive,** especially in NMC, where 74.6% of the region is considered open to exploration (16.3% in SWIO). Areas awarded and under application/negotiation remain relatively limited (SWIO: 2.0%; NMC: 11.1%) but pose growing threats, as these are already – or soon will be – subjected to oil and gas exploration and/or production activities, underscoring the urgent need for integrated conservation and sustainable-use strategies.

- **There are alarming overlaps between areas with oil and gas activities and high-value conservation areas in SWIO and the NMC.** Notably, these include an 80% to 100% overlap between areas open for oil and gas exploration (or “open blocks”) and strict MPAs and UNESCO (United Nations Educational, Scientific and Cultural Organization) Natural and World Heritage Sites. Highly vulnerable coastal habitats are also under threat from oil and gas exploration: mangrove forests (SWIO: 90.54%; NMC: 92.41%), coral reefs (SWIO: 59.35%; NMC: 73.57%) and seagrass beds (SWIO: 43.28%; NMC: 54.57%) are highly overlapped by open blocks. These large overlaps highlight the need for integrated spatial planning in anticipation of the bidding rounds/awarding of these open blocks.

- **Shipping activity is dominated by commercial vessels in both SWIO and NMC and is heavily concentrated in sensitive zones.** In particular, commercial vessels are densest in IUCN Category V and Category IV MPAs, including UNESCO sites, KBAs, EBSAs, IMMAs and seagrass beds, raising pollution and disturbance concerns.



- **Leisure vessel traffic is the second-most prominent shipping activity in the NMC** and shows alarming overlaps with IUCN Category I and Category II areas, KBAs and sensitive habitats (seagrass beds and coral reefs). This threat demonstrates the importance of biodiversity for tourism and the need for effective management to promote a sustainable tourism industry.

- **Oil and gas and fishing vessel activity is present in KBAs, IMMAs and EBSAs, with higher expression in SWIO.** Without robust spatial regulation, these overlaps will increase the risk of conflict between development and conservation goals.

RECOMMENDATIONS

Ultimately, the results of the study indicate that, even in strictly protected areas, there is intense overlap between industrial activity and biodiversity hotspots. To safeguard ocean health and unlock the region's full economic potential, an urgent shift is needed toward ecosystem-based integrated ocean governance. WWF and partners recommend the following actions:

1 UNDERTAKE MARINE SPATIAL PLANNING

Marine spatial planning (MSP) is a tool that, once implemented, will enable striking a balance between marine resources exploitation and environmental protection in the SWIO and NMC regions. To this end, the Nairobi Convention Secretariat recently adopted a Regional MSP Strategy for the Western Indian Ocean and is working with the NMC countries to establish a harmonized MSP process for the region.

2 PROTECT ECOSYSTEMS THROUGH SYSTEMATIC CONSERVATION PLANNING

Systematic conservation planning is a process that focuses on providing decision-making support for spatial biodiversity conservation outcomes. If implemented in conjunction with MSP, systematic conservation planning can guide resource allocation toward areas of greatest biodiversity value.

3 FORMALIZE COMMUNITY-LED CONSERVATION

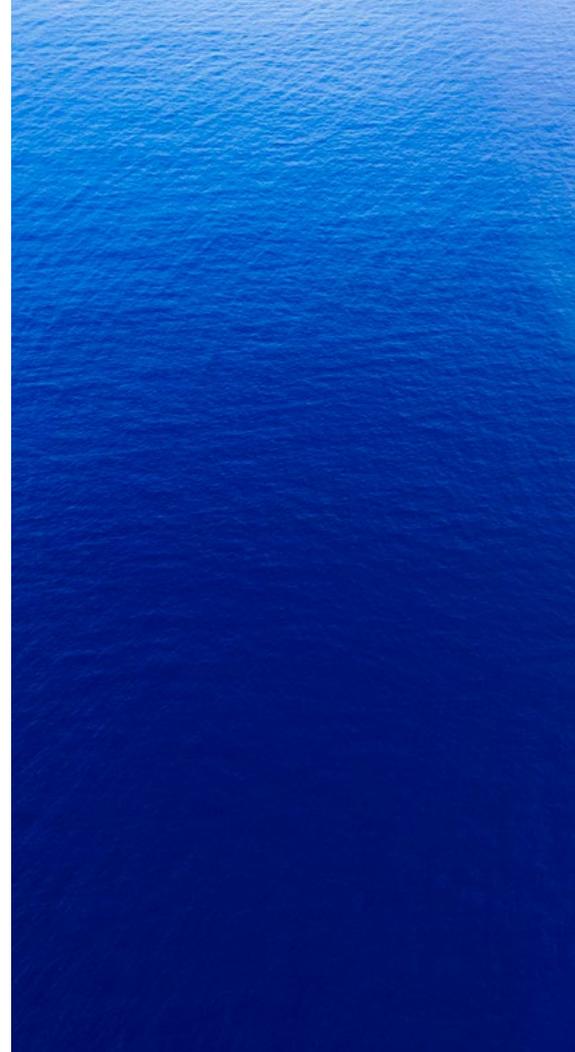
Community-led conservation plays a critical role in marine governance and management. Formalizing community-led conservation through stronger national policies and the recognition of locally managed marine areas as other effective area-based conservation measures (OECMs) could enhance local governance, attract sustainable funding, and foster long-term ecological and socio-economic benefits for coastal communities.

4 TRANSITION TO A SUSTAINABLE BLUE ECONOMY

WWF defines a sustainable blue economy as one that carries economic and social benefits for current and future generations; is underpinned by protection and restoration of diverse and resilient marine ecosystems; and advocates for clean technologies, renewable energy and circular material flows. Effective maritime policies, economic and legislative incentives, ecosystem-based marine planning, and responsible investment are key to achieving this vision in the SWIO and NMC regions.



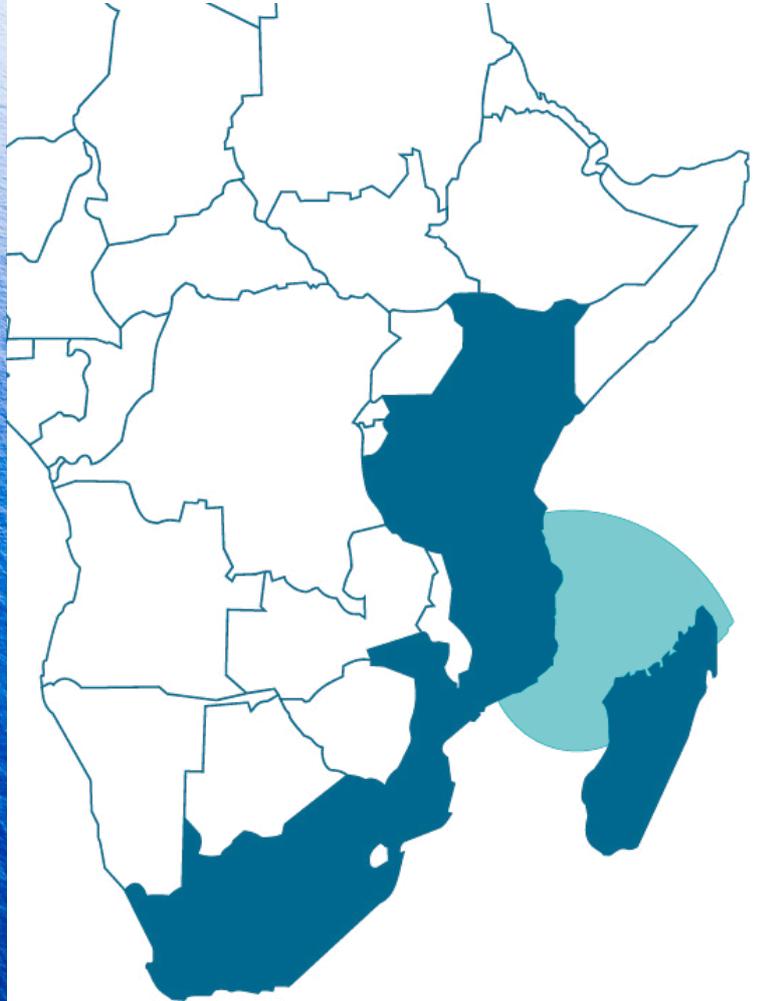
90.54%
of SWIO's
mangrove
forests are
under threat.



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© ReWild Africa / WWF-Mozambique



5 LEAD A JUST ENERGY TRANSITION AWAY FROM FOSSIL FUELS

A just transition from fossil fuels is critical to both climate security and marine sustainability in SWIO and the NMC, requiring strong financial regulation and support for renewable energy and sustainable livelihoods.

6 ADDRESS CHALLENGES TO SUSTAINABLE FISHERIES MANAGEMENT

For sustainable fisheries to flourish in the SWIO and NMC regions, regional and national governance should be strengthened, data systems and compliance measures should be improved, and monitoring and enforcement should be secured. Without these changes, both biodiversity and the socio-economic resilience of coastal communities will continue to erode under opaque and unmanaged fishing pressure.

7 REGULATE SHIPPING ACTIVITIES

High shipping density demands improved maritime governance to prevent ecological degradation. Several measures and regulations are recommended to reduce or eliminate impacts on local wildlife populations and habitat, such as adopting protocols that limit vessel activity in ecologically sensitive areas and establishing a public regional shipping risk registry to track, for example, pollution incidents and collisions with marine megafauna.

KEY MESSAGES

1. BOTH THE NORTHERN MOZAMBIQUE CHANNEL AND THE BROADER SWIO REGION CONTAIN LARGE MARINE AREAS THAT ARE RECOGNIZED FOR THEIR BIODIVERSITY.

9.3 million

hectares of ecologically or biologically significant marine areas in the South West Indian Ocean

of which

940 544

hectares

are in the Northern Mozambique Channel.

2. HOWEVER, THE EXTENT OF STRICT PROTECTION REMAINS MINIMAL.

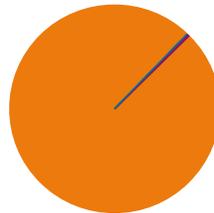
LOW LEVELS OF STRICT PROTECTION



Only **0.05% OF THE SOUTH WEST INDIAN OCEAN** is currently under strict protections (IUCN Category Ia, Ib and II).



Protection rates increase slightly to **0.3% WITHIN THE NORTHERN MOZAMBIQUE CHANNEL** but are still not sufficient to prevent the degradation of ecosystems and substantial species loss in this biodiversity hotspot.



3. WHILE LIMITED, AREAS WHERE OIL AND GAS CONTRACTS HAVE BEEN AWARDED OR APPLIED FOR POSE A GROWING THREAT.

2.0%

of the South West Indian Ocean

11.1%

of the Northern Mozambique Channel

are already – or soon will be – occupied by oil and gas exploration and/or production activities.

OVERLAP BETWEEN OPEN BLOCKS AND AREAS OF SIGNIFICANT OCEAN BIODIVERSITY

SOUTH WEST INDIAN OCEAN

17%

IMPORTANT MARINE MAMMAL AREAS



NORTHERN MOZAMBIQUE CHANNEL

47%

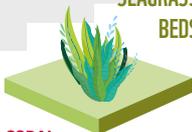
MANGROVE FORESTS



92%

96%

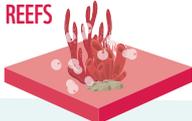
SEAGRASS BEDS



56%

43%

CORAL REEFS



74%

59%

4. THERE ARE ALARMING OVERLAPS BETWEEN OIL AND GAS DEVELOPMENT ACTIVITIES AND HIGH-VALUE CONSERVATION AREAS.

In both regions,

80%-100%

of strictly protected marine areas and UNESCO Heritage Sites are considered open for oil and gas exploration.

While not as pressing as active contracts, the prevalence of open blocks suggests future risks if exploration advances unchecked.

5. COMMERCIAL VESSEL TRAFFIC REPRESENTS OVER 99% OF SHIPPING DENSITY IN THE SWIO AND NORTHERN MOZAMBIQUE CHANNEL IN RELATION TO FISHING, OIL AND GAS, LEISURE, AND PASSENGER VESSELS.

6. ALTHOUGH THE ABSOLUTE NUMBER OF COMMERCIAL VESSEL RECORDINGS IS MUCH HIGHER IN SWIO, THE NORTHERN MOZAMBIQUE CHANNEL HAS ALMOST TWICE THE DENSITY OF VESSELS (PER SQUARE KILOMETRE).

SOUTH WEST INDIAN OCEAN	NORTHERN MOZAMBIQUE CHANNEL
7.4 trillion	558 billion
Hourly commercial vessel recordings between 2015 and 2021	
302 912	547 601
vessel position recordings per km ²	

7. COMMERCIAL SHIPPING VESSELS FOLLOW “MARINE HIGHWAYS” THAT CUT THROUGH AREAS OF SIGNIFICANT BIODIVERSITY.

In particular, high commercial shipping density was recorded in the following areas:

- 📍 Ecologically or biologically significant marine areas
- 📍 Key biodiversity areas
- 📍 Important marine mammal areas
- 📍 Seagrass habitats

8. RECOMMENDATIONS FOR SECURING ECOSYSTEM-BASED INTEGRATED OCEAN GOVERNANCE.

1. UNDERTAKE MARINE SPATIAL PLANNING

Marine spatial planning is a tool that, once implemented, will enable striking a balance between marine resource exploitation and environmental protection in the SWIO and NMC regions.



4



4. TRANSITION TO A SUSTAINABLE BLUE ECONOMY

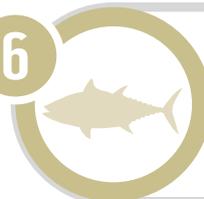
Effective maritime policies, economic and legislative incentives, ecosystem-based marine planning, and responsible investment are key for a sustainable blue economy.

5. LEAD A JUST ENERGY TRANSITION AWAY FROM FOSSIL FUELS

A just transition from fossil fuels is critical to both climate security and marine sustainability, requiring strong financial regulation and support for renewable energy and sustainable livelihoods.



6



6. ADDRESS CHALLENGES TO SUSTAINABLE FISHERIES MANAGEMENT

Regional and national governance needs to be strengthened, data systems and compliance measures should be improved, and monitoring and enforcement should be secured.

2



2. PROTECT ECOSYSTEMS THROUGH SYSTEMATIC CONSERVATION PLANNING

Systematic conservation planning is a process that focuses on providing decision-making support for spatial biodiversity conservation outcomes.

3



3. FORMALIZE COMMUNITY-LED CONSERVATION

Doing so could enhance local governance, attract sustainable funding and foster long-term ecological and socio-economic benefits for coastal communities.

7. REGULATE SHIPPING ACTIVITIES

High shipping density demands improved maritime governance to prevent ecological degradation. Several measures and regulations can be adopted to reduce or eliminate impacts on local wildlife populations and habitats.





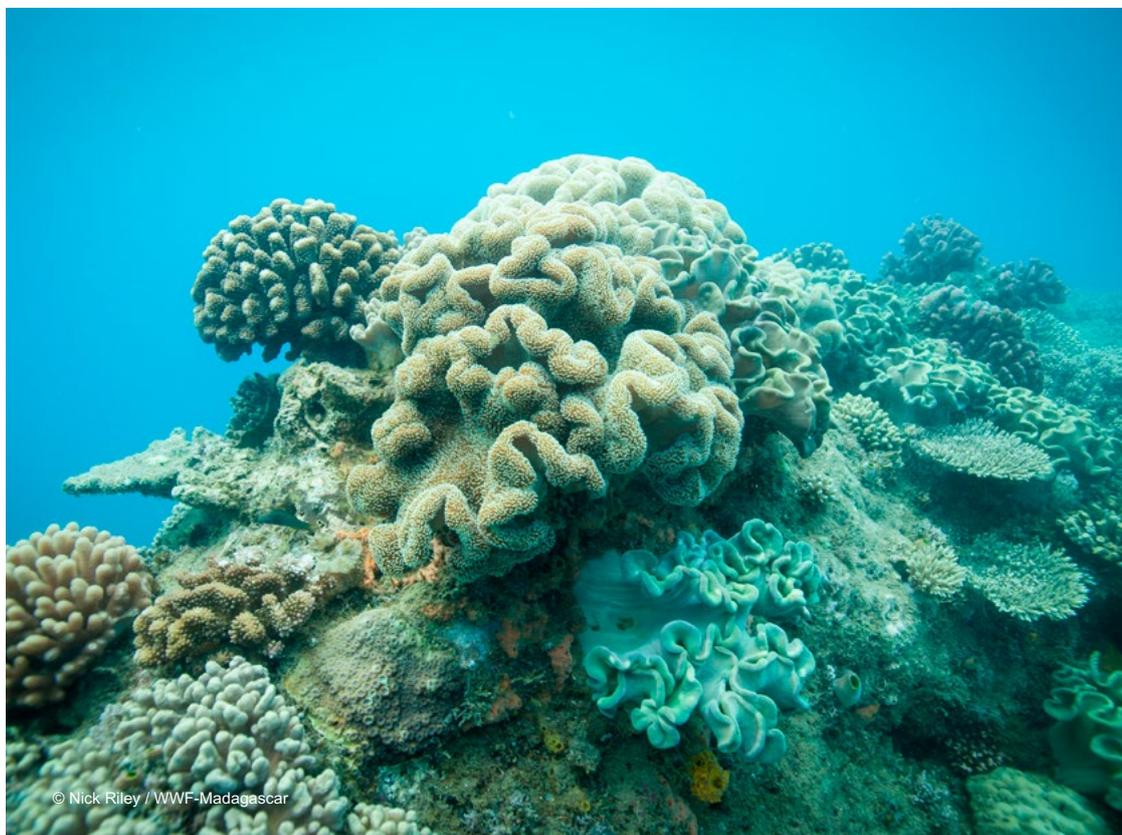
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INTRODUCTION

The South West Indian Ocean is the most biodiverse oceanic region in Africa and the second-most biodiverse in the world.



The Northern Mozambique Channel contains **35%** of the Indian Ocean's coral reefs, with about **450** coral species.



© Nick Riley / WWF-Madagascar



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This ecologically significant region hosts several diverse and productive marine ecosystems – including coral reefs, mangrove forests, seagrass beds and deep-sea habitats – and a rich variety of marine species, many of which are endangered, threatened or protected (ETP). This biodiversity is crucial for maintaining an ecological balance and providing essential ecosystem services such as fisheries resources, coastal protection and tourism opportunities, which roughly 55 million people in the South West Indian Ocean (SWIO) coastal region depend on for their food and livelihoods. Thus, preserving the ecological integrity of SWIO is vital for both environmental sustainability and the well-being of the local communities and economies of Kenya, Madagascar, Mozambique, Tanzania and South Africa, as well as those of the small island developing states (Mauritius, Mayotte, Réunion, Seychelles and the Union of Comoros).

At the heart of this region lies the Northern Mozambique Channel (NMC), a recognized ecologically or biologically

significant marine area (EBSA) with high levels of marine connectivity, which was awarded World Restoration Flagship status by the United Nations Decade on Ecosystem Restoration in June 2025. Despite its much smaller size, the NMC contains 57% of the SWIO's mangrove coverage, 36% of its seagrass beds, and 41% of its coral reefs. This subregion also contains 35% of the Indian Ocean's coral reefs, consisting of approximately 450 coral species. Many of these coral species demonstrate resilience to climate change, making the NMC a potential refuge for future reef regeneration once climate conditions stabilize.

As one of the most biologically productive marine areas, the NMC serves as a critical breeding and foraging ground for key indicator and flagship species, including sea turtles, sharks and rays, marine mammals, and tuna and tuna-like species (Obura et al. 2017). Spanning southern Tanzania, northern Mozambique, Comoros, southern Seychelles and northern Madagascar, the NMC's coastal and marine resources play a fundamental role in the food security, livelihoods and cultural heritage of nearly 10 million coastal residents.

POTENTIAL THREATS TO BIODIVERSITY

In addition to their ecological importance, the SWIO and NMC regions are also rich in a variety of valuable resources that have catalysed significant sectoral developments. The regions are historically large contributors to the global tuna catch by industrial and artisanal fleets – the latter being more prevalent in the NMC. Moreover, recent offshore discoveries of oil and gas deposits in exclusive economic zones (EEZs) of countries such as Mozambique, Tanzania and Kenya have significantly altered the perception of SWIO's economic potential. And several global maritime shipping routes cut through the regions, which has given rise to expanding marine shipping and infrastructure sectors.

A 2024 WWF-commissioned study on the financial flows in SWIO's blue economy found that sectoral development is heavily weighted in favour of resource extraction activities, many of which could harm marine ecosystems (WWF and Profundo 2024). Specifically, it found that 78% of investments (US\$5.49 billion) and 70% of loans approved between 2017 and 2023 (US\$14.1 billion) were in the energy and mineral resources sector – more than half of which went toward oil and gas activities.

The study also found that financial institutions active in the region do not sufficiently consider the ocean-related risks of loans and investments to SWIO's blue economic activities, and that national financial regulators do not have the policies in place to negate the externalized costs of these financial decisions. If left unabated, these development trends could have profound consequences for both nature and the coastal communities.

INDUSTRIAL FISHERIES

The SWIO region is a vital tuna fishing area characterized by both artisanal and industrial fisheries. Geospatial catch data from the Indian Ocean Tuna Commission (IOTC) highlights that industrial fleets from France (Réunion), Seychelles and Spain have been actively operating within this region, particularly targeting surface schools using purse seines and longlines. The NMC also experiences substantial industrial and small-scale fishing activity, with industrial fleets from France, Spain, Seychelles and other countries operating extensively within this area. Between 2013 and 2023, the SWIO region accounted for approximately 3-6% of Indian Ocean tuna landings per year on average, with catches from the NMC alone constituting a significant portion of those landings (IOTC 2024).

Both SWIO and the NMC are increasingly pressured by distant water fishing nations, including Chinese squid jiggers and large-scale purse seiners that use drifting fish aggregating devices (dFADs) and other gear associated with the bycatch of marine mammals, sharks and rays. The use of dFADs in combination with purse seine fishing has resulted in large-scale, non-selective harvesting of marine life – including juveniles of the tuna species that have not yet had the time to reproduce. These unsustainable fishing practices raise ecological concerns, including ghost fishing, where abandoned, lost or otherwise discarded fishing gear continue to trap and kill fish and other marine life;

BOX 1

PERVASIVE IMPACT OF CLIMATE-INDUCED ENVIRONMENTAL CHANGES IN THE SOUTH WEST INDIAN OCEAN AND NORTHERN MOZAMBIQUE CHANNEL

According to the Indian Ocean Tuna Commission (IOTC) Working Party on Tropical Tunas, current environmental indicators signal major shifts in marine ecosystem function due to climate change.

These indicators include:

- Increasing sea surface temperatures, leading to a 3% expansion in waters warmer than 25°C over 30 years
- Declining ocean productivity, indicated by lowered chlorophyll-a concentration
- Fluctuating Indian Ocean dipole states
- Reduced dissolved oxygen levels below 100 metres, with levels near the 2.5 millilitres/litre hypoxia threshold.

Altered marine ecosystems affect tuna spawning grounds, distribution and catchability, and are likely to influence the spatial dynamics of industrial fishing fleets. In particular, near-hypoxic deep water may force tuna into shallower waters, increasing vulnerability to surface fisheries and altering predator-prey dynamics. If unaddressed, these stressors will undermine both biodiversity and the economic viability of fisheries, especially for coastal states with limited adaptive capacity.

unquantified bycatch, which can lead to significant mortality of ETP species (for example, silky and hammerhead sharks); and the localized depletion of stocks as a result of overfishing. Compounding these concerns is the fact that fishing activities often occur within or adjacent to sensitive ecological habitats for ETP species, including sea turtles (nesting sites and foraging areas), and sharks, cetaceans and tuna (migratory routes, spawning and nursery areas).

OIL AND GAS

The SWIO region is a hub for oil and gas extraction, with several active operations in Tanzania, Madagascar and Mozambique, and new concessions under development in Kenya and Mozambique. Oil and gas concessions pose a variety of threats to the surrounding marine ecosystems across its phases: exploration, development and production. During the exploration phase, the pressure and acoustic impacts of seismic activities can harm marine mammals, invertebrates and fish species. The drilling during the development phase damages the seabed, harms benthic organisms and leads to various types of discharge (including lubricants) that reduce water quality. Pipeline construction can damage sensitive ecosystems, especially coral reefs. The production phase releases “produced water” that, despite treatment, contains pollutants that can harm marine environments. There is also the added threat of several catastrophic malfunctions: leakages, well blowouts, pipeline breakage and transport vessel (tanker) collisions can release oil into marine waters, having severe, long-lasting effects on the surrounding biodiversity (see Box 2 on page 12).

Oil and gas extraction worsen the climate crisis, which can indirectly threaten the marine health and economic value of the SWIO and NMC regions (see Box 1 on page 10). Gas leaks from extraction and transportation, for example, could directly add to climate change, as the

main ingredient of natural gas is methane – the second most potent greenhouse gas after carbon dioxide. These leaks are difficult to track, even with advanced technology, and could undermine the climate benefits of natural gas if not effectively managed. Moreover, a continuously growing oil and gas sector and use of fossil fuels will impede progress towards achieving the targets of the Paris Agreement, which seeks to keep a global temperature rise this century well below 2°C above preindustrial levels and to pursue efforts to limit the temperature increase even further to 1°C. 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. Despite these serious concerns about the climate impacts and risks to the local environment and communities, oil and gas sector development in the SWIO could accelerate very soon.

SHIPPING

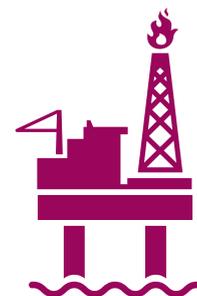
The shipping sector includes vessels engaged in a range of different activities such as commercial shipping, oil and gas, fishing, maritime leisure and passenger transport. While commercial ships and oil and gas vessels (or tankers) often pose the highest risks due to their size and frequency of operation, even smaller leisure or passenger boats can disrupt marine ecosystems. The threats to marine biodiversity from the shipping sector include vessel strikes, especially with marine mammals, and habitat degradation. The latter can be caused by anchoring (which disrupts the seabed and damages sensitive ecosystems such as coral reefs); pollution from bilge water discharge and underwater noise; and oil spills (see Box 2 on page 12).

In summary, the SWIO region faces considerable environmental risks from oil spills and gas extraction. Enhanced response strategies, improved regulations and monitoring are essential to mitigate these threats and protect the region’s rich biodiversity.

THE PURPOSE OF THIS REPORT

The SWIO and NMC regions face many threats and pressures from human development activities – those receiving the most funding also being the ones that carry dire ocean-related risks. These activities may pose direct threats to marine ecosystems, especially areas with significant biodiversity-related features.

This report aims to provide insights on the extent and location of sector-specific threats to marine biodiversity in SWIO and the NMC, with a focus on three growing ocean sectors: industrial fishing; shipping; and the oil and gas industries.

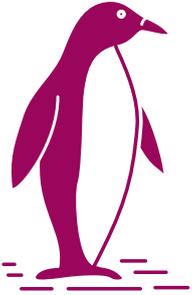


The SWIO region is a hub for oil and gas extraction, with several active operations in Tanzania, Madagascar and Mozambique.

BOX 2

OIL SPILLS: A COMMON THREAT

Oil spills are a prominent, indirect threat to biodiversity that can be caused by vessels (collisions/groundings or leaks, especially from tankers) as well as oil and gas concessions (blowouts, pipeline leaks or drilling operations). The South West Indian Ocean (SWIO) region's vulnerability to oil spills has been acknowledged by various organizations, including the International Maritime Organization. The Mozambique Channel is particularly susceptible, as it is a crucial shipping route that faces heightened risks due to unpredictable weather, vessel discharges and port activities. Major ports, such as Mombasa in Kenya, also add to the region's risk. Notable spills include Katina P (Mozambique, 1992), Gulser Ana (Madagascar, 2009) and MV Wakashio (Mauritius, 2020), all of which released oil into the surrounding waters, causing irreparable damage to marine biodiversity. South Africa has recorded 36 oil spills since 1968, of which 13 have impacted seabirds.



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PREPAREDNESS AMONG SWIO COUNTRIES

While the region is increasingly exposed to offshore oil and gas activities, the legal and institutional frameworks governing oil spill response remain uneven across SWIO countries. There is limited visibility on whether states have ratified key instruments such as the International Convention on Oil Pollution Preparedness, Response and Co-operation or Annex I of the International Convention for the Prevention of Pollution from Ships, or how these are domesticated and implemented. Moreover, current frameworks appear weak in establishing liability for transboundary pollution or addressing compensation for impacted fisheries.

EFFECTS ON MARINE BIODIVERSITY

Seabirds are the most susceptible to oil spills, as their feathers readily absorb oil, causing them to lose insulation, waterproofing and buoyancy. Seabirds may also ingest the oil when preening, which can lead to internal organ damage and death. The fur coats of marine mammals are similarly affected, in that it compromises their insulation and mobility. Oil also irritates the eyes and mucous membranes of marine animals – including dolphins, whales and marine turtles – and can be accidentally ingested depending on how they feed or breathe. On a larger scale, the widespread harmful impact of oil on most marine organisms means that spills may cause adverse cascading effects that can disrupt entire ecosystems.

To date, only South Africa and Kenya have taken steps to address oiled wildlife response, including contingency plans, trained personnel, and equipment stockpiles. Other SWIO countries lack national response frameworks, facilities and trained responders, leaving their wildlife highly vulnerable to oil spills.

SANCCOB: AN OILED WILDLIFE RESPONSE CASE STUDY

SANCCOB (Southern African Foundation for the Conservation of Coastal Birds) plays a vital role in South Africa's oiled wildlife response, especially considering the country's high risk of oil spills along its extensive coastline and the threats it poses to seabirds like the endangered African Penguin. Legally mandated by the South African government, SANCCOB focuses on oil spill preparedness and response, as well as protecting species of conservation value. It contributes to contingency planning, training, and ensuring that the state and blue industries understand marine biodiversity risks. Additionally, SANCCOB is part of the Global Oiled Wildlife Response System (GOWRS), a network of ten international organizations dedicated to professional oil spill response. Since 2022, GOWRS has operated under Oil Spill Response Limited's Service Level Agreement, providing a 24/7 rapid assessment team for wildlife emergencies worldwide, and is available to support oil spill preparedness and response in the SWIO region.

METHODOLOGY

This study employed GIS-based spatial analyses using WWF-SIGHT – a platform developed by WWF – to determine the location of sector-specific threats to marine biodiversity within the area of analysis.

The area of analysis included the following spatial layers:

- The WWF South West Indian Ocean (WWF-SWIO) Regional Programme focus region
- The Northern Mozambique Channel
- EEZs of relevant SWIO countries (Flanders Marine Institute 2023).

The marine biodiversity of SWIO and the NMC was mapped using the spatial layers of several biodiversity-related features. These features included important biodiversity areas, protected areas, heritage sites and critical marine habitats (Table 1).

Table 1. Biodiversity features layers on WWF-SIGHT

Biodiversity feature layer	Source
Marine protected areas and UNESCO World Heritage Sites	UNEP-WCMC and IUCN (2024)
Key biodiversity areas	BirdLife International (2023)
Ecologically or biologically significant marine areas	Convention on Biological Diversity (2016)
Important marine mammal areas	IUCN-MMPATF (2019)
Mangrove ecosystems	Global Mangrove Watch; Bunting et al. (2022)
Seagrass beds distribution	UNEP-WCMC and Short (2021)
Coral reef distribution	UNEP-WCMC, WorldFish Centre, WRI and TNC (2021)

The analyses overlaid the spatial layers of three sectors’ activities (or “development assets”) (Table 2 on page 14) onto the layers of areas with biodiversity-related features to identify “threats” to marine ecosystems – areas where a development asset activity overlapped with a biodiversity feature. Shipping and fisheries vessel activities were based on automatic identification system (AIS) tracking data. Specifically, this study used the global shipping density layer, which was created using the International Monetary Fund’s analysis of hourly AIS positions from January 2015 to February 2021.¹ Another assessment included under industrial fisheries was potential illegal, unreported or unregulated (IUU) fishing, which was inferred from AIS Disabling Events density – IUU vessels deliberately turning off their AIS transponders to avoid detection. Oil and gas block data was sourced from Enverus (2024).

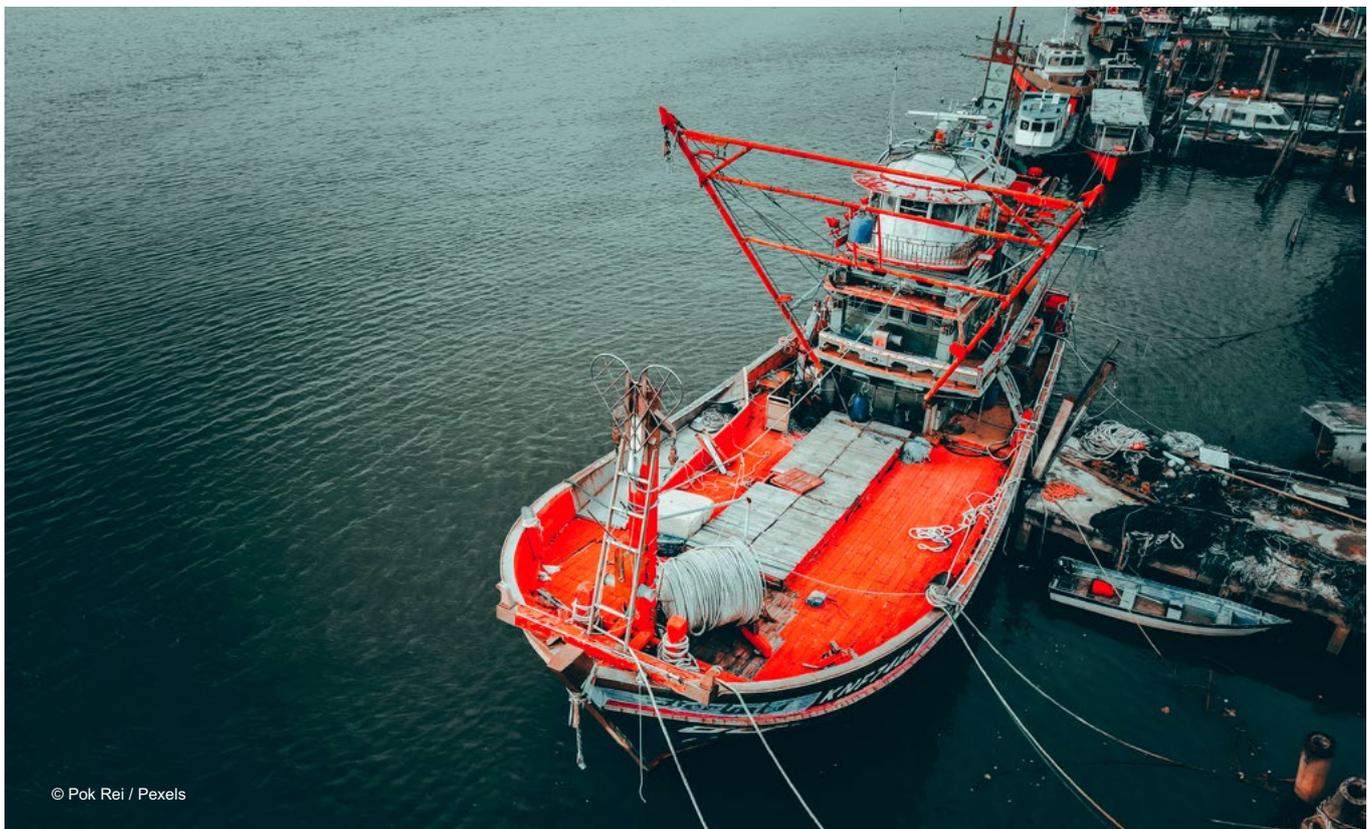
¹The data represents the total number of AIS positions reported by ships within each grid cell of dimensions 0.005° x 0.005°, which is approximately a 500 m x 500 m grid at the equator.

Table 2. Development assets layers on WWF-SIGHT

Development asset layer	Definition	Source
Industrial fisheries	Automatic identification system (AIS) tracking of fishing vessels AIS Disabling Events density as a proxy for illegal, unreported and unregulated fishing.	Cerdeiro et al. (2020) Welch et al. (2022) via Global Fishing Watch
Shipping	Vessel AIS positions per category (commercial, fishing, leisure, oil and gas, and passenger).	Cerdeiro et al. (2020)
Oil and gas	Oil and gas blocks, including: <ul style="list-style-type: none"> • Open (for exploration) • Under application/negotiation • Awarded contracts • Force majeure (operations are suspended due to legal, political or technical challenges). 	Enverus (2024)

This spatially explicit approach enabled the identification of sector-specific pressures on ecologically significant marine environments, highlighting potential risks and supporting conservation and sustainable development strategies. In cases where no direct overlap occurred, the study assumed a marginal or negligible threat.

Based on the results, several recommendations were provided to address the identified threats. Indirect impacts may extend beyond designated boundaries to affect sensitive habitats and species. These impacts – which include oil spills and noise pollution from oil and gas exploration, surveys or shipping, as well as cumulative pressures from industrial activities – were also considered in the recommendations.



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AREA OF ANALYSIS

SOUTH WEST INDIAN OCEAN

In this report, the SWIO region is described as including all countries bordering the region, specifically African nations and small island developing states located south of the equator and west of 60 degrees East (Figure 1 on page 16). These include France (Réunion and Mayotte), Kenya, Madagascar, Mauritius, Mozambique, Seychelles, the Union of Comoros, Tanzania and South Africa. The SWIO region encompasses the EEZs of these nine countries, except for South Africa, where the boundary is limited to 18 degrees East (at Cape Point), and France, where only the Indian Ocean territories are included. This region features a total coverage of 24.5 million square kilometres (km²).



The NMC occupies about **4.2%** of SWIO's **24.5 million** square kilometres.

NORTHERN MOZAMBIQUE CHANNEL

According to the Western Indian Ocean Consortium and the Nairobi Convention, the NMC region includes the marine areas between the southern part of the Tanzania and northern part of Mozambique, Northwest Madagascar, the Union of Comoros, Mayotte and the southern extent of the Seychelles EEZ (Figure 1). The region includes key Contracting Parties of the Nairobi Convention, which came into force in 1996 under the United Nations Environment Programme (UNEP) Regional Seas Programme. The total area of the NMC is 1 018 324 km², representing 4.2% of the SWIO region.

EXCLUSIVE ECONOMIC ZONES

As shown in Table 3 on page 16, the SWIO region encompasses a vast 6 676 607 km² of EEZs, with Mauritius (1 278 212 km²) and Seychelles (1 341 481 km²) holding the largest marine jurisdictions. The NMC is primarily shared by Madagascar (27.2%), Mozambique (19.6%) and Seychelles (13.1%), making these nations key stakeholders in the region's marine conservation and resource management. France maintains administrative authority over territories in the Indian Ocean, such as Mayotte and Juan de Nova Island, although these are subject to sovereignty claims by the Union of Comoros and Madagascar, respectively.² South Africa has an EEZ of 1 072 708 km², but only 753 012 km² (3.1%) falls within the SWIO, indicating that a significant portion of its maritime jurisdiction lies outside this region.

² France exercises administrative authority over Mayotte and Juan de Nova Island, which are integrated into French overseas territories. However, sovereignty over Mayotte is claimed by the Union of the Comoros, and Madagascar claims sovereignty over Juan de Nova Island. These overlapping claims are acknowledged by the United Nations. References to these areas in this report do not imply a position on their legal status.

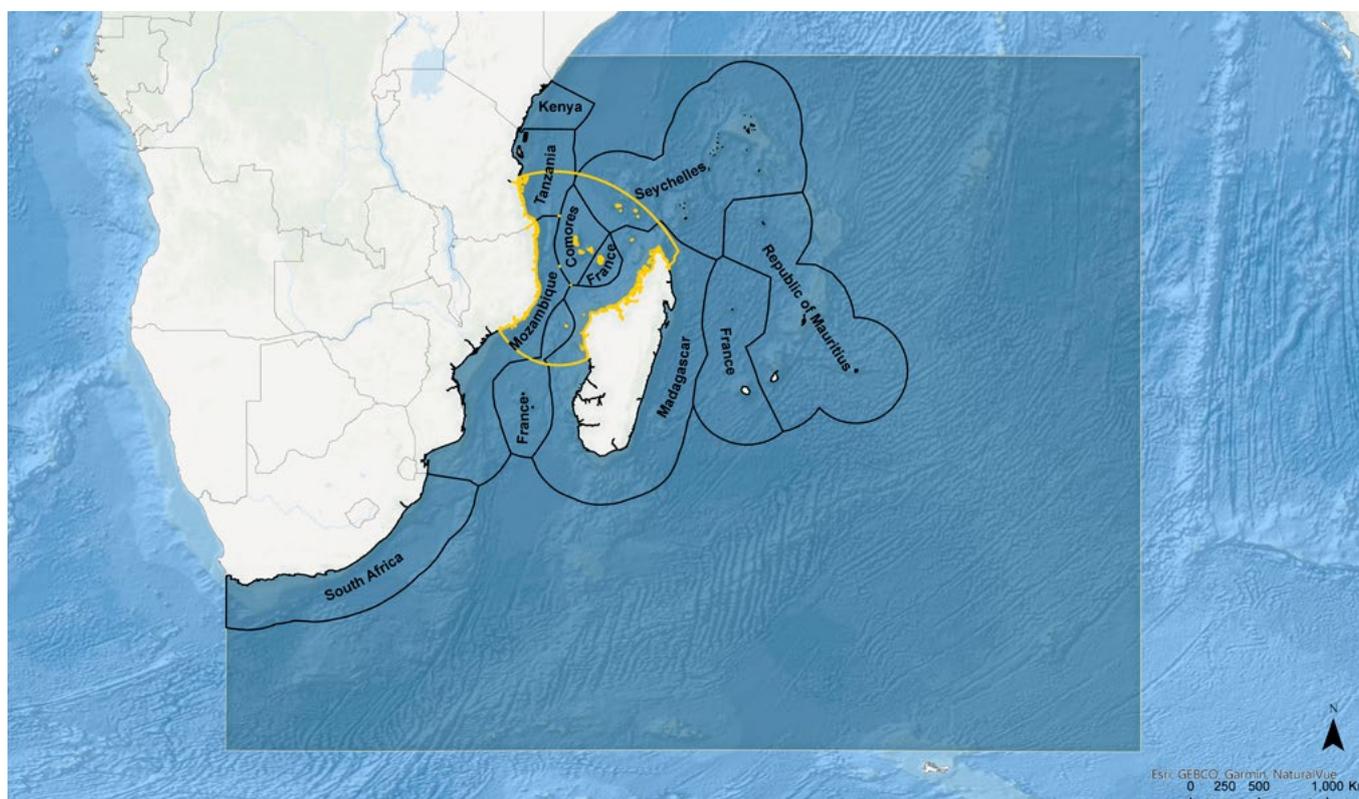
Table 3: Exclusive economic zones (EEZs) within the SWIO and NMC regions

Country	Total EEZ area (km ²)	EEZ area within SWIO area (km ²)	% EEZ within SWIO area	EEZ area within NMC area (km ²)	% EEZ area within NMC area
Comoros	164 469	164 469	0.67%	164 469*	16.2%*
France	967 906	967 906	3.95%	132 282*	13.1%*
Kenya	123 961	123 961	0.51%	0	0.0%
Madagascar	1 239 710	1 239 710	5.06%	276 478*	27.2%*
Mozambique	566 277	566 277	2.31%	199 180*	19.6%*
Republic of Mauritius	1 278 212*	1 278 212*	5.22%*	0	0.0%
Seychelles	1 341 481*	1 341 481*	5.47%*	137 915*	13.5%*
South Africa	1 072 708	753 012	3.07%	0	0.0%
Tanzania	241 580	241 580	0.99%	107 644	10.6%
TOTAL	6 996 303	6 676 607	27.24%	1 017 968	100.0%

* Significant results

Source: See Table 1 on page 13 and Table 2 on page 14.

Figure 1: Area of analysis, with the delineations of the SWIO and NMC regions and the country exclusive economic zones



Legend

- SWIO Area of Analysis
- Northern Mozambique Channel
- Exclusive Economic Zones by Country

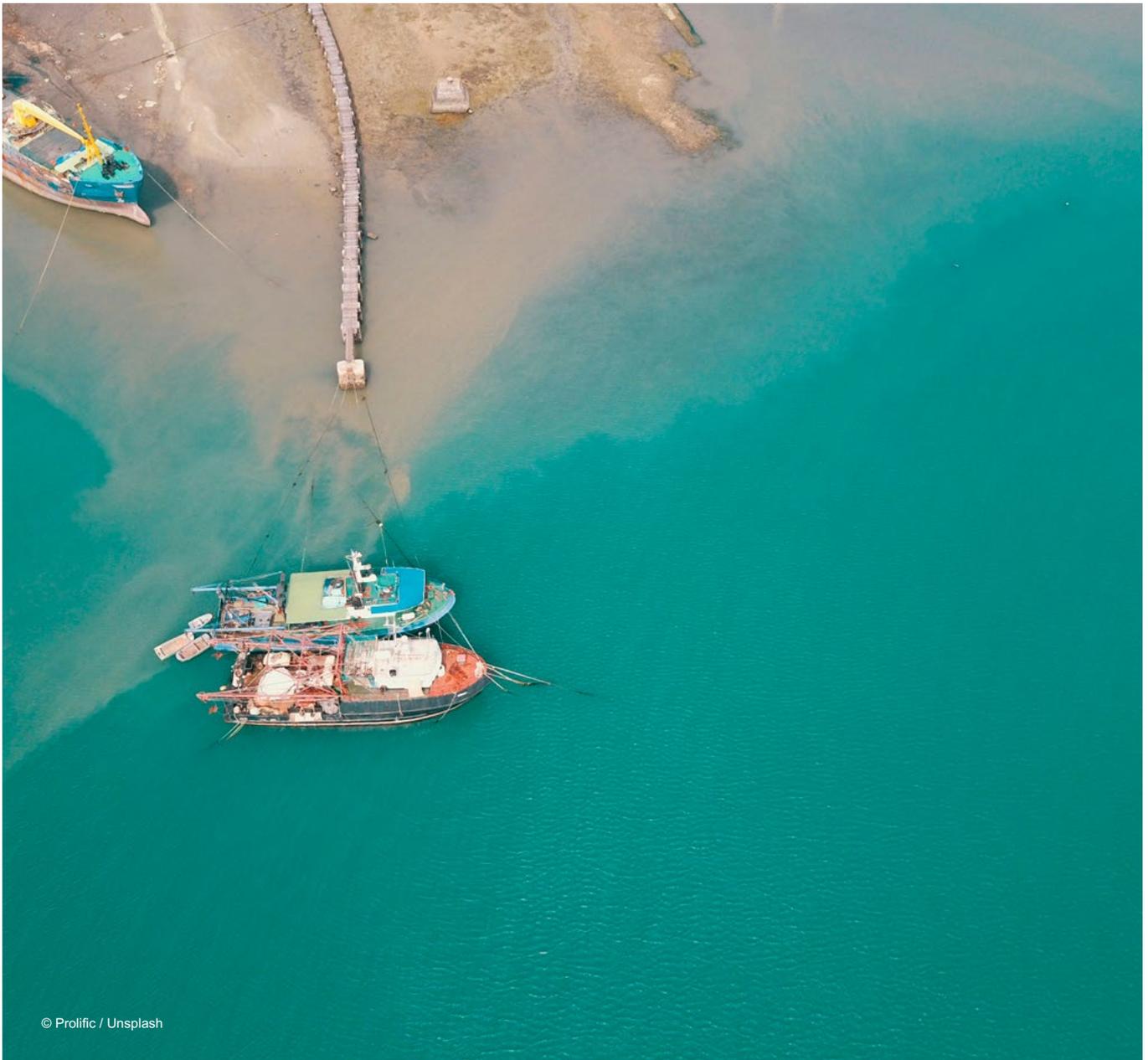
Data from: WRI, IUCN, World Bank, AIM, S&P Global Market Intelligence, Copyright Enverus, Inc., Basile, WWF-SGHT. Map created by Pablo Izquierdo, WWF-Norway, 2025.

* Boundaries and names shown on this map do not imply official endorsement or any position taken by WWF or its partners.

DATA LIMITATIONS

The spatial overlap between development assets and biodiversity features does not quantify impact severity (including intensity and frequency) and does not consider seasonality. However, an overlap would indicate a potential risk to biodiversity features. Data gaps may persist, as national datasets on environmental and development assets may be incomplete or outdated. For example, the World Database on Protected Areas may not consistently reflect the latest marine protected areas (MPAs) within a country. Temporal misalignment between oil and gas, shipping or fisheries data and the designation of biodiversity features could further affect risk assessments. While the environmental dataset is robust, it does not encompass all ecologically significant areas, and certain critical ecosystems may fail to meet designation criteria.

The selection of sectors assessed in this report does not represent the full suite of industrial activities that may pose risks to SWIO's biodiversity, as interest in marine mineral resources extends beyond offshore oil and gas to the deep sea, where known reserves of polymetallic sulphides, nodules and ferromanganese crusts contain valuable minerals such as platinum, gold, diamonds, nickel, titanium, copper, molybdenum and other rare earth metals. Although seabed mining is not part of this assessment, recognizing and mitigating the potential impacts of the industries in this report is essential to preserving the region's marine heritage and ensuring sustainable development.

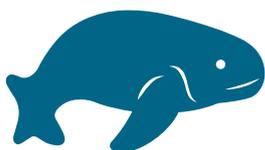


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MARINE BIODIVERSITY AND SECTORAL THREATS

The South West Indian Ocean and Northern Mozambique Channel host a variety of important biodiversity areas, protected areas and critical marine habitats that are overlapped by environmentally intensive sectoral activities.

BIODIVERSITY FEATURES



Only
0.05%
of SWIO and
0.30%
of the Northern
Mozambique
Channel
are currently
under strict
protections.

The distributions and coverage of the biodiversity features in SWIO and the NMC are illustrated in Figure 2 on page 19 and provided in Table 4 on page 20. (See also Annex 1 for supplementary data.)

Both regions contain large areas of important biodiversity, highlighting their immense natural value. The highest coverage is observed in EBSAs, which encompass 37.9% of SWIO and 92.4% of the NMC, alongside important marine mammal areas (IMMAs) covering 14.2% and 30.1%, respectively. While occupying relatively smaller areas, the regions' critical marine habitats – mangroves, seagrass beds and coral reefs – provide crucial ecosystem services along the coast, where they are primarily distributed.

When it comes to MPAs, strictly protected zones – International Union for Conservation of Nature (IUCN) Categories Ia, Ib or II – remain extremely limited.³ Although 21 strict MPAs and 5 strict MPAs are found in SWIO and the NMC, these areas cover less than 0.05% (4 822 km²) and 0.30% (2 831 km²) of the regions, respectively.

By contrast, less strict MPAs (Categories IV, V and VI) dominate in the SWIO and NMC regions (5.2% and 12.1%, respectively). In particular, the SWIO region contains 61 Category

IV, V and VI MPAs, and NMC, 26. This reflects a preference for a management approach targeting large sustainable management areas with a focus on protecting particular species or habitats rather than full seascape protection.

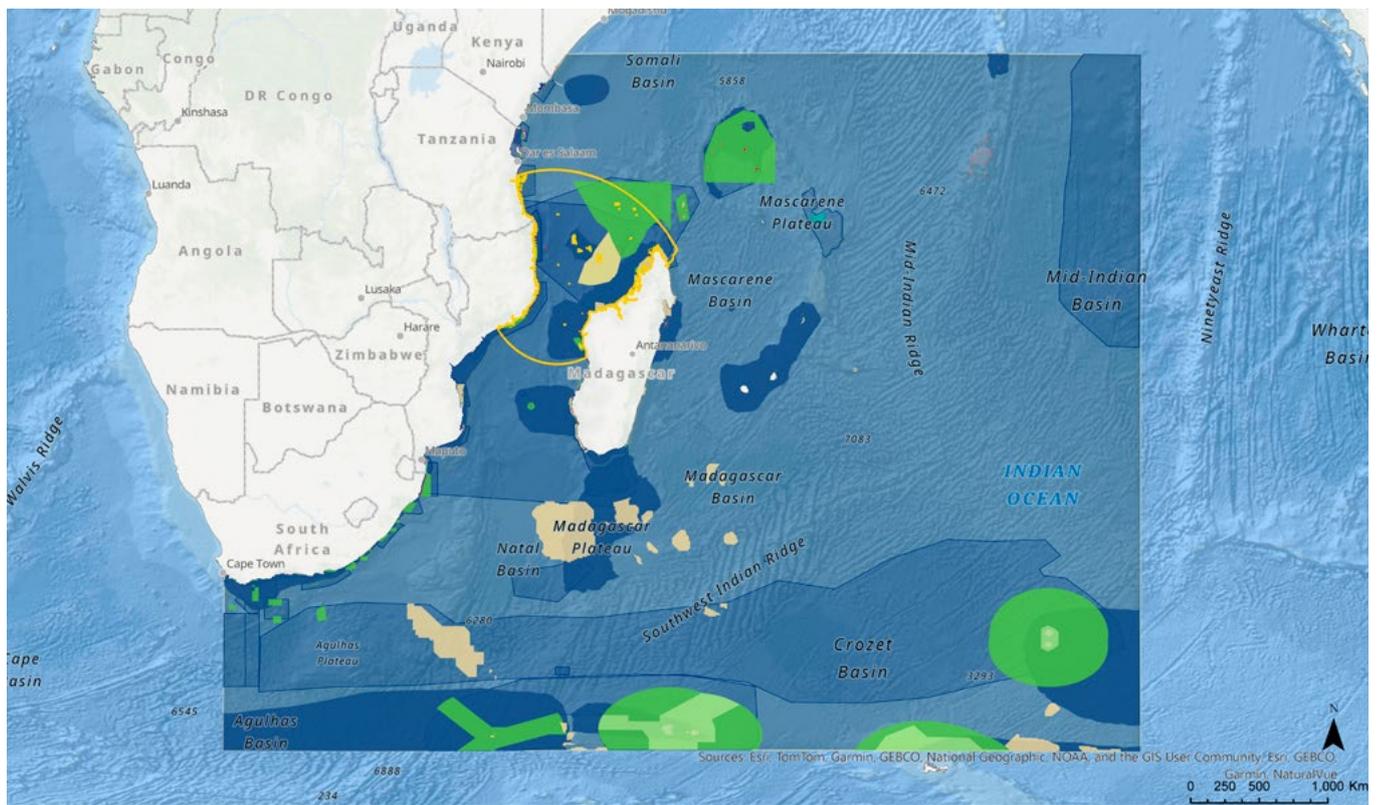
Additionally, a significant proportion of protected areas falls under unclassified or “Other” categories in SWIO (269 areas; 2.7%) and NMC (11 areas; 13.4%), suggesting inconsistencies in classification. Key biodiversity areas (KBAs) are more extensive in SWIO (2.2%) but represent a higher proportion of NMC (8.7%), highlighting the subregion's critical conservation priorities and the lack of protection of sites needed to deliver long-term conservation outcomes.

Overall, while large marine areas are recognized for their biodiversity importance, the extent of strict protection remains minimal, and classification gaps may challenge effective conservation planning.



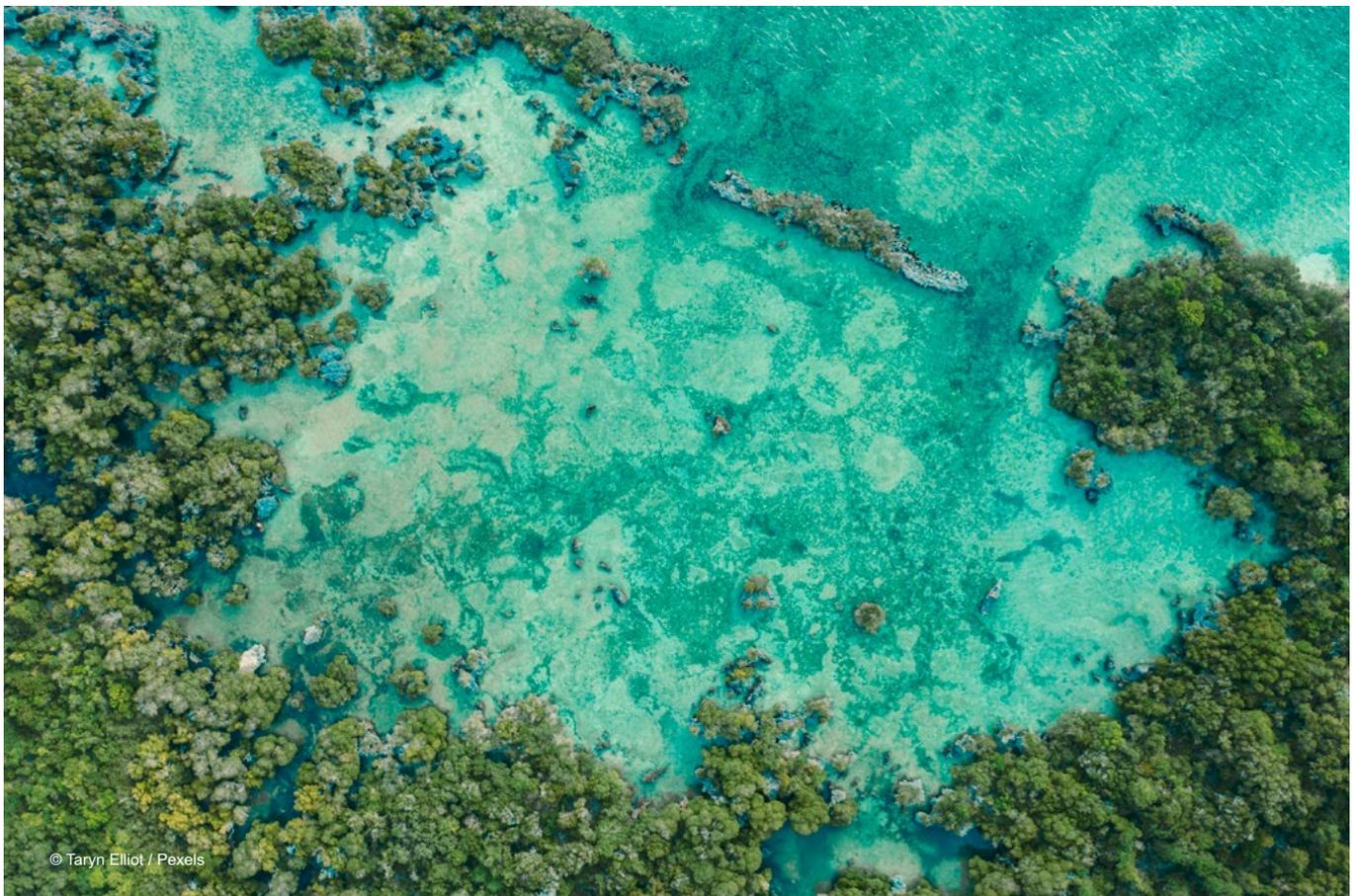
³The IUCN has developed guidelines that categorize MPAs based on their primary stated management objective. These categories place different restrictions on marine activities, with some (Categories Ia, Ib, II and III) stricter than others (Categories IV, V and VI) (IUCN 2012).

Figure 2: Biodiversity features within the SWIO and NMC regions



- Legend**
- SWIO Area of Analysis
 - World Database on Protected Areas
 - UNESCO World Heritage Sites
 - Northern Mozambique Channel
 - Ecologically or Biologically Significant Marine Areas (EBSAs)
 - Important Marine Mammal Areas (IMMAs)
 - Seagrasses
 - Coral Reef 2021
 - Key Biodiversity Areas
 - Global Mangrove Watch 2020

Data from: WRI, IUCN, World Bank, AIM, S&P Global Market Intelligence, Copyright Esri, Inc., Bentley, WWF-SIGHT. Map created by Pablo Izquierdo, WWF-Norway, 2025.



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Table 4. Biodiversity features in the SWIO and NMC regions

Biodiversity feature	SWIO			NMC		
	Number of areas	Area (km ²)	% of SWIO	Number of areas	Area (km ²)	% of NMC
International Union for Conservation of Nature (IUCN) Category Ia	4	2 418	0.01%	1	2 417	0.24%
IUCN Category Ib	1	0	0.00%	0	0	0.00%
IUCN Category II	16	2 404	0.01%	4	414	0.04%
IUCN Category III	0	0	0.00%	0	0	0.00%
IUCN Category IV	35	1 184 331	4.83%	15	43 515	4.27%
IUCN Category V	9	79 743	0.33%	8	78 893	7.75%
IUCN Category VI	17	2,018	0.01%	3	895	0.09%
Other (not reported / not applicable)	269	653 800	2.67%	111	136 634	13.42%
UNESCO Natural and Mixed World Heritage Sites	5	1 057	0.00%	1	2	0.00%
Key biodiversity areas	277	539 044	2.20%	63	88 416	8.68%
Ecologically or biologically significant marine areas	36	9 288 741	37.90%*	7	940 544	92.36%*
Important marine mammal areas	26	3 481 999	14.21%*	5	306 429	30.09%*
Mangrove forests	N/A	174	0.00%	N/A	99	0.01%
Seagrass beds	N/A	15 883	0.06%	N/A	5 652	0.56%
Coral reefs	N/A	10 001	0.04%	N/A	4 132	0.41%

* Significant results

Source: Table 1 on page 13 and Table 2 on page 14.

INDUSTRIAL FISHERIES

The SWIO region recorded more than 9 billion AIS positions between 2015 and 2021, compared to just 16 443 637 positions recorded in the NMC. In relative terms, the SWIO region also experienced a far higher density of fishing vessels (369.76 AIS positions per km²) compared to the NMC (16.15 AIS positions per km²; see Table 8 on page 27). The resulting AIS data – which reflects only a subset of industrial and larger-scale vessels – suggests that industrial fishing is much more prominent in the SWIO region. The higher number of fishing vessels in SWIO indicates a greater strain on marine resources, with potential

implications for overfishing, bycatch of ETP species and habitat degradation.

The relatively low traffic of large-scale fishing vessels in the NMC may indicate the region's importance for artisanal or small-scale fisheries along the region's coastline. These fisheries operate without AIS or vessel monitoring systems (VMSs), and their activity level and density in the SWIO and NMC regions' EEZs and nearshore areas are not captured in the results of the analysis. Despite being largely underreported, the impact of artisanal fisheries and small-scale fisheries is not negligible. According to the IOTC's 2023 nominal catch data, 94% of yearly catches in SWIO are made by artisanal fleets. This discrepancy in yearly catch is particularly notable in the NMC countries: Tanzania, Mozambique and Madagascar (WWF 2024).

The SWIO region also recorded significantly more AIS Disabling Events (4 890 events in total) than the NMC (89 events). Thus, the NMC accounted for 0.01% of the total AIS Disabling Events in SWIO, which is lower than expected given the region's high biodiversity, importance for fisheries, and ongoing offshore oil and gas activities. This difference could suggest lower overall activity of large-scale or industrial vessels in the NMC compared to the broader SWIO region.

THREATS IN THE SWIO AND NMC REGIONS

FISHING ACTIVITY AND DENSITY (BASED ON AIS POSITION TRACKING)

The AIS tracking analysis revealed that fishing vessel activity in SWIO is relatively low across most biodiversity features, with IMMAs (528 AIS/km²) and EBSAs (853 AIS/km²) showing the highest density (see Annex 2, Table A2.1). In the NMC region, fishing activity is almost non-existent across all protected areas, suggesting strong enforcement or low fishing pressure (Table 2A.2). While these results might suggest that the NMC experiences lower fishing pressure or that MPAs are more strictly enforced than in SWIO, it is important to note that the AIS data do not reflect the activity of artisanal or small-scale fisheries – the main type of fishing observed



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in the NMC region. As previously discussed, compared to industrial and large-scale fisheries, the smaller fishing boats operating in the region's coastal areas do not use AIS or VMS and are consequently underreported.

Fishing vessel density appeared significantly lower than that of commercial shipping, raising concerns about potential IUU fishing. In addition to regulated artisanal fisheries and small-scale fisheries that do not use AIS, IUU fishing has impacts on marine mammals and critical biodiversity zones that are not reflected in these results. Given the ecological importance of these areas, stricter enforcement of existing fishing restrictions and stronger fishing regulations more broadly may be necessary to minimize risks.

ILLEGAL, UNREPORTED AND UNREGULATED FISHING ACTIVITY

The overlap between AIS Disabling Events and biodiversity features was significantly greater in SWIO than in the NMC, with the highest densities in EBSAs (SWIO: 892; NMC: 68) and IMMAs (SWIO: 319; NMC: 18) (Figure 3 and Table 5 on page 22). These globally significant conservation zones appear to be major target areas for illegal activities.

AIS Disabling Events density differed among MPAs based on their location and IUCN Categories. Category IV MPAs recorded 17 events in SWIO and 2 in NMC, indicating potential differences in enforcement or illegal fishing pressure in the regions, while Category V areas had minimal activity (3 in SWIO; 0 in NMC), likely due to higher human presence and regulation. Unregulated or weakly managed areas ("Other") saw 139 AIS Disabling Events in SWIO and 29 in NMC, reflecting higher risks in regions with less enforcement. KBAs also showed disparities between the regions (SWIO: 88; NMC: 3), suggesting either stronger enforcement or underreporting in NMC. Meanwhile, seagrass ecosystems had only two recorded events (SWIO: 2; NMC: 0), and no events were reported in mangrove or coral reef areas, possibly due to shallow waters.



SWIO saw a greater overlap between IUU fishing and biodiversity than the NMC, especially in EBSAs and IMMAs.

Figure 3. AIS Disabling Events density in the SWIO region

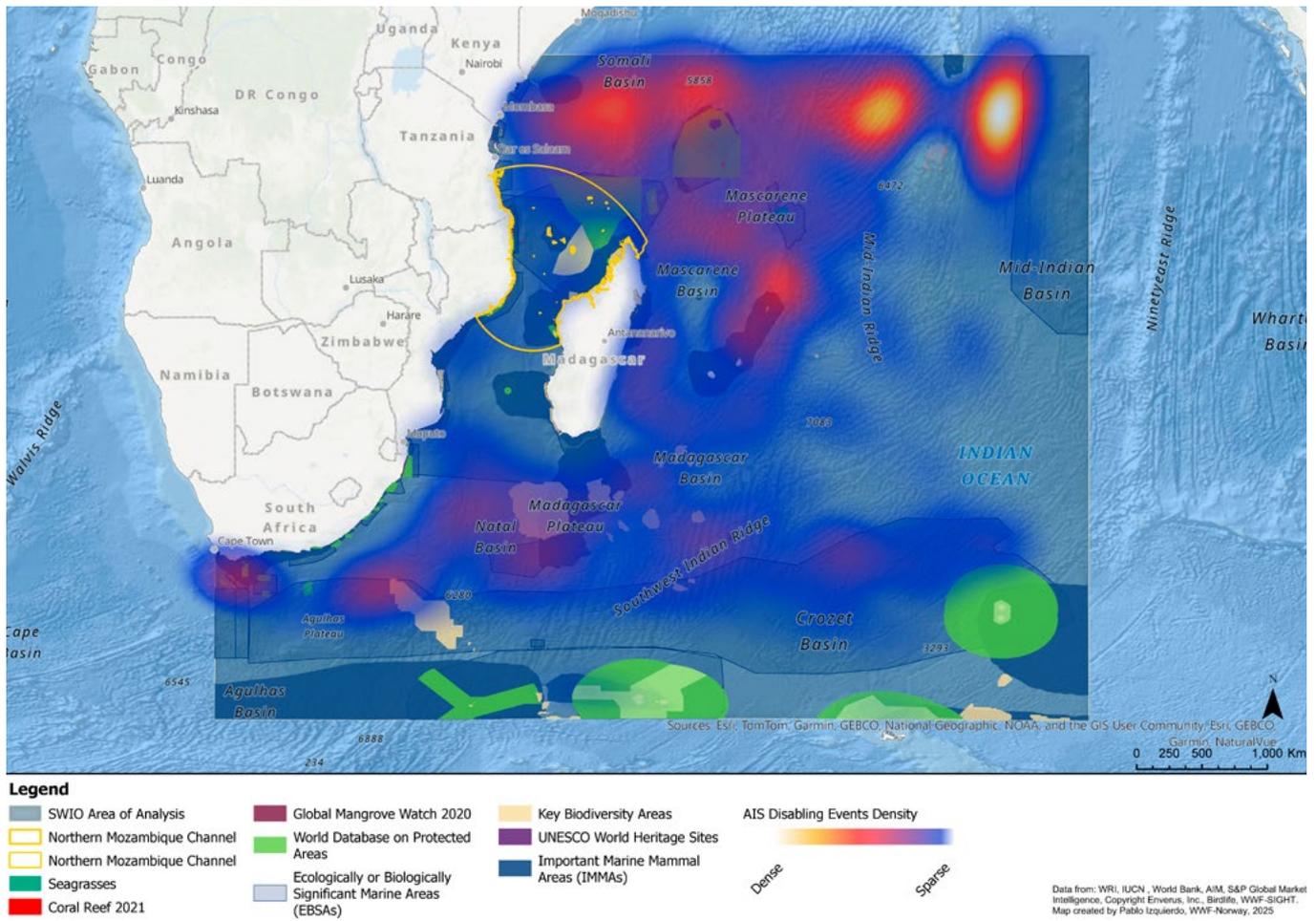


Table 5. AIS Disabling Events in the SWIO and NMC regions

Biodiversity feature	Number of areas	Area (km ²)	Number of AIS Disabling Events	
			SWIO	NMC
IUCN Category IV	35	1 184 331	17	2
IUCN Category V	9	79 743	3	0
Other (not reported / not applicable)	269	653 800	139	29*
Key biodiversity areas	277	539 044	88	3
Ecologically or biologically significant marine areas	36	9 288 741	892*	68*
Important marine mammal areas	26	3 481 999	319*	18
Seagrass beds	N/A	15 883	2	0

Note: AIS Disabling Events cannot be summed, seeing as biodiversity features overlap with each other, which could lead to double counting.

Source: Table 1 on page 13 and Table 2 on page 14.

OIL AND GAS

The spatial analysis of oil and gas sectoral activities revealed that, while a significant portion of the SWIO region remains open for oil and gas exploration (16.3%), these “open blocks” dominate even more substantially in the NMC, covering 74.6% of the region (Table 6; Figure 4 on page 24). This suggests that the NMC remains a major frontier for potential hydrocarbon development, with a high level of availability for future investments.

Blocks under application and negotiation are minimal in both regions, accounting for only 0.5% of SWIO and 5.3% of the NMC, indicating limited ongoing application and negotiation efforts at present.

Awarded contracts cover 1.5% of SWIO and 5.8% of the NMC, suggesting that while licensed activities are relatively low in SWIO, the NMC has a higher concentration of active developments relative to its total area. These areas are already (or soon will be) under oil and gas exploration and/or production activities, underscoring the urgent need for integrated conservation and sustainable use strategies.

The presence of force majeure blocks – where operations are suspended due to legal, political or technical challenges – is negligible, with only 0.2% of SWIO and 0.1% of NMC affected. This implies that, while some operational constraints exist, they do not significantly impede exploration across either region.

The results indicate that the NMC has a much higher proportion of open acreage available for oil and gas activities than SWIO, with relatively more awarded contracts and applications in progress, potentially positioning it as a more active hub for future hydrocarbon developments.

Table 6: Oil and gas blocks in the SWIO and NMC regions

Status	SWIO			NMC		
	Number of blocks	Area (km ²)	% of the total SWIO area	Number of blocks	Area (km ²)	% of the total NMC area
Open	1 694	4 003 385*	16.3%*	488	759 190*	74.6%*
Under application / negotiation	10	125 004	0.5%	7	53 725	5.3%
Awarded contract	63	356 112	1.5%	31	59 409	5.8%
Force majeure	4	37 122	0.2	1	1 420	0.1%

* Significant results

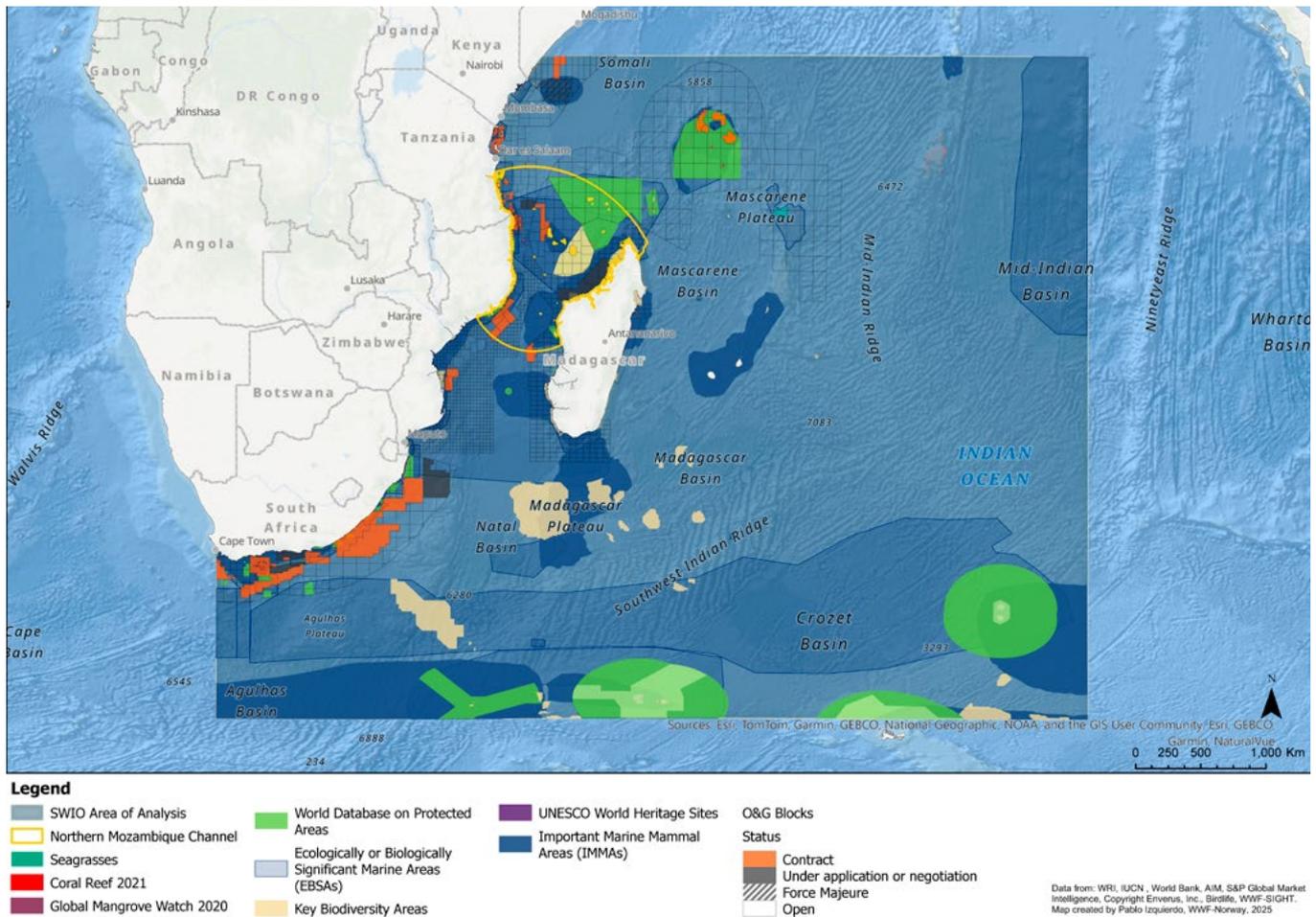
Source: Table 1 on page 13 and Table 2 on page 14.

THREATS IN THE SWIO REGION

The analysis found that oil and gas activities pose significant threats to biodiversity features in the SWIO region, particularly in areas currently classified as open for exploration (Figure 4 on page 24). For instance, strictly protected areas (MPAs with IUCN Category Ia or Category Ib) face near-total overlap with open blocks (99.9% to 100%), while UNESCO (United Nations Educational, Scientific and Cultural Organization) World Heritage Sites (80.9% overlap) and IUCN Category VI MPAs (67.4% overlap) are also highly vulnerable. EBSAs are the most potentially at risk in absolute terms, with over 1.7 million km² overlapped by open blocks. KBAs and IMMAs are also affected, with moderate but concerning overlaps with open blocks (5.7% and 16.6%, respectively), signalling potential threats to biodiversity and endangered species. (See Annex 3, Table A3.1 for detail.)

Large portions of critical marine ecosystems are overlapped by open blocks. Mangroves (90.5% overlap), seagrass beds (43.3%) and coral reefs (59.4%) are particularly vulnerable to oil and gas activities, as it could lead to habitat destruction, pollution and significant biodiversity loss. Coral reefs could experience notable impacts, with nearly 10% of their total area overlapped by areas with active oil and gas contracts. Although few of these areas currently have active oil and gas contracts, the prevalence of open blocks suggests future risks if exploration advances unchecked.

Figure 4. Oil and gas blocks in the SWIO region



THREATS IN THE NMC REGION

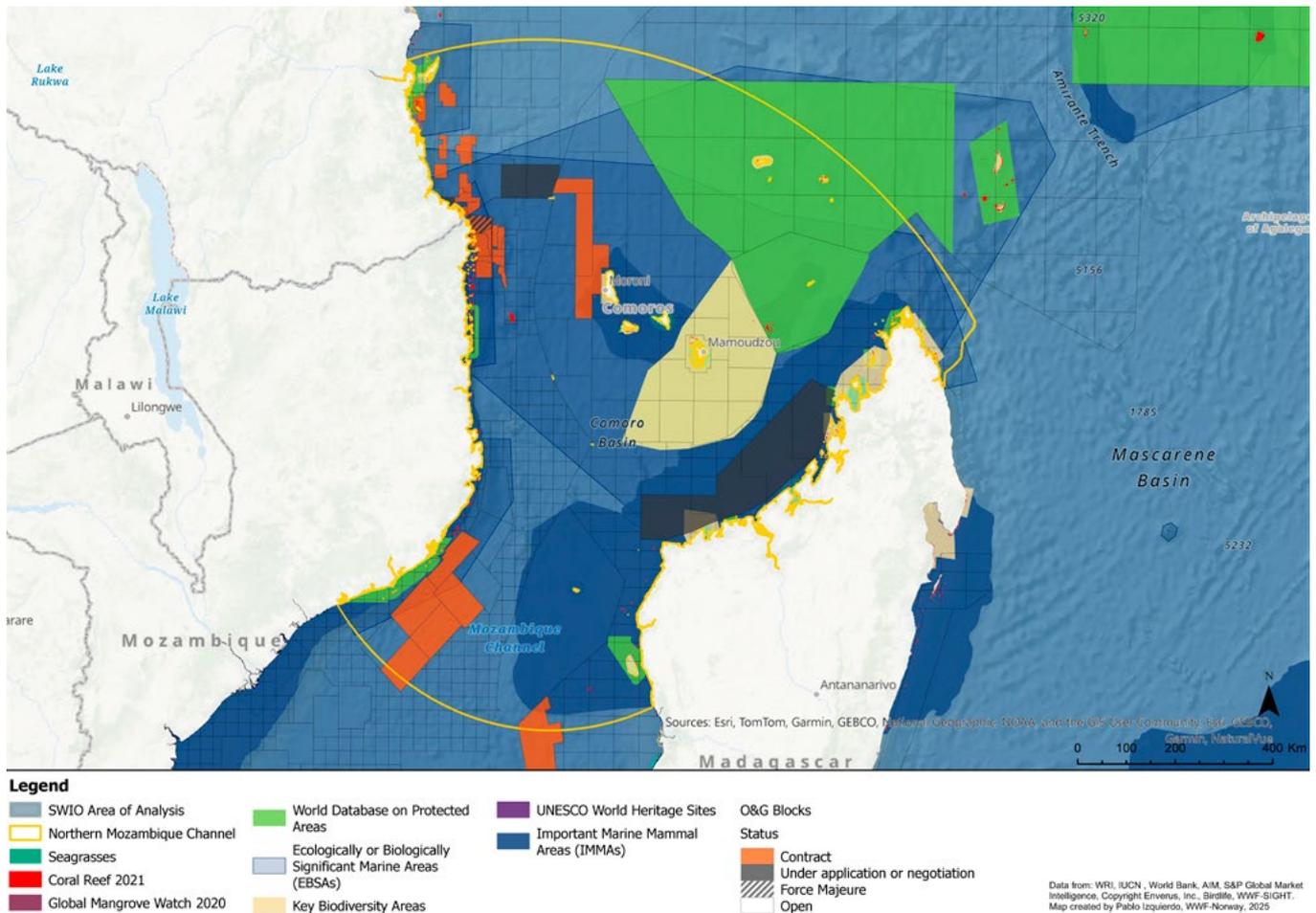
There is significant overlap between oil and gas activities and biodiversity features in the NMC (Figure 5). IUCN Category Ia protected areas within the NMC are completely overlapped with open blocks, leaving them fully exposed to future oil and gas exploration. UNESCO World Heritage Sites within NMC show large overlaps (80.9%) with open blocks, which indicates the alarming threats posed to globally recognized heritage. IUCN Category II protected areas face an 83.8% overlap with open blocks, while blocks under application or negotiation (15.2%) and blocks with awarded contracts (0.02%) remain relatively low, indicating that while exploration is extensive, active extraction is limited. In contrast, about 20.7% of IUCN Category VI protected areas – which allow for sustainable use – overlap with active oil and gas contracts, with most of the remaining area (77.7%) open for exploration. (See Annex 3, Table A3.2 for detail.)

Among the areas of biodiversity conservation significance, EBSAs face the greatest pressure, with 65.5% overlapped by areas open to oil and gas exploration and 6.1% by contracted oil and gas operations. IMMAs show 47.3% overlap with open blocks, and while contracted activities currently only affect 1.33%, blocks under application/negotiation cover 14.85%, signalling future risks of active oil and gas operations. Open blocks overlap with 17.73% of KBAs, but

contracted oil and gas operation coverage is low (0.35%), suggesting a window for conservation efforts.

Coastal ecosystems are highly vulnerable, with significant overlaps between open blocks and mangrove forests (92.41%), seagrass beds (54.57%) and coral reefs (73.57%). Contracted oil and gas activities impact 5.2% of mangrove forests, 2.7% of seagrass beds and 10.1% of coral reefs. These figures underscore the urgent need for conservation measures to mitigate escalating environmental risks.

Figure 5. Oil and gas blocks in the NMC region



THREATS PER COUNTRY

In multiple countries, large portions of EBSAs, IMMAs and KBAs are affected by open, under-application/negotiation and contracted oil and gas blocks, which could present significant environmental challenges. Although open blocks represent the highest overlap with biodiversity features, especially in the EEZs of NMC countries, these blocks have not yet been awarded, and there is still an opportunity for conservation action. Under application/negotiation blocks are fewer but still show substantial overlap with EBSAs, KBAs and IMMAs. Awarded or contracted blocks involve active or near-active operations. This is the most concerning category, especially in Mozambique and Seychelles, where significant overlaps with conservation zones exist. While some nations show near-total overlap across multiple conservation categories, others have relatively lower levels of overlap with contracted oil and gas blocks but still significant exposure to open and under application/negotiation blocks. This may suggest different regulatory approaches or varying levels of consideration for conservation between the countries.

Several countries also show a near-total overlap between oil and gas blocks and IUCN-designated protected areas. For instance, 100% of IUCN Category II and VI areas in Kenya, Mozambique and Seychelles are overlapped by open oil and gas blocks. This trend suggests that even formally protected

areas are not immune to extractive industry pressures.

Marine ecosystems like seagrass beds, mangrove forests and coral reefs face considerable overlap with open blocks. Mozambique (92% coral reefs; 97% mangrove forests), Madagascar (82% coral reefs; 100% seagrass beds), and Seychelles (99.8% coral reefs) demonstrate particularly high levels of exposure. These countries stand to lose ecosystems that are critical for biodiversity, livelihoods, carbon sequestration and coastal protection.

Some of the open blocks in SWIO are currently in bidding rounds, which reflects the potential for near-future oil and gas exploration and exploitation, with direct implications for local marine ecosystems and conservation efforts. Bidding rounds suggest an imminent risk of industrial activity and associated environmental pressures.

Notably, Kenya stands out with 87% of its open blocks (99 938 km² across 21 blocks) currently in active bidding rounds (Table 7). This trajectory raises critical questions about how Kenya plans to reconcile its ambitions for expanding marine conservation and promoting a sustainable blue economy with the expansion of oil and gas operations. Similarly, countries like

Mozambique are receiving substantial investments for liquefied natural gas projects, highlighting the strong financial backing for oil and gas development in the region (Box 3).

Table 7. Percentage of open blocks in bidding rounds per country exclusive economic zone

Country	Open blocks		Bid rounds		
	Area (km ²)	Number of blocks	Area (km ²)	Number of blocks	Percentage
Comoros	144 883	30	-	-	-
France	-	-	-	-	-
Kenya	114 789	26	99 938	21	87%*
Madagascar	465 129	330	97 597	1	21%
Mozambique	491 553	752	66 897	12	14%
Republic of Mauritius	65 539	14	-	-	-
Seychelles	1 302 749	135	-	-	-
South Africa	442 209	126	71 509	2	16%
Tanzania	151 070	47	88 232	27	5%

* Significant results

Source: Table 1 on page 13 and Table 2 on page 14.

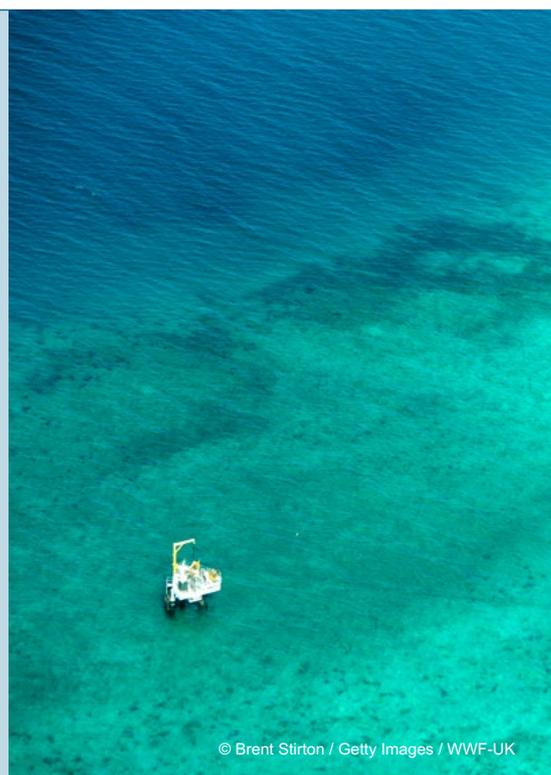
BOX 3

RESUMPTION OF MAJOR LIQUIFIED NATURAL GAS PROJECT IN MOZAMBIQUE

In March 2025, the United States Exim Bank approved a US\$5 billion loan to the French company TotalEnergies towards its US\$20 billion Mozambique Liquefied Natural Gas (LNG) Project in Cabo Delgado, Mozambique's northernmost province and the site of an ongoing conflict since 2017.

The Mozambique LNG Project was halted following the attacks on Palma in 2021 when TotalEnergies called force majeure due to security threats resulting from the conflicts.

The project's resumption could be critical for the revival of Mozambique's economy, which has faced ongoing challenges since 2015. At the same time, the prospective rapid growth of Mozambique's LNG sector may carry long-term costs for the country's marine ecosystem health and the livelihoods of coastal communities.



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SHIPPING

The analysis of shipping vessel density (AIS positions per km²) across different categories of activity (commercial, fishing, leisure, oil and gas, and passenger) revealed that traffic is dominated by commercial vessels in both SWIO and the NMC, followed by fishing in the SWIO region and leisure in the NMC region (Table 8).

Although the absolute number of AIS recordings for commercial shipping between 2015 and 2021 is much higher in SWIO (~7.4 trillion AIS positions recorded) than in the NMC (~558 billion AIS positions), the NMC shows almost twice the density of AIS positions per km² compared to SWIO region (Table 8).⁴ The high volume of commercial shipping activities in the SWIO region could be due to its strategic role in global maritime trade routes, linking the East African coast with the rest of the Indian Ocean and key international ports. The higher density in the NMC illustrates how most of the region is affected by shipping activity, and that commercial traffic is high and insufficiently managed. Specific routes should be further established to protect sensitive areas from the impact of shipping activities.

The absolute number of leisure vessels recorded is significantly higher in SWIO than in the NMC (likely due to the size difference), but leisure traffic density is again notably higher in the NMC (471.34 AIS positions/km²) than in SWIO (130.01 AIS positions/km²; Table 8). This could be attributed to the region's growing popularity as a destination for tourism. While leisure traffic has a less direct environmental impact, it could still pose considerable risks in ecologically sensitive areas such as MPAs or important habitats for marine species.

Oil and gas shipping traffic differed significantly between SWIO and the NMC, with the SWIO region experiencing much higher density (151.51 AIS positions/km²) than the

NMC (21.17 AIS positions/km²; Table 8). The higher density in SWIO suggests that the region is heavily involved in oil and gas exploration, transportation and shipping, which has implications for environmental risks such as oil spills, particularly in ecologically sensitive areas. The results could indicate that oil and gas-related traffic is less intense in NMC and likely primarily attributable to shipping and transportation, since the region is situated along major maritime oil shipping routes connecting the southern tip of Africa and Asia. Oil and gas shipping traffic in the NMC has likely risen since 2021, given the increase in oil and gas exploration and extraction. For example, the Coral South floating liquified natural gas plant shipped its first cargo of extracted liquefied natural gas in November 2022 and its hundredth cargo in April 2025.

Passenger vessel recordings are low in both regions, with respective densities of 0.01 AIS positions/km² in SWIO and 0.09 AIS positions/km² in the NMC. While these numbers do confirm the presence of cruise ships and passenger ferries, their activity is minimal in comparison to other categories and less likely to carry considerable biodiversity risks.

⁴ Exact number of AIS positions recorded between 2015 and 2021 are 7 423 147 490 310 for SWIO and 557 634 988 953 for the NMC region.

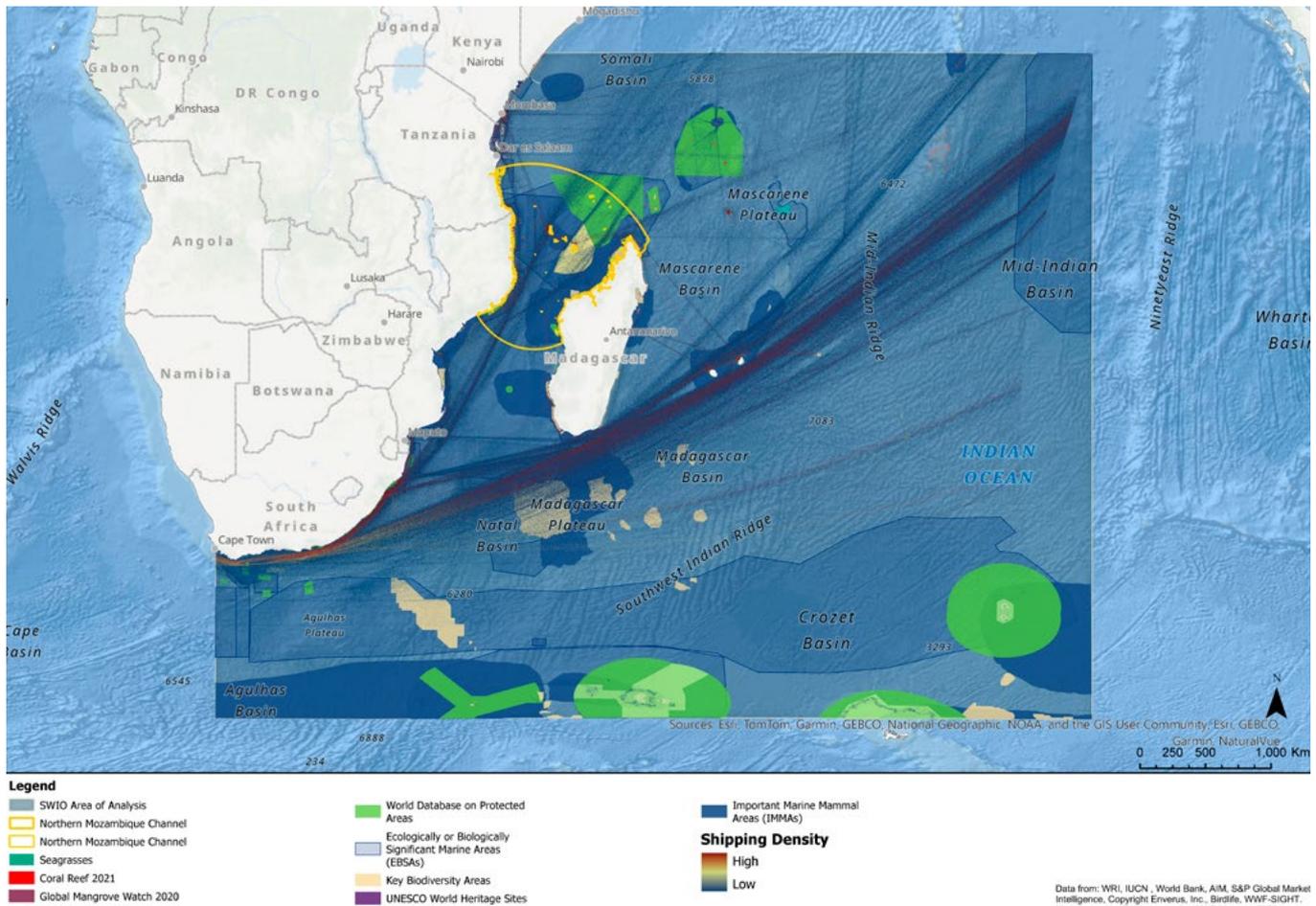
Table 8. Shipping density (AIS positions per km²) in the SWIO and NMC regions

	AIS positions per km ² in SWIO	AIS positions per km ² in NMC
Commercial	302 911.70	547 600.91
Fishing	369.76*	16.15
Leisure	130.01	471.34*
Oil and gas	151.51	21.17
Passenger	0.01	0.09
Total	303 563.00	548 109.66

* Significant results

Source: See Table 1 on page 13 and Table 2 on page 14.

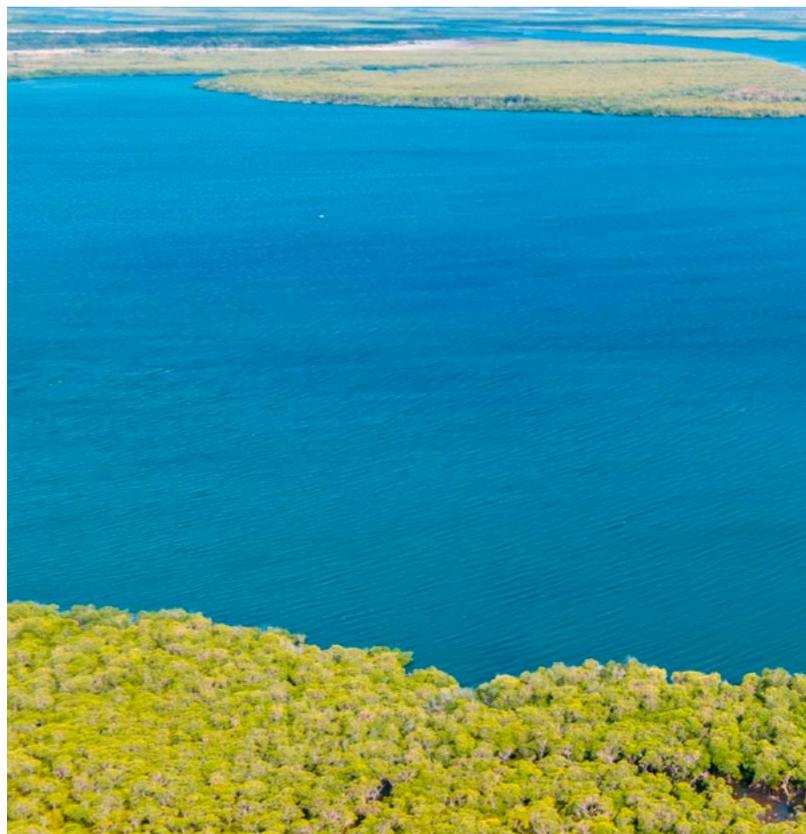
Figure 6. Shipping traffic density in SWIO and NMC regions



THREATS IN THE SWIO REGION

The results suggest significant interactions between commercial shipping activities and biodiversity in IUCN Category V protected areas (535 823 AIS positions/km²), UNESCO World Heritage Sites (294 AIS positions/km²) and seagrass beds (293 250 AIS positions/km²). By contrast, strictly protected MPAs (IUCN Categories Ia, Ib and III) show little to no shipping activity, indicating effective enforcement of restrictions in these zones. (See Annex 2, Table A2.1.)

Leisure vessel traffic is notable in IUCN Category II protected areas (7 489 AIS positions/km²), UNESCO World Heritage Sites (979 AIS positions/km²), coral reefs (2 028 AIS positions/km²) and seagrass beds (1 705 AIS positions/km²). This suggests that marine tourism is concentrated in ecologically sensitive areas, posing potential threats such



as anchor damage, pollution, disturbance to endangered species and habitat disturbances. Effective management and sustainable tourism regulations should be implemented to mitigate these pressures.

Oil and gas vessel activity is present mainly in IMMAs (157 AIS positions/km²), as well as some in KBAs (74 AIS positions/km²) and EBSAs (56 AIS positions/km²), indicating further possible areas of conflict between conservation objectives and the shipping activities of the oil and gas sector. Passenger vessel traffic is minimal, suggesting limited interactions between ferry or cruise ship movement and marine biodiversity.

Overall, vessel activity is unevenly distributed across conservation categories, with multiple-use areas such as IUCN Categories IV, V and VI protected areas and KBAs experiencing significant traffic. IMMAs and EBSAs, despite their high conservation value, face substantial vessel activity. There is thus an urgent need for stricter regulation and enforcement. Conservation efforts should focus on creating buffer zones, rerouting high-traffic shipping lanes and strengthening protection measures in ecologically significant areas to balance conservation goals with economic activities.

THREATS IN THE NMC REGION

The NMC region exhibits high overlap between commercial shipping density and several areas critical to biodiversity, particularly KBAs (532 839 AIS positions/km²), EBSAs

(569 002 AIS positions/km²) and IMMAs (527 969 AIS positions/km²). Commercial shipping densities are also high in the region's MPAs, especially IUCN Category IV (451 869 AIS positions/km²) and IUCN Category V (540 229 AIS positions/km²) protected areas. These overlaps indicate high risks of habitat degradation, pollution and vessel strikes in ecologically sensitive regions.

Leisure vessel density is significant in IUCN Category Ia protected areas (2 683 AIS positions/km²), seagrass beds (4 608 AIS positions/km²) and coral reefs (1 171 AIS positions/km²), highlighting the potential impact of tourism on the NMC's fragile marine ecosystems. Oil and gas vessel traffic was recorded in EBSAs, KBAs and IUCN Category IV protected areas, though at low densities, indicating potential risks posed by the extraction or transit of oil and gas through sensitive habitats. Fortunately, some protected areas – such as IUCN Category II MPAs and UNESCO World Heritage Sites – and mangroves forests recorded no AIS positions for oil and gas vessels.



The NMC region exhibits high overlap (>500 000 AIS positions/km²) between commercial shipping and biodiversity, especially in KBAs, EBSAs and IMMAs.



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RECOMMENDATIONS

The South West Indian Ocean and Northern Mozambique Channel face myriad threats and pressures from human development activities, many of which pose significant risks to our oceans and to the communities who depend on the ocean for livelihoods, health and well-being.

The pressures of these development activities do not exist in isolation and often co-occur within or adjacent to sensitive marine habitats that are crucial for sea turtles (nesting sites, foraging areas), as well as sharks, cetaceans and tuna (migratory routes, spawning and nursery areas). The changing climate is an added stressor that not only further threatens marine biodiversity but also weakens the resilience of coastal communities and reduces their adaptive capacity, especially in the context of depleting marine resources due to mismanagement. To ensure that development does not occur at the expense of ocean health and people's lives, WWF and its partners recommend the following.

1 UNDERTAKE MARINE SPATIAL PLANNING

The complexity of overlapping uses and pressures within the SWIO and NMC regions underscores the urgent need for integrated and anticipatory planning to ensure the long-term sustainability of marine and coastal resources. Marine spatial planning (MSP) offers a structured and future-oriented framework to address this challenge. It facilitates

the rational allocation of marine space by clarifying spatial and temporal uses, identifying responsible actors, and accounting for the cumulative impacts of human activities (including oil and gas, shipping and fishing). While addressing ecological, economic and social objectives, MSP promotes a transparent, inclusive and scientifically grounded process that supports both current needs and equity that can be sustained in the long-term (Intergovernmental Oceanographic Commission-UNESCO and European Commission 2021). WWF advocates for inclusive, sustainable MSP that considers ecosystem-based integrated management, human rights and climate change. To support such integrated MSP, the Wildlife Conservation Society and Fauna & Flora have developed guidelines for oil and gas developments in the NMC (see Box 4). Additionally, the Swedish Agency for Marine and Water Management has been delivering institutional strengthening capacity for MSP to government officials in the region.

Recent advances include the Government of Seychelles signing the region's first Marine Spatial Plan into law in June 2025 with the support of The Nature Conservancy. Work to implement MSP is ongoing in Kenya and Tanzania as well, also with the assistance of The Nature Conservancy and other partners. With the support of WWF, the Nairobi Convention Secretariat and partners, the governments of Madagascar, Mozambique, the Union of Comoros, the United Republic of Tanzania and Seychelles have developed a shared Vision and Roadmap for MSP in the NMC (UNEP et al. 2025) to deliver effective integrated ocean governance of the region. To operationalize this

BOX 4

BEST-PRACTICE POLICY AND GUIDELINES FOR OIL AND GAS DEVELOPMENTS IN THE NORTHERN MOZAMBIQUE CHANNEL

The Wildlife Conservation Society and Fauna & Flora recently developed a set of best-practices guidelines to mitigate impacts of oil and gas development on coral reefs, sea turtles and marine mammals in the Northern Mozambique Channel (NMC) (Fauna & Flora 2024). The guidelines highlight marine biodiversity features identified and selected through multi-stakeholder (government representatives, the private sector and civil society) consultations in Mozambique, Madagascar and Tanzania. The aim was to identify key biodiversity features that are both vulnerable to the oil and gas sector and hold ecological importance within the NMC, while also serving as practical indicators for measuring and monitoring those impacts. In other words, the guidelines are a direct translation of the Mitigation Hierarchy, and were developed through a review of international, regional and national best practices for the oil and gas industry. The Mitigation Hierarchy is a tool to decrease impacts to biodiversity and increase the sustainable management and use of living natural resources. Incorporating the Mitigation Hierarchy into national permitting, environmental impact assessments and strategic environmental assessment processes could serve as a regulatory safeguard to manage long-term risks of industrial activity on ecologically significant areas.

approach, a dedicated set of MSP Technical Guidelines has been developed to support the NMC region to adopt a harmonized MSP process. These guidelines, collaboratively produced by members of the regional MSP Technical Working Group, regional experts, research institutions and international conservation partners, are specifically tailored to the socio-ecological context of the NMC (Truter et al. 2025). They build upon the Regional MSP Strategy for the Western Indian Ocean that the Nairobi Convention agreed to implement in August 2024 at its eleventh Conference of Parties (COP11) (Decision CP 11/13). The Guidelines reflect relevant international frameworks, including the United Nations Sustainable Development Goals and the Convention on Biological Diversity, and lay the institutional and technical foundations required for coordinated and inclusive marine governance.

Through endorsement and official validation of the MSP Technical Guidelines at the upcoming Nairobi Convention COP, likely in 2026 at COP12, governments will own and integrate the Guidelines into national MSP processes. Engaging national stakeholders through consultations will be key to raising awareness and building familiarity with the MSP Technical Guidelines. Additionally, the natural capital value and the costs of implementing integrated MSP in the NMC region are currently being assessed through a study commissioned by WWF and the Nairobi Convention Secretariat. The results will help identify investment opportunities and funding mechanisms to support MSP implementation and ensure the conservation of the NMC's natural capital.

2 PROTECT ECOSYSTEMS THROUGH SYSTEMATIC CONSERVATION PLANNING

Systematic conservation planning is a process and methodology that provides decision-making support for the identification of priority biodiversity conservation areas. Systematic conservation planning can be used to create spatial prioritization maps that consider the distribution of biodiversity features and their overlap with areas that provide important nature-based benefits. These outputs can be used in multi-sector MSP processes evaluating the spatial distribution of commercial activities and guiding them away from areas of critical biodiversity or ecological significance (Holness et al. 2022). Developing a systematic conservation plan for the SWIO region, with a particular focus on the NMC, could be a significant contribution to the targets and goals of the Kunming-Montreal Global Biodiversity Framework (recognized by the Convention on Biological Diversity). This should be supported by training and capacity development in systematic conservation planning at both national and regional scales.

The biodiversity of the SWIO and NMC regions is not only ecologically but also economically important: many of the regions' coastal inhabitants are highly dependent on healthy marine ecosystems and their services for subsistence and as a source of income. Therefore, one of the main concerns emerging from this analysis is the significant socio-economic risks associated with the potential large-scale impact from fishing, shipping and the oil and gas industry. From a

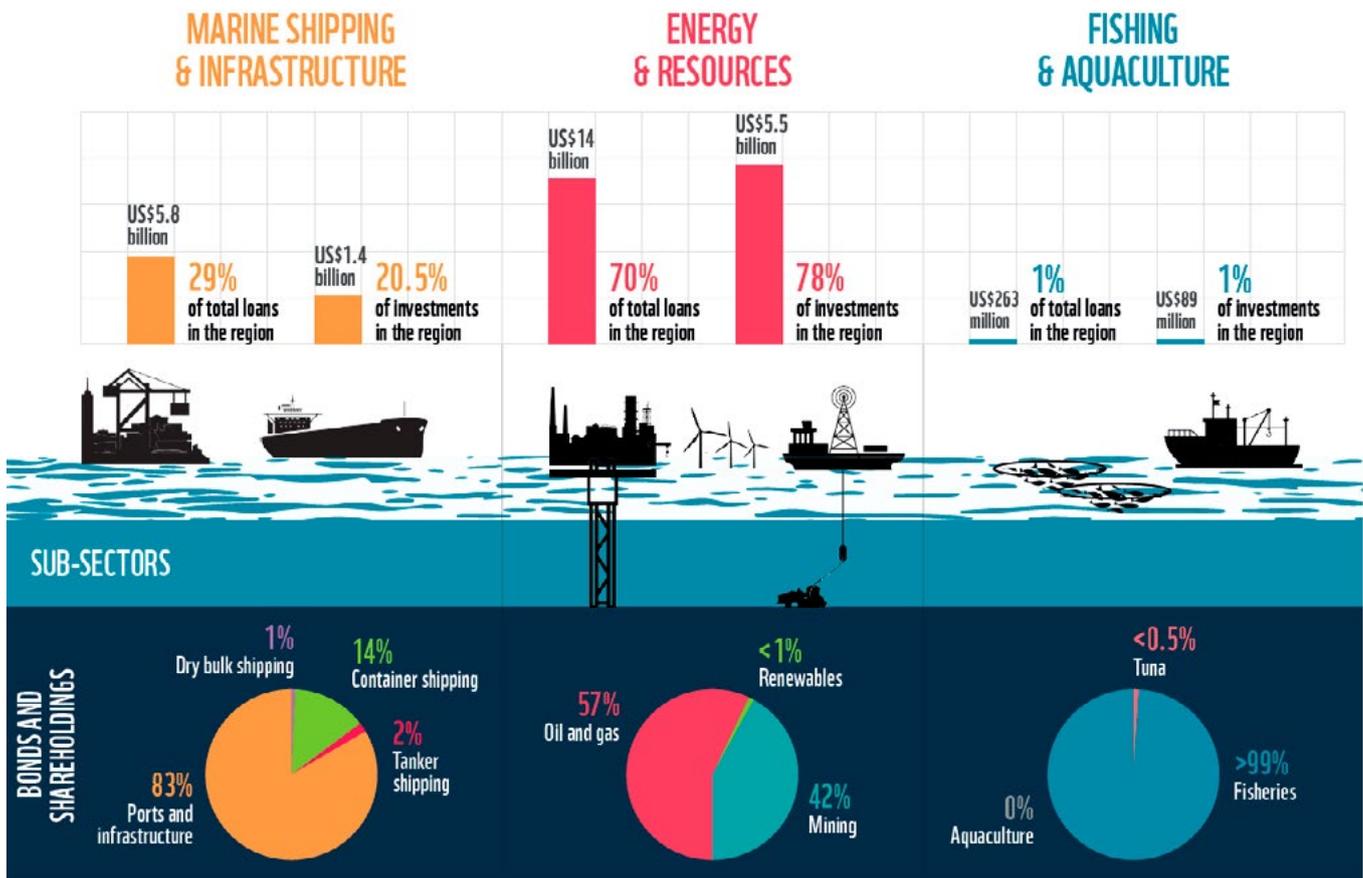
systematic conservation planning perspective, there is an opportunity to use existing spatial data on sectoral activities and biodiversity features (such as MPAs, spawning grounds and coral reef distributions) alongside data on nature-based activities as departure points in MSP negotiations with the three sectors' stakeholders. This would support proactively identifying high-risk zones and applying exclusion or mitigation buffers; declaring MPAs; or recognizing areas with potential to be reported as other effective area-based conservation measures (OECMs) towards achieving the Global Biodiversity Framework's target of protecting 30% of these regions.⁵

3 FORMALIZE COMMUNITY-LED CONSERVATION

Coastal communities play a crucial role in conserving marine ecosystems. Their traditional knowledge and sustainable practices have been shaped by generations of depending on these environments for food security, livelihoods and cultural heritage. As such, coastal communities should be empowered in their role as frontline stewards of ocean health and have their rights formally recognized in natural resource management and conservation.

A recent study showed that, while much progress has been made to support community rights to manage marine ecosystems, there is still much progress to be made across the region (WWF and CORDIO East Africa 2025). While legal frameworks that recognize local management rights exist across the region, there are many ways in which these frameworks could be strengthened. A promising approach to formalizing community-led conservation is the recognition and reporting of locally managed marine areas or other community-managed marine areas as OECMs. OECMs recognize marine areas that achieve conservation outcomes outside traditional protected area designations. This recognition can help elevate the role that communities play in effective marine governance internationally, while at the same time contributing to global conservation targets (as OECMs or MPAs).

⁵ Accountability, transparency and public participation are needed for all concessions – oil and gas – particularly if they potentially affect MPAs, 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.



Source: WWF and Profundo 2024.

It is increasingly believed that OECM recognition can help identify pathways to strengthen national and local policies for community-led conservation, as well as attract novel and sustainable funding, so contributing to long-term ecological and socio-economic benefits and helping to ensure the resilience of both marine ecosystems and the communities that depend on them. Communities could also potentially play a role in monitoring and enforcing conservation measures within OECMs to contribute to their effectiveness. For example, the *polisin'ala* in Madagascar act as mangrove forest rangers, and in Mozambique, community agents patrol protected areas and monitor and report hazards to marine ecosystems as part of management-oriented monitoring systems (also known as MOMS).

4 TRANSITION TO A SUSTAINABLE BLUE ECONOMY

A 2024 WWF-commissioned study found that financial flows in the SWIO region are currently skewed toward unsustainable activities such as oil and gas extraction, coastal and seabed mining, and marine infrastructure (WWF and Profundo 2024).

After analysing 25 financial institutions engaging with blue sectors in the SWIO region, the study also found that most financial institutions do not have comprehensive policies in place to manage or mitigate ocean-related environmental, social and governance (ESG) risks linked to their loan and

investment decisions, even though most institutions still fund high-risk activities such as oil and gas exploration and deep-seabed mining. Moreover, there appeared to be insufficient regulation to protect the region's ocean health and local livelihoods from unsustainable loan and investment decisions.

If current investment and financing patterns persist, the SWIO region's blue economy is headed towards an unsustainable future. Stronger financial regulation by national financial regulators and central banks is needed to correct this trajectory and accelerate responsible financing and investment in the region's sustainable blue economy. Financial institutions need to take urgent action to reform and strengthen policies that relate to investments and loans to blue economy sectors.

WWF co-developed the Sustainable Blue Economy Finance Principles with the European Commission, European Investment Bank and the Prince of Wales's International Sustainability Unit (UNEPFI n.d.). These Principles were launched in 2018 to encourage

banks, insurers and investors to finance a sustainable blue economy, and are now hosted by UNEP Sustainable Blue Economy Finance Initiative. WWF encourages public and private stakeholders to adopt the Sustainable Blue Economy Finance Principles to establish a sustainable blue economy defined by its:

- Economic and social benefits for current and future generations
- Protection and restoration of diverse and resilient marine ecosystems
- Utilization of clean technologies, renewable energy and circular material flows.

To support a shift to a sustainable blue economy, environmental and social non-governmental organizations should advocate for regulations that ensure that financial institutions regularly measure and report their carbon and biodiversity footprints at the portfolio level. Additionally, they should help financial institutions establish measurable, time-bound commitments to reduce their environmental impact. Civil society can support a transition to a sustainable blue economy by collaborating with banks and investors to create sustainable financing frameworks, metrics and mechanisms for emerging sustainable blue enterprises and value chains. The SWIO Venture Builder, a joint WWF project, and others like it should be further supported to advance micro, small and medium-sized blue enterprises.

5 LEAD A JUST ENERGY TRANSITION AWAY FROM FOSSIL FUELS

While coal remains the largest single contributor to global carbon dioxide emissions, transitioning away from oil and gas is crucial to achieving a zero-emission society and limiting global warming to 1.5°C. To do so, WWF advocates for the rapid elimination of emissions from oil and gas production and use. This applies to both conventional and unconventional resources. Key actions include ending new oil and gas exploration and production immediately, and phasing out existing oil and gas infrastructure in a manner that keeps emissions within the 1.5°C limit and supports a fully renewable energy system by 2050. High- and upper-middle-income countries should lead by ending oil and gas production by 2040, while lower-income countries should do so by 2050.

An ethical energy transition should also consider the costs it might present to workers and communities impacted by the shift away from fossil fuels. Moving away from fossil fuels must be fair and inclusive. To this end, a “just transition” should prioritize zero-emission solutions in infrastructure and end-use sectors; embed climate risk and 1.5°C alignment into public and private decision-making; and ensure equity and justice by addressing local challenges and barriers to transition.

Oil and gas extraction is an important economic component for many of the SWIO countries. While expansion of the sector might yield much-needed economic growth in the short term, the repercussions on ocean health will likely

result in a net loss in the long term. Thus, a just transition that minimizes the short-term costs of shifting away from fossil fuels is essential. This would require:

- Phasing out fossil fuel extraction to meet the 1.5°C climate target
- Halting extraction that violates human rights
- Ensuring fair distribution of transition costs based on financial capacity
- Supporting affected workers and communities
- Avoiding investments in fossil fuel infrastructure, which risks becoming stranded assets.

By implementing these strategies, countries can shift toward a sustainable and equitable energy future.

6 ADDRESS CHALLENGES TO SUSTAINABLE FISHERIES MANAGEMENT

While this study found a relatively small overlap between industrial fisheries activities and marine biodiversity features in the SWIO and NMC regions, determining the full ecological impacts of the fisheries sector requires information beyond that which AIS position tracking can provide. Examples of such key additional information would be the inclusion of gear-specific data, fishing intensity along the coast, small-scale and artisanal fishing activity, and the frequency and severity of unsustainable practices (such as IUU fishing, ETP species bycatch, mismanaged dFAD-use, and stock depletion).

In 2024, WWF published a fisheries baseline report examining the status and challenges of fisheries management in SWIO (WWF 2024). The report found that several interrelated governance, socio-economic and climate factors were impeding the sustainable use of fisheries resources, leading to growing pressures on fisheries across SWIO and the NMC from both industrial fleets and small-scale coastal operations.

The report provided the following recommendations to address the challenges to sustainable fisheries management in the SWIO and NMC regions (WWF 2024).

- **National and regional fisheries governance in SWIO should be strengthened.** This would require that countries ratify and implement key international agreements that combat IUU fishing, improve crew safety, and regulate harmful subsidies.⁶ Institutional reforms within the IOTC are also needed to ensure fairer resource allocation, better regulation of dFADs and stronger bycatch mitigation measures (such as nylon leaders, circle hooks and tori lines). These efforts should be supported by greater transparency through SWIO countries' adoption of the FiTI (Fisheries Transparency Initiative) Standard and integration of ecological and climate risk into national fisheries policies and access planning.
- **Data systems and compliance measures should be improved.** This could be achieved by supporting community-based data collection for small-scale fisheries and integrating it into national fisheries databases; encouraging proper use of vessel tracking systems (AIS and VMS) and reducing the number of AIS Disabling Events in high biodiversity areas; and conducting targeted research and pilots for new tools to estimate fishing activity of untracked vessels below the AIS threshold.
- **Effective monitoring and enforcement should be scaled up.** Doing so would require ensuring 100% observer or electronic monitoring coverage for all industrial and semi-industrial fleets; stricter oversight of transshipment practices; and the strengthening of national and regional surveillance and data-sharing systems. The latter would be achieved by securing effective operation of the Southern African Development Community Regional Fisheries Monitoring, Control and Surveillance (MCS) Coordination Centre (SADC MCSCC) and supporting national investment in MCS and joint intelligence-sharing systems.

Important biodiversity areas could also be declared particularly sensitive sea areas (or PSSAs). A PSSA is an area that needs special protection because of its significance for recognized ecological, socio-economic or scientific attributes, where these attributes may be vulnerable to damage by international shipping activities (IMO 2005).

If no action is taken, both biodiversity and the socioeconomic resilience of coastal communities will continue to erode under opaque and unmanaged fishing pressure.

7 REGULATE SHIPPING ACTIVITIES

The expansion of oil and gas activities and terrestrial mineral extraction in the region is expected to drive port development and increase shipping operations (Obura et al. 2018). This growth raises concerns about pollution, habitat destruction and the need for stricter maritime regulations. It is therefore particularly important that ships take measures to reduce

or eliminate impacts on local wildlife populations and habitat. As a starting point, recommended regulations should aim to:

- **Improve wastewater management** by requiring that vessels treat blackwater and greywater prior to discharge at sea, and avoid discharge in sensitive areas such as MPAs when possible.
- **Limit the impact of exhaust gas cleaning systems, or scrubbers,** by regulating the use of high-polluting systems (that is, open-loop), encouraging the use of alternative fuels or designating zero-discharge zones.
- **Prevent the spread of invasive species** by ensuring sufficient biosafety practices are being implemented with regards to ballast water treatment and biofouling management, and encouraging the regional adoption and enforcement of the International Maritime Organization's Ballast Water Management Convention and Biofouling Guidelines, with specific protocols adapted for SWIO island and coastal states.
- **Protect marine biodiversity** by prohibiting operation in sensitive areas, such as birthing areas or migratory corridors, by declaring "areas to be avoided" and similar measures. If this avoidance is not possible, ship slow-down procedures or other rules for marine mammal encounters should be implemented to reduce the chances of ship strikes as well as the production of disruptive underwater radiated noise. Important biodiversity areas can also be designated as Particularly Sensitive Sea Areas (PSSAs).⁷
- **Increase accountability and transparency** by encouraging the establishment of a publicly accessible regional shipping risk registry to track pollution incidents, underwater noise emissions, AIS Disabling Events, and near-miss or actual collisions with marine megafauna.

⁶ Examples are the Port State Measures Agreement, Cape Town Agreement, International Labour Organization's Work in Fishing Convention (C-188), and the World Trade Organization's Fisheries Subsidies Agreement.

⁷ A PSSA is an "area that needs special protection through action by International Maritime Organization because of its significance for recognized ecological, socio-economic or scientific reasons and which may be vulnerable to damage by international maritime activities." (IMO Resolution A.982(24), Adopted on 1 December 2005).

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ANNEXES

ANNEX 1. SUPPLEMENTARY DATA FOR BIODIVERSITY FEATURES

Table A1.1 Biodiversity features by designation

Designation	SWIO			NMC		
	Number	Area (km ²)	% of SWIO area	Number	Area (km ²)	% of NMC area
Area of outstanding natural beauty	8	237771	0.97%	1	5170	0.51%
Beach and lagoon areas protected	1	2	0.00%			
Biotope protection order	2	1	0.00%	1	1	0.00%
Buffer zone	1	1318	0.01%	1	1318	0.13%
Community nature reserve	1	104	0.00%			
Biodiversity feature	3	1249	0.01%			
Dive site	2	11	0.00%			
Environmental protection area	1	5828	0.02%	1	5828	0.57%
Fishing reserve	3	8	0.00%			
Forest managed biological reserve	1	0.003	0.00%			
Forest nature reserve	5	1	0.00%			
Forest reserve	106	190	0.00%	94	150	0.01%
Island (mangrove, wetland, reef and lagoon) areas	1	5	0.00%			
Island, Lagoon, Reef and Dive Site	1	0.14	0.00%			
Lagoon, Reef and Dive site areas	1	5	0.00%			
Land acquired by Conservatoire du Littoral (national seaside and lakeside conservancy)	16	0.31	0.00%	9	0.26	0.00%
Locally managed marine area	21	755	0.00%			
Mangrove and wetland areas protected	2	1.2	0.00%			
Mangrove, island, reef and lagoon areas protected	1	8	0.00%			
Marine national park	15	197011	0.80%	1	120012	11.79%
Marine national reserve	6	593	0.00%			
Marine nature park	1	68207	0.28%	1	68207	6.70%
Marine park	2	883	0.00%	2	883	0.09%

Table A1.1 Biodiversity features by designation (continued)

Designation	SWIO			NMC		
	Number	Area (km ²)	% of SWIO area	Number	Area (km ²)	% of NMC area
Marine protected area	29	192 391	0.79%			
Marine reserve	2	33	0.00%			
National nature reserve	4	1 183 371	4.83%	2	43 496	4.27%
National park	19	5 740	0.02%			
National reserve	1	693	0.00%			
Nature reserve	48	839	0.00%			
Paysage harmonieux protégé	5	4 282	0.02%	4	3 511	0.34%
Protected	1	8	0.00%			
Protected environment	3	14	0.00%			
Ramsar Site, Wetland of International Importance	14	22 343	0.09%	6	8 345	0.82%
Réserve de Ressources Naturelles	1	382	0.00%			
Sanctuary	1	218	0.00%			
Sanctuary and Closed Forest Reserve	1	1	0.00%			
Shell reserve	4	7	0.00%			
Special reserve	6	2 452	0.01%	2	2 430	0.24%
UNESCO-MAB Biosphere Reserve	1	42	0.00%	1	42	0.00%
UNESCO Natural and Mixed World Heritage Sites	5	1 057	0.00%	1	2	0.00%
Key biodiversity area	277	539 044	2.20%	63	88 416	8.68%
Ecologically or biologically significant marine area	36	9 288 741	37.90%	7	940 544	92.36%
Important marine mammal areas	26	3 481 999	14.21%	5	306 429	30.09%
Mangrove forest	N/A	174	0.00%	N/A	99	0.01%
Seagrass bed	N/A	15 883	0.06%	N/A	5 652	0.56%
Coral reef	N/A	10 001	0.04%	N/A	4 132	0.41%

ANNEX 2. SUPPLEMENTARY DATA FOR INDUSTRIAL FISHERIES AND SHIPPING

Table A2-1. Shipping density (AIS position per km²) within biodiversity features in the SWIO region

Biodiversity feature	Number	Total area (km ²)	Commercial	Fishing	Leisure	Oil and gas	Passenger	Total
IUCN Category Ia	4	2 418	19 637	0	2 927*	0	0	22 564
IUCN Category Ib	1	0.000004	0	0	0	0	0	0
IUCN Category II	16	2 404	61 340	0	7 489*	0	0	68 829
IUCN Category III	0	0	0	0	0	0	0	0
IUCN Category IV	35	1 184 331	17 981	8	20	1	0	18 010
IUCN Category V	9	79 743	535 823*	24	720	19	0	536 586
IUCN Category VI	17	2 018	55 429	0	39	25	0	55 493
IUCN Other (not reported / not applicable)	269	653 800	191 585	176	722	15	0	192 498
UNESCO Natural and Mixed World Heritage Sites	5	1 057	293 250*	1	979	0	0	294 229
Key biodiversity area	277	539 044	247 849*	292*	279	74	0	248 494
Ecologically or biologically significant marine areas	36	9 288 741	213 671*	528*	165	56	0	214 420
Important marine mammal area	26	3 481 999	295 043*	853*	382	157	0	296 435
Mangrove forest	N/A	174	21 438	0	0	0	0	21 438
Seagrass bed	N/A	15 883	397 509*	0	1 705*	5	3	399 223
Coral reef	N/A	10 001	33 876	0	2 028*	0	0	35 905

* Significant results

Table A2.2. Shipping density (AIS position per km²) within biodiversity features in the NMC region

Biodiversity feature	Number	Total area (km ²)	Commercial	Fishing	Leisure	Oil and gas	Passenger	Total
IUCN Category Ia	4	2 418	19 520	0	2 683	0	0	22 203
IUCN Category Ib	1	0.000004	0	0	0	0	0	0
IUCN Category II	16	2 404	0	0	0	0	0	0
IUCN Category III	0	0	0	0	0	0	0	0
IUCN Category IV	35	1 184 331	451 869*	0	443	5	0	452 318
IUCN Category V	9	79 743	540 229*	24	714	19	1	540 987
IUCN Category VI	17	2 018	41 849	0	0	0	0	41 849
IUCN Other (not reported / not applicable)	269	653 800	200 293	0	338	29	0	200 660
UNESCO Natural and Mixed World Heritage Sites	5	1 057	0	0	0	0	0	0
Key biodiversity area	277	539 044	532 839*	58	1 222	18	1	534 138
Ecologically or biologically significant marine area	36	9 288 741	569 002*	17	504	23	0	569 547
Important marine mammal area	26	3 481 999	527 969*	0	955	13	0	528 938
Mangrove forest	N/A	174	0	0	0	0	0	0
Seagrass bed	N/A	15 883	624 348*	0	4 608*	14	9	628 979
Coral reef	N/A	10 001	53 440	0	1 171*	0	1	54 611

* Significant results

ANNEX 3. SUPPLEMENTARY DATA FOR OIL AND GAS

Table A3.1. Oil and gas (O&G) block by status overlapping biodiversity features in the SWIO region

Biodiversity feature	Number	Total area (km ²)	OPEN			UNDER APPLICATION & NEGOTIATION (UAN)				CONTRACTS			
			# of OPEN O&G blocks overlapping biodiversity features	Area overlapped by OPEN O&G area (km ²)	% of total area overlapped by O&G	# of UAN O&G blocks overlapping biodiversity features	Area overlapped by UAN O&G area (km ²)	% of total area overlapped by O&G	# of CONTRACTS O&G blocks overlapping biodiversity features	Area overlapped by CONTRACTS O&G area (km ²)	% of total area overlapped by O&G		
IUCN Category Ia	4	2 418	2	2 418.1	99.99%**	0.0	0.0	0.00%	0.0	0.0	0.00%	0.0	0.00%
IUCN Category Ib	1	0	1	0.0	100.00%**	0.0	0.0	0.00%	0.0	0.0	0.00%	0.0	0.00%
IUCN Category II	16	2 404	24	2 251.1	93.63%**	1.0	62.7	2.61%	2.0	0.7	0.03%	0.0	0.00%
IUCN Category III	0	0	0	0.0	0.00%	0.0	0.0	0.00%	0.0	0.0	0.00%	0.0	0.00%
IUCN Category IV	35	1 184 331	10	847.5	0.07%	0.0	0.0	0.00%	0.0	0.0	0.00%	0.0	0.00%
IUCN Category V	9	79 743	54	11 025.1	13.83%	2.0	502.3	0.63%	1.0	5.2	0.01%	3.0	31.39%
IUCN Category VI	17	2 018	12	1 360.1	67.41%**	3.0	600.0	0.09%	19	30 558.6	4.67%	1.0	0.01%
IUCN Other (not reported / not applicable)	269	653 800	162	460 650.4	70.46%**	0.0	0.0	0.00%	1.0	10.2	0.96%	10	0.08%
UNESCO Natural and Mixed World Heritage Sites	5	1 057	10	855.5	80.94%	5.0	2 750.4	0.51%	10	410.3	0.08%	57	1.76%
Key biodiversity area	277	539 044	230	30 738.8	5.70%	6	56 681.6	1.63%	30	72 109.1	2.07%	1.0	0.01%
Ecologically or biologically significant marine area	36	9 288 741	1 242	1 700 575.4	18.31%	1	0.2	0.13%	11	8.9	5.10%	2.0	0.28%
Important marine mammal area	26	3 481 999	532	577 535.3	16.59%	0.0	0.0	0.00%	4.0	63.7	0.64%	13.0	9.78%
Mangrove forest	N/A	174	191	157.9	90.54%**	0.0	0.0	0.00%	0.0	0.0	0.00%	2.0	0.28%
Seagrass bed	N/A	15 883	44	6 874.1	43.28%	0.0	0.0	0.00%	0.0	0.0	0.00%	2.0	0.28%
Coral reef	N/A	10 001	176.0	5 935.9	59.35%	0.0	0.0	0.00%	0.0	0.0	0.00%	2.0	0.28%

* Significant results

Table A3.2. Oil and gas (O&G) block by status overlapping biodiversity features in the NMC region

	Number	Total area (km ²)	OPEN			UNDER APPLICATION & NEGOTIATION (UAN)				CONTRACTS		
			# of OPEN O&G blocks overlapping biodiversity features	Area overlapped by OPEN O&G area (km ²)	% of total area overlapped by O&G	# of UAN O&G blocks overlapping biodiversity features	Area overlapped by UAN O&G area (km ²)	% of total area overlapped by O&G	# of CONTRACTS O&G blocks overlapping biodiversity features	Area overlapped by CONTRACTS O&G area (km ²)	% of total area overlapped by O&G	
IUCN Category Ia	1	2 417	2	2 416.7	100.00%	0.0	0.0	0.00%	0.0	0.00%	0.0	0.00%
IUCN Category II	4	414	12	346.6	83.81%	1.0	62.7	15.17%	1.0	0.02%	0.1	0.02%
IUCN Category IV	15	43 515	0	0.0	0.00%	0.0	0.0	0.00%	0.0	0.00%	0.0	0.00%
IUCN Category V	8	78 893	54	10 146.4	12.86%	2.0	502.3	0.64%	1.0	0.01%	5.2	0.01%
IUCN Category VI	3	895	7	695.0	77.69%	1.0	14.6	1.63%	3.0	20.69%	185.1	20.69%
IUCN Other (not reported / not applicable)	111	136 634	104	134 237.3	98.25%	2.0	241.4	0.18%	10	0.44%	604.2	0.44%
UNESCO Natural and Mixed World Heritage Sites	1	2	1	1.5	100.00%	0.0	0.0	0.00%	0.0	0.00%	0.0	0.00%
Key biodiversity area	63	88 416	201	15 676.7	17.73%	5.0	2 737.7	3.10%	8	0.35%	309.2	0.35%
Ecologically or biologically significant marine area	7	940 544	1 143	615 712.1	65.46%	8	55 139.9	5.86%	39	6.14%	57 712.6	6.14%
Important marine mammal area	5	306 429	464	144 925.8	47.30%	5	45 498.2	14.85%	10	1.33%	4 072.8	1.33%
Mangrove forest	N/A	99	182	91.2	92.41%	2	0.4	0.36%	10	5.19%	5.1	5.19%
Seagrass bed	N/A	5 652	35	3 084.0	54.57%	0.0	0.0	0.00%	4.0	2.67%	150.8	2.67%
Coral reef	N/A	4 132	166.0	3 040.0	73.57%	5.0	97.5	2.36%	12.0	10.14%	419.1	10.14%

* Significant results

Table A3.3. Oil and gas (O&G) block by status overlapping biodiversity features in the SWIO region per country

Country	Biodiversity feature	Number	Total area (km ²)	OPEN			UNDER APPLICATION & NEGOTIATION (UAN)			CONTRACTS		
				# of OPEN O&G blocks overlapping biodiversity features	Area overlapped by OPEN blocks (km ²)	% of total area overlapped by OPEN blocks	# of UAN O&G blocks overlapping biodiversity features	Area overlapped by UAN blocks (km ²)	% of total area overlapped by UAN blocks	# of CONTRACTS O&G blocks overlapping biodiversity features	Area overlapped by CONTRACTS blocks (km ²)	% of total area overlapped by CONTRACTS blocks
Comoros	IUCN Other (not reported)	15	659.4	2	12.4	1.87%						
	Key Biodiversity Area (KBA)	13	1 415.5	3	84.8	5.99%			1	35.5	2.5%	
	Ecologically or biologically significant marine area (EBSA)	3	161 260.7	30	141 675.9	87.86%			3	13 915.9	8.6%	
	Important marine mammal area (IMMA)	1	29 941.0	11	22 575.2	75.40%			1	2 660.7	8.9%	
	Seagrass bed	N/A	1 244.9	3	150.8	12.11%						
	Coral reef	N/A	195.5	1	9.8	5.02%						
Kenya	IUCN Category II	2	33.9	2	33.9	100.00%						
	IUCN Category VI	3	239.6	3	239.6	100.00%						
	IUCN Other (not reported)	6	476.7	6	476.7	100.00%						
	UNESCO Natural and Mixed World Heritage Sites (WHS)	10	882.8	6	882.8	100.00%						
	KBA	3	13 833.7	14	13 816.4	99.87%						
	EBSA	4	15 996.6	6	8 046.8	50.30%						
	Mangrove forest	N/A	11.8	9	11.8	100.00%						
	Seagrass bed	N/A	107.1	2	107.1	100.00%						
	Coral reef	N/A	400.9	9	400.9	100.00%						

Table A3.3. Oil and gas (O&G) block by status overlapping biodiversity features in the SWIO region per country (continued)

Country	Biodiversity feature	Number	Total area (km ²)	OPEN			UNDER APPLICATION & NEGOTIATION (UAN)				CONTRACTS		
				# of OPEN O&G blocks overlapping biodiversity features	Area over-lapped by OPEN blocks (km ²)	% of total area overlapped by OPEN blocks	# of UAN O&G blocks overlapping biodiversity features	Area over-lapped by UAN blocks (km ²)	% of total area over-lapped by UAN blocks	# of CONTRACTS O&G blocks overlapping biodiversity features	Area over-lapped by CONTRACTS blocks (km ²)	% of total area over-lapped by CONTRACTS blocks	
Madagascar	IUCN Category II	5	1 098.1	12	947.1	86.26%	1	62.7	5.71%	1	0.1	0.0%	
	IUCN Category V	6	4 389.9	18	3 882.4	88.44%	2	502.3	11.44%	1	5.2	0.1%	
	IUCN Category VI	2	393.4	3	393.4	99.99%							
	IUCN Other (not reported)	30	7 638.4	31	7 349.9	96.22%	1	240.7	3.15%	1	0.1	0.0%	
	KBA	79	29 136.2	94	20 711.7	71.09%	3	2 722.1	9.34%	1	52.3	0.2%	
	EBSA	4	671 310.1	290	404 920.3	60.32%	4	45 498.2	6.78%	2	8 891.4	1.3%	
	IMMA	8	443 745.7	211	259 641.0	58.51%	4	45 498.2	10.25%	2	714.4	0.2%	
	Mangrove forest	N/A	82.9	67	77.7	93.66%				1	3.4	4.1%	
	Seagrass bed	N/A	5 555.3	24	5 555.2	100.00%				1	0.02	0.0%	
	Coral reef	N/A	2 401.3	73	1 969.8	82.03%	3	2.6	0.11%	1	12.6	0.5%	
	IUCN Category II	1	1 224.5	8	1 224.5	100.00%							
	IUCN Category IV	2	911.0	10	847.5	93.03%							
	IUCN Category V	2	7 146.0	36	7 142.7	99.95%							
	KBA	15	6 270.1	84	6 171.2	98.42%				3	35.8	0.6%	
EBSA	9	564 898.3	732	490 215.5	86.78%				19	46 749.9	8.3%		
IMMA	3	84 853.3	215	82 071.1	96.72%				7	2 519.9	3.0%		
Mangrove forest	N/A	54.1	98	52.6	97.08%				4	1.2	2.3%		
Seagrass bed	N/A	676.5	11	582.0	86.02%								
Coral reef	N/A	1 647.4	62	1 510.6	91.70%				2	133.8	8.1%		
EBSA	2	5 195.6	4	4 337.4	83.48%								
Seagrass bed	N/A	132.2	2.0	132.2	100.00%								
Republic of Mauritius													

Table A3.3. Oil and gas (O&G) block by status overlapping biodiversity features in the SWIO region per country (continued)

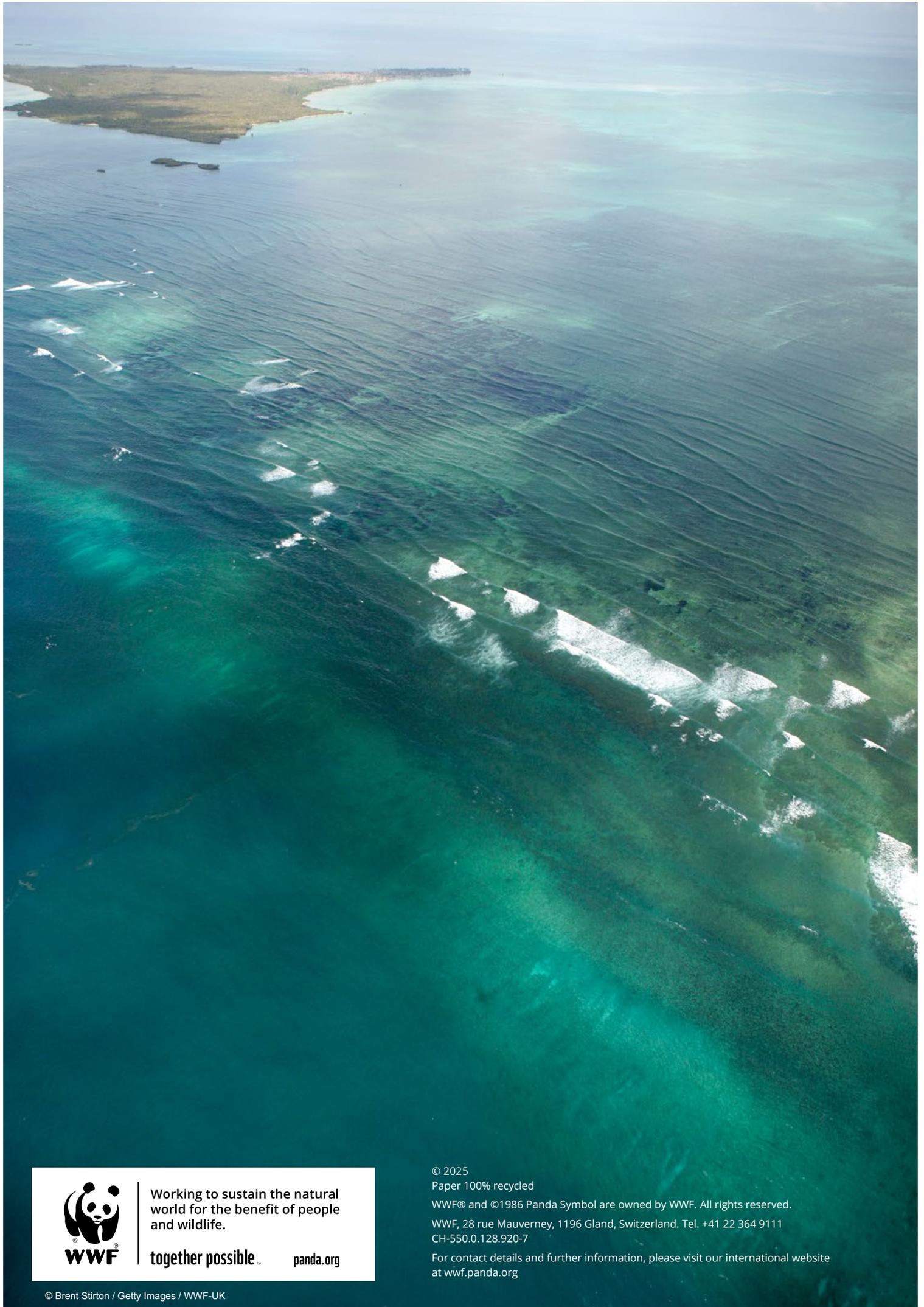
Country	Biodiversity feature	Number	Total area (km ²)	OPEN			UNDER APPLICATION & NEGOTIATION (UAN)				CONTRACTS			
				# of OPEN O&G blocks overlapping biodiversity features	Area overlapped by OPEN blocks (km ²)	% of total area overlapped by OPEN blocks	# of UAN O&G blocks overlapping biodiversity features	Area overlapped by UAN blocks (km ²)	% of total area overlapped by UAN blocks	# of CONTRACTS O&G blocks overlapping biodiversity features	Area overlapped by CONTRACTS blocks (km ²)	% of total area overlapped by CONTRACTS blocks		
Seychelles	IUCN Category Ia	3	2 418.1	2	2 418.1	100.00%								
	IUCN Category Ib	1	0.000004	1	0.000004	100.00%								
	IUCN Category II	6	44.5	1	44.5	100.00%								
	IUCN Category VI	5	0.1	2	0.1	100.00%								
	IUCN Other (not reported)	22	434 367.4	60	411 915.5	94.83%			4	22 752.7	5.2%			
	UNESCO WHS	1	1.5	1	1.5	100.00%								
	KBA	45	1 729.1	13	1 729.1	100.00%			1	0.0001	0.0%			
	EBSA	3	468 744.6	63	444 536.5	94.84%			4	22 262.0	4.7%			
	IMMA	2	158 634.9	27	134 605.5	84.85%			4	24 029.3	15.1%			
	Mangrove forest	N/A	0.1	5	0.1	100.00%								
South Africa	Coral reef	N/A	1 466.5	18	1 464.2	99.84%			1	2.3	0.2%			
	IUCN Other (not reported)	79	45 437.9	52	37 858.3	83.32%	1	358.6	0.79%	6 408.1	14.1%	5	6 408.1	14.1%
	UNESCO WHS	2	1 046.6	9	853.9	81.59%			1	10.2	1.0%			
	KBA	38	330.2	23	220.6	66.80%	1	12.9	3.92%	4.4	1.3%	1	4.4	1.3%
	EBSA	12	237 567.4	81	156 999.8	66.09%	3	18 576.5	7.82%	56 364.2	23.7%	14	56 364.2	23.7%
	IMMA	4	117 786.2	59	68 826.5	58.43%	2	11 183.4	9.49%	37 344.0	31.7%	14	37 344.0	31.7%
	Seagrass bed	N/A	405.6	2	346.9	85.53%								
	Coral reef	N/A	1.4	1	0.04	3.13%								
	IUCN Category II	2	3.2	1	1.0	31.17%			1	0.6	19.2%			
	IUCN Category VI	4	1 374.9	4	727.1	52.88%	1	14.6	1.06%	633.2	46.1%	3	633.2	46.1%
Tanzania	IUCN Other (not reported)	109	4 704.7	11	3 037.7	64.57%	1	0.7	0.02%	1 397.7	29.7%	9	1 397.7	29.7%
	KBA	14	1 315.2	7	938.5	71.36%	1	15.3	1.17%	282.2	21.5%	3	282.2	21.5%
	EBSA	7	72 169.8	28	44 073.8	61.07%	3	8 221.9	11.39%	15 237.1	21.1%	15	15 237.1	21.1%
	IMMA	3	7 039.5	3	1 769.1	25.13%			2	4 840.8	68.8%			
	Mangrove forest	N/A	22.4	12	15.8	70.87%	1	0.2	1.01%	4.2	18.8%	5	4.2	18.8%
	Coral reef	N/A	1 647.0	12	580.5	35.24%	1	61.0	3.71%	829.7	50.4%	9	829.7	50.4%

Table A3.4. Oil and gas (O&G) block by status overlapping biodiversity features in the NMC region per country

Country	Biodiversity feature	Number	Total area (km ²)	OPEN			UNDER APPLICATION & NEGOTIATION (UAN)			CONTRACTS			
				# of OPEN O&G blocks overlapping biodiversity features	Area overlapped by OPEN blocks (km ²)	% of total area overlapped by OPEN blocks	# of UAN O&G blocks overlapping biodiversity features	Area overlapped by UAN blocks (km ²)	% of total area overlapped by UAN blocks	# of CONTRACTS O&G blocks overlapping biodiversity features	Area overlapped by CONTRACTS blocks (km ²)	% of total area overlapped by CONTRACTS blocks	
Comoros	IUCN Other (not reported / not applicable)	15	659.4	2	12.4	1.87%							
	Key biodiversity area (KBA)	13	1 415.5	3	84.8	5.99%			1	35.5	2.51%		
	Ecologically or biologically significant marine area (EBSA)	1	161 260.7	30	141 675.9	87.86%			3	13 915.9	8.63%		
	Important marine mammal area (IMMA)	1	29 941.0	11	22 575.2	75.40%			1	2 660.7	8.89%		
	Coral reef	N/A	195.5	1	9.8	5.02%							
	IUCN Category II	3	413.2	12	346.6	83.88%		62.7	15.19%	1	0.1	0.02%	
	IUCN Category V	4	3 511.1	18	3 003.7	85.55%		502.3	14.30%	1	5.2	0.15%	
IUCN Category VI	1	11.6	3	11.6	100.00%			0.00%			0.00%		
Madagascar	IUCN Other (not reported / not applicable)	7	6 694.2	31	6 443.1	96.25%		240.7	3.60%	1	0.1	0.00%	
	KBA	31	16 696.5	94	13 784.5	82.56%		2 722.1	16.30%	1	52.3	0.31%	
	EBSA	1	274 454.9	290	155 579.3	56.69%		45 498.2	16.58%	2	2 970.3	1.08%	
	IMMA	2	181 464.1	211	106 475.3	58.68%		45 498.2	25.07%	2	714.4	0.39%	
	Mangrove forest	N/A	63.1	67	58.0	91.92%				1	3.4	5.45%	
	Seagrass bed	N/A	3 045.6	24	3 045.6	100.00%				1	0.02	0.00%	
	Coral reef	N/A	1 201.4	73	980.9	81.65%		2.6	0.22%	1	12.6	1.04%	
	IUCN Category V	2	7 146.0	36	7 142.7	99.95%						0.00%	
	KBA	5	370.3	84	333.7	90.12%		0.2343	0.06%	3	35.8	9.66%	
	EBSA	1	198 575.5	732	162 775.1	81.97%		1 419.8	0.71%	19	34 148.9	17.20%	
Mozambique	IMMA	1	16 335.4	215	15 508.3	94.94%		0.04	0.00%	7	697.7	4.27%	
	Mangrove forest	N/A	20.5	98	20.1	98.41%		0.1	0.64%	4	0.1	0.66%	
	Seagrass bed	N/A	38.4	11	38.4	100.00%						0.00%	
	Coral reef	N/A	1 611.6	62	1 476.4	91.61%		33.9	2.10%	2	133.8	8.30%	

Table A3-4. Oil and gas (O&G) block by status overlapping biodiversity features in the NMC region per country

Country	Biodiversity feature	Number	Total area (km ²)	OPEN			UNDER APPLICATION & NEGOTIATION (UAN)			CONTRACTS		
				# of OPEN O&G blocks overlapping biodiversity features	Area overlapped by OPEN blocks (km ²)	% of total area overlapped by OPEN blocks	# of UAN O&G blocks overlapping biodiversity features	Area overlapped by UAN blocks (km ²)	% of total area overlapped by UAN blocks	# of CONTRACTS O&G blocks overlapping biodiversity features	Area overlapped by CONTRACTS blocks (km ²)	% of total area overlapped by CONTRACTS blocks
Seychelles	IUCN Category Ia	1	2 416.7	2	2 416.7	100.00%						
	IUCN Other (not reported)	2	124 852.1	60	124 807.3	99.96%						
	UNESCO Natural and Mixed World Heritage Sites	1	1.5	1	1.5	100.00%						
	KBA	4	916.9	13	916.9	100.00%						
	EBSA	1	122 773.7	63	121 749.7	99.17%						
	IMMA	1	366.96	27	366.96	100.00%						
	Mangrove forest	N/A	0.019	5	0.02	100.00%						
	Coral reef	N/A	197.8	18	197.8	100.00%						
	IUCN Category VI	2	883.03	4	683.4	77.39%	1	14.6	1.65%	3	185.1	20.96%
Tanzania	IUCN Other (not reported)	62	3 821.5	11	2 974.5	77.84%	1	0.7	0.02%	9	604.1	15.81%
	KBA	4	767.6	7	556.7	72.53%	1	15.3	2.00%	3	185.6	24.18%
	EBSA	1	51 175.3	28	33 932.0	66.31%	3	8 221.9	16.07%	15	6 677.6	13.05%
	Mangrove forest	N/A	15.1	12	13.0	86.34%	1	0.2	1.50%	5	1.5	10.27%
	Coral reef	N/A	785.4	12	375.1	47.75%	1	61.0	7.77%	9	272.8	34.73%



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