

Preliminary Strategic Environmental Assessment of the Petroleum Sector for the Government of the Federal Republic of Somalia



Developed in collaboration with



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TABLE OF CONTENTS

List of Acronyms	8
Acknowledgements	10
Executive Summary	11
1 INTRODUCTION	16
1.1 Recent Developments in Somalia	16
1.2 Developments in the Oil and Gas Sector in Somalia	16
1.3 Renewed Exploration Interest in Somalia	16
1.4 Phases and Timing of Oil and Gas Activities	19
1.5 The Need for a Strategic Environmental Assessment	19
2 ASSESSMENT METHODOLOGY	21
2.1 Defining the Terms of Reference	21
2.2 Adapting the Scope to meet COVID-19 and Logistical Restrictions	21
2.3 Geographical Scope of the Preliminary SEA	23
2.4 Use of GIS during the SEA process	23
2.4.1 Main GIS steps	23
2.4.2 Type of Datasets	23
2.4.3 Data Sources	23
2.4.4 GIS Processing	23
2.4.5 Software used	23
2.5. Initial Collaboration Efforts and Stakeholder Consultations	24
2.6 The Phases of the SEA Process	24
2.6.1 The Pre-Scoping Phase (Dec 2020 – Mar 2021)	24
2.6.2 The Scoping Phase (Mar 2021 – Aug 2021)	25
2.6.3 Key Issue Validation and Recommendation Phase (Sep 2021 – Jun 2022)	26
2.7 Beyond the Preliminary SEA	26
3 BACKGROUND TO THE ASSESSMENT	27
3.1 Environmental Legal, Policy and Regulatory Regime	27
3.1.1 Primary Legislation	27
3.1.2 International Commitments	28
3.1.3 Challenges related to the Development of the Petroleum Sector	29
3.2 Baseline Conditions of the Environment	30
3.3 Weather and Climate	30
3.3.1 Southeast Coast Conditions	30
3.3.2 Climate Change	30
3.4 Terrestrial Environment	30
3.4.1 Coastal Features	30
3.4.2 Coastal Geology and Hydrocarbon Prospects	33
3.5 Marine Environment	35
3.5.1 Oceanography	35
3.5.2 Marine Biological Environment	36

3.6 Marine Species and Areas of Conservation Importance	38
3.6.1 Species and Species Groups of Importance	38
3.6.2 Sites of Conservation Importance	40
3.7 Social and Economic Setting	41
3.7.1 Administrative Governance	41
3.7.2 Population	43
3.7.3 Land-based Economy and Livelihoods	43
3.7.4 Marine-based Economy and Livelihoods	43
3.7.5 Maritime Traffic	56
3.7.6 Security	56
4 STAKEHOLDER PARTICIPATION IN SCENARIO DEVELOPMENT	59
4.1 Development of Scenarios	59
4.2 Use of GIS for Scenario Visualization and Analysis	61
4.3 Risk and Opportunities Analysis	66
4.4 Development of Key Issues	66
4.4.1 Key Issues and Strategic Areas grouping	68
4.4.2 Validation and Prioritization of Key Issues	68
4.5 Comparison with Previous Capacity Needs Assessment	70
5 PRIORITIZED KEY ISSUES AND RECOMMENDATIONS	72
Strategic Area 12. Establishment of Environmental and Socio-economic Baseline Dataset	72
Strategic Area 10. Transboundary Issues	73
Strategic Area 9. Institutional Capacity, Structure and Functions	73
Strategic Area 2. Discharges and Emissions from the Petroleum Industry	76
Strategic Area 8. Critical Infrastructure	77
Strategic Area 11. Land and Marine Area Quality, Use and Spatial Planning	78
Strategic Area 6. Co-existence with Fisheries Sector	79
Strategic Area 4. Emergency Preparedness and Response (for Accidental Events)	80
Strategic Area 3. Waste Management	81
Strategic Area 5. Co-existence with Local Communities	82
Strategic Area 7. Co-existence with Tourism Sector	83
Strategic Area 1. Activities in Environmentally Sensitive and Protected Areas	84

6 NEXT STEPS	86
6.1 Finalization of the Preliminary SEA process	86
6.2 Focus of Efforts beyond the Preliminary SEA	86
6.3 Evaluating Renewable Energy Options for Somalia	87
7 BIBLIOGRAPHY	88
8 APPENDICES	92
Appendix 1. Meetings and Workshop Log	92
Appendix 2. Participating Individuals, Institutions and Meetings Attended.	93
Appendix 3. Risk and Opportunities Matrices for Upstream Activities.	95
Appendix 4. Survey Monkey Questionnaire Outline	98
Appendix 5. Master List of Issues and Scores of Risk and Opportunities Matrix and Survey Monkey	102
Appendix 6. Key Issues and Associated Issues from Master List	104
Appendix 7. Key Issue and Poll Question (Q) in Validation and Prioritization Exercise	106
Appendix 8. Final Key Issue Validation and Prioritization Exercise 12 January 2022.	109
Appendix 9. Proposed Key Issues "Owner" Institution from the ToT Workshop June 2022.	110

LIST OF FIGURES

Figure 1: Federal Republic of Somalia. Source: UNEP (2022).	17
Figure 2: Offshore exploration blocks from the August 2020 -March 2021 round, with the seven priority offshore blocks shown. Source: Modified from Somali Petroleum Authority (2019).	18
Figure 3: Exploration and production lifecycle phases and activities. Source: International Association of Oil and Gas Producers and IPIECA (2020).	19
Figure 4: Approximate distribution of three hydrocarbon basins off south-eastern Somalia, the focus of the Preliminary SEA, showing the seven exploration blocks currently on offer for exploration. Source: UNEP (2022).	22
Figure 5: Structure of the collaboration between the SEA Core Team, Co-chairs, TWG and Government Offices involved in the Preliminary SEA for the petroleum sector of Somalia.	25
Figure 6: Institutional Architecture for Environmental Management and Governance in Somalia's Oil and Gas Sector. Source: UNEP (2022).	27
Figure 7: Surface waters in southern Somalia.	31
Figure 8: Estuarine portion of the Juba-Shabelle basin at Gobweyn also visible is a portion of the Merka red dune complex inshore of Kismayo. Source: Google Earth (2022).	32
Figure 9: Satellite image of December 2020 showing the Bajuni Islands, extending 160 km from close to Kismayo to Ras Kiambooni on the Kenya border. Source: Google Earth (2022).	33
Figure 10: The bathymetry and oceanographic features of south-eastern Somalia.	34
Figure 11: The western sheltered shores of Tandas Island in the Bajuni Archipelago, showing large areas of dense mangrove forest and other intertidal habitats. Source: Google Earth (2022).	36
Figure 12: Biodiversity and protected areas of southeast Somalia.	39
Figure 13: Coastal areas of southern Somalia identified as being of Sub-regional importance (Source: Modified from WWF, 2004).	31
Figure 14: Population map of south-eastern Somalia.	42
Figure 15: Fish landing sites and main oceanographic features of the southeast coast of Somalia.	46
Figure 16: March 2022 satellite image of the new T-shaped small port facility at Hobyo. Also visible are GRP boats on the sand. Darker patches in the sea are likely washed-up seagrass. Source: Google Earth (2022).	49
Figure 17: Google Earth image showing the south-central Adale village and landing area March 2013 (upper) and March 2019 (lower). Source: Google Earth (2022).	50
Figure 18: Google Earth image of El Maan, from November 2018, showing GRP boats in the water and on the shore, as well as a few houris; with darker seabed probably seagrass, contrasting against the white sand, and part of the rocky reef that provides shelter to the town also visible. Source: Google Earth (2022).	51
Figure 19: Google Earth image from February 2022, showing possibly three landing sites and the two port areas of Mogadishu. Source: Google Earth (2022).	52
Figure 20: Google Earth image from February 2022, showing the small Jazeera town, plus adjacent evaporation salt pans and part of the lagoon system and inlet that feeds the salt works. Source: Google Earth (2022).	52
Figure 21: Google Earth image from March 2017, showing the sprawling city of Baraawe and its likely fish landing sites. Source: Google Earth (2022).	54
Figure 22: Maritime traffic (all vessel) off the south-eastern coast and offshore waters and the positions of the offshore exploration blocks.	57

Figure 23: The three areas selected for the first scenarios to initiate the identification of issues.	58
Figure 24: Geographical representation of a scenario showing three hypothetical explorations well locations in the North Obbia Basin with (a) a set of socio-environmental layers along the coastline, (b) identification of grids where at least one of the socio-environmental layers can be found, and (c) the number of socio-environmental layers that can be found in one grid with potential overlap of oil and gas activities.	60
Figure 25: Geographical representation of a scenario showing three hypothetical explorations well locations in the North Obbia Basin of interactions between socio-environmental receptors with potential oil and gas activities.	62
Figure 26: Geographical representation of a scenario showing three hypothetical explorations well locations in the Coriole Basin with (a) a set of socio-environmental layers along the coastline, (b) identification of grids where at least one of the socio-environmental layers can be found, and (c) the number of socio-environmental layers that can be found in one grid with potential overlap of oil and gas activities.	63
Figure 27: Geographical representation of a scenario showing three hypothetical explorations well locations in the Coriole Basin of interactions between socio-environmental receptors with potential oil and gas activities.	64
Figure 28: Geographical representation of a scenario showing three hypothetical explorations well locations in the Juba-Lamu Basin with (a) a set of socio-environmental layers along the coastline, (b) identification of grids where at least one of the socio-environmental layers can be found, and (c) the number of socio-environmental layers that can be found in one grid with potential overlap of oil and gas activities.	65
Figure 29: Geographical representation of a scenario showing three hypothetical explorations well locations in the Juba-Lamu Basin of interactions between socio-environmental receptors with potential oil and gas activities.	66
Figure 30: Plot of the initial prioritization poll from January 2022 of the 24 Key Issues (numbered).	68
Figure 31: Spider plot of the Somalia CNA questionnaire showing the summary results per sector.	70
Figure 32: Spider plot of the Somalia CNA questionnaire showing the detailed results per sector.	71

LIST OF TABLES

Table A1: Final prioritization of the 23 Key Issues.	
Table 1: Multilateral Environmental Agreements that Somalia has Signed and/or Ratified.	28
Table 2: Regional Environmental Agreements/Protocols that Somalia has Signed and/or Ratified.	29
Table 3: Fish landing sites in south-eastern Somalia.	47
Table 4: The first scenarios presented to stakeholders to initiate the identification of issues.	59
Table 5: Sample risks and opportunities matrix for seismic surveys.	67
Table 6: Prioritization of Key Issues.	69

LIST OF ACRONYMS

AG	Attorney General	IOCs	International Oil Companies	MOPMR	Ministry of Petroleum and Mineral Resources	SC	Somali Current
ASCLME	Agulhas and Somali Current Large Marine Ecosystems Project	IOGP	International Association of Oil and Gas Producers	MOPMT	Ministry of Ports and Marine Transport	SCC	Somali Counter Current
AVHRR	Advanced Very High-Resolution Radiometer	IOTC	Indian Ocean Tuna Commission	MOPWRH	Ministry of Public Works, Reconstruction and Housing	SMA	Somalia Maritime Administration
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora	ISO	International Organization for Standardization	MPA	Marine Protected Areas	SMP	Somali Marine Products
CMP	Conservation and Management Plan	JNCC	Joint Nature Conservation Committee	MSP	Marine Spatial Planning	SMRRC	Somali Marine Resource Research Centre
CMS	Convention on the Conservation of Migratory Species of Wild Animals	KO	Kick-off	NBSAP	National Biodiversity Strategy Action Plan	SNU	Somalia National University
CNA	Capacity Needs Assessment	LPR	Legal and policy review	NC	Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region, 1985	SONRECC	Somali Natural Resource Research Centre
DECC*	Directorate of Environment and Climate Change	MARPOL	73/78 International Convention for the Preservation of Pollution from Ships, 1973, as amended by the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973	NCS	Norwegian Continental Shelf	SPA	Somali Petroleum Authority
EACC	East Africa Coastal Current	MDA	Ministries, Departments and Agencies	NEA	Norwegian Environment Agency	SST	Sea surface temperature
EEZ	Exclusive Economic Zone	MEA	Multilateral Environmental Agreements	NEAP	National Environmental Action Plan	STD	Sexually transmitted disease
EMA	Environmental Management Act	MEMD	Uganda, Ministry of Energy and Mineral Development	NESAP	National Environment Strategy and Action Plan	ToR	Terms of Reference
ESIA	Environmental and Social Impact Assessment	MEP	Kenya, Ministry of Energy and Petroleum	NGO	Non-governmental organization	ToT	Training of Trainers
ESMP	Environmental and Social Management Plan	MIREME	Mozambique, Ministry of Mineral Resources and Energy 2017	NOSCP	National Oil spill contingency plan	TRAFFIC	Trade Records Analysis of Flora and Fauna in Commerce
EUCAP	European Union Capacity Building Mission	MMO	Marine mammal observer	NORAD	Norwegian Agency for Development Cooperation	TWG	Technical Working Group
FAO	Food and Agriculture Organization of the United Nations	MOE	Ministry of Environment	OECD	Organization for Economic Co-operation and Development	UNCCD	United Nations Convention to Combat Desertification
FGS	Federal Government of Somalia	MOEWR	Ministry of Energy and Water Resources	OfD	Oil for Development	UNCLOS	UN Convention on the Law of the Sea
FMS	Federal Member States	MOF	Ministry of Finance	OPM	Office of Prime Minister	UNEP	United Nations Environment Programme
FP	Focal point	MOFMR	Ministry of Fisheries and Marine Resources	OPRC	International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990	UNFCCC	United Nations Framework Convention on Climate Change
GHG	Green-house gas	MOH	Ministry of Health	OSCP	Oil spill contingency plan	WCMC	World Conservation Monitoring Centre
GIS	Geographical Information System	MOHADM	Ministry of Humanitarian Affairs and Disaster Management	PERSGA	Regional Convention for the Conservation of the Red Sea and the Gulf of Aden Environment	WWF	World Wildlife Fund
GoS	Government of Somalia	MOIFAR	Ministry of Interior and Federal Affairs	PSA	Production Sharing Agreement		
GRP	Glass reinforced plastic	MOJ	Ministry of Justice	QGIS	Quantum Geographical Information System		
HSE	Health, Safety and Environment	MOLSA	Ministry of Labour and Social Affairs	SEA	Strategic Environmental Assessment		
IBA	Important Bird Area	MOP	Ministry of Planning				
ILO	International Labour Organization	MOPE	Ministry of Petroleum and Energy				
IMMA	Important Marine Mammal Area						
IMO	International Maritime Organization						

*As of September 2022, the DECC is being reconstituted into the new Ministry of Environment and Climate Change.

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EXECUTIVE SUMMARY

Background and context

In the last decade, the East Africa region has garnered attention for oil and gas exploration as there have been major discoveries both onshore and offshore. With the improved peace and security situation in Somalia, the Government is preparing to develop its potential oil and gas reserves that have remained dormant for over two decades. Under the leadership of the Federal Government (FGS) and Federal Members States (FMS), current oil and gas exploration focus is on three hydrocarbon basins: North-Obbia, Coriole and Juba-Lamu, all located on the south-eastern margins and offshore areas of the country.

The potential discovery of commercial oil and gas resources presents possible significant socio-economic opportunities for the coastal region of southern Somalia, and the country at large. However, it is also important to view potential oil and gas development in the context of Somalia's wider blue economy, which include areas of high ecological and biodiversity significance, and which are highly populated and supporting important artisanal and industrial fisheries. This presents various challenges for environmental and socio-economic protection.

The United Nations Environment Programme's (UNEP) ongoing collaboration with the Government of Norway's Oil for Development (OfD) Programme provides technical assistance and training support to Somalia, among other countries. Support includes training in environmental data baselining, environmental legal/policy review, and Strategic Environmental Assessment (SEA) in relation to the oil and gas sector. This collaboration is being coordinated through the UNEP's Disasters and Conflicts Branch based in Geneva, but work involves other UNEP colleagues including the UNEP Africa Regional Office and UNEP-World Conservation Monitoring Centre (WCMC) based in Cambridge.

To guide the sustainable development of the potential oil and gas sector in Somalia, preparation of an SEA is proposed. Development of such a tool is best applied at the earliest stages of decision making, both to help

formulate policies, plans and programmes, and to assess their potential development effectiveness and sustainability. The geographical scope of this SEA comprises possible oil and gas exploration activities on coastal land and all offshore blocks within the three hydrocarbon basins.

The approach to prepare the SEA has necessitated adjustment to meet with the requirements imposed by the COVID-19 pandemic in 2021, particularly with respect to travel to Somalia by the UNEP SEA Core Team, and regarding distancing and meetings. As a result, the outcome is referred to as a 'Preliminary' SEA, which can over time be expanded to the full document as needs arise. The outputs from the *Preliminary SEA* will nevertheless serve as a sound basis from which a widespread and comprehensive validation process can be conducted and amendments made over time.

The *Preliminary SEA* in the context of the potential petroleum sector in the south-eastern coastal states of Somalia focuses mainly on upstream activities. It represents a strategic policy tool to guide and inform environmental, socio-economic, health, safety and security regulations, policy, governance arrangements and decision-making pertaining to this emergent sector, vis a vis other important socio-economic sectors, in this coastal and marine space.

Preliminary SEA Scope and Objective

Across this broad scope, the key objectives of the *Preliminary SEA* were to:

1. Contribute to an environmental and sustainable decision-making process
2. Improve policy, plan, and programme quality
3. Strengthen and facilitate individual project environmental and social impact assessments (ESIAs)
4. Foster new means of making decisions through enhanced coordination mechanisms across Federal Government Ministries as well as with Federal Member States

Structure of the Preliminary SEA

The *Preliminary SEA* process began in late 2020 and proceeded through 2021. The key findings and recommendations were presented at a national workshop in March 2022 in Mogadishu. Key findings and recommendations were further validated during a Training of Trainers on SEA held in Nairobi, Kenya, in June 2022. This report reflects the outcome of these processes.

The *Preliminary SEA* presents a background to the process, a comprehensive description of the environmental and socio-economic baseline conditions, and a brief overview of the legal, policy and regulatory situation, followed by a description of the stakeholder engagement process, the development of upstream exploration scenarios, the identification of issues and concerns and their validation and prioritization into the final Key Issues. Each Key Issue is then presented with the proposed recommendations.

The local partnership technical involvement was co-chaired by an appointed representative of the Ministry of Petroleum and Mineral Resources (MOPMR) and of the Directorate of Environment and Climate Change (DECC*) under the Office of the Prime Minister, with the SEA Technical Working Group (TWG) including members of the selected Federal Member States.

An extensive stakeholder engagement program to support the SEA process was a main feature of the work. To date, 70 individuals from a diverse range of institutions, from both the FGS and FMS government as well as research and non-governmental organizations (NGO), participated. The stakeholder engagement process and meeting and workshop log are included in the *Preliminary SEA*.

Summary of the Preliminary SEA Outputs

The SEA consultation process identified a number of Key Issues, which were grouped into the following 12 Strategic Areas:

1. Activities in environmentally sensitive and protected areas
2. Discharges and emissions from the petroleum industry
3. Waste management
4. Emergency preparedness and response (for accidental events)
5. Co-existence with local communities
6. Co-existence with fisheries sector
7. Co-existence with tourism sector
8. Critical infrastructure
9. Institutional capacity building, structure, and functions
10. Transboundary issues
11. Land and marine area quality, use and spatial planning
12. Establishment of an environmental and socio-economic baseline dataset

In January 2022, the Key Issues as presented were re-considered by the TWG and stakeholders and ranked with respect to their perceived priority for the country and the petroleum sector. Following that ranking exercise the number was reduced to 23 Key Issues, as shown in Table A1.

Each of the 23 Key Issues is accompanied by a set of clear recommendations and will need to be carried forward with formal identification of their “owners”, being the institutions that have a responsibility for managing aspects related to the significant issues. A preliminary assignment of Key Issue “owners” was also undertaken at the Trainer of Trainers Workshop, which provides a basis for identifying institutions responsible for implementing the recommendations.

Table A1. Final prioritization of the 23 Key Issues.

Key Issue and corresponding Strategic Area number	Overall priority
12.1 Incomplete (and inaccessible) environmental data to support environmental management of offshore petroleum activities in Somalia	Highest
3.1 Impacts from hazardous waste	
9.1 Appropriate legal and policy requirements should be in place	
1.2 Impact on marine species of conservation or national importance	High
1.1 Impact on environmentally sensitive marine areas and habitats	
10.1 Transboundary oil spill preparedness	
11.1 Spatial planning to aid management of Somalia EEZ	
8.1 Infrastructure is available to the petroleum sector	
9.4 Legal enforcement	
9.5 Technical capacity requirements are met	
2.1 Routine and accidental discharges	
6.1 Ensuring fisheries productivity	
7.1 Ensuring tourism potential	
9.2 Coordination between institutions to facilitate sustainable development of the sector	Medium
8.2 Appropriate analytical laboratory is available to the petroleum sector	
5.1 Local content participation in the oil and gas sector	
4.1 Emergency response preparedness (for accidental events)	Medium-Low
5.3 Health and safety among local communities and employees	
2.3 Impacts from sea level rise and storms	
9.3 Insurance requirements and liability are provided	Low
2.2 Greenhouse gas emissions	
5.2 Gender representation and impact assessment	
3.2 Impacts from non-hazardous waste	

*As of September 2022, the DECC is being reconstituted into the new Ministry of Environment and Climate Change.

Conclusions

The *Preliminary SEA* is multi-dimensional in nature, as it analyses social, environmental, economic and governance issues, prioritizes, and validates the Key Issues with extensive, participatory, and responsive consultations with stakeholders, and recommends actions to address the issues.

The *Preliminary SEA* is the first for the oil and gas sector in Somalia and will be a valuable reference and precedent at national and other levels. It is also a beginning of stakeholder partnership on concerted implementation of the recommendations that will guide future plans and decisions regarding sustainable environmental management of offshore oil and gas activities but also the broader coastal and marine space in Somalia. As such, it should feed into the current ongoing licensing rounds and decision making by providing information on the strategic impact areas as upstream oil and gas activities are undertaken in Somalia.

Furthermore, the exercise can have broader benefits beyond the potential oil and gas sector, as it was designed to build institutional capacities on how to undertake SEAs, which can also be replicated in other sectors and other geographic regions. The approach was also to look at oil and gas vis-à-vis other emerging, critical development sectors such as fisheries and tourism.

Main messages

Based on the background and analysis presented in the *Preliminary SEA*, and in addition to the 23 Key Issues and the associated recommendations, the following are the key messages and initiatives that should be the immediate focus to inform the development of the petroleum sector in Somalia:

Sensitive marine and coastal environment

- The highly sensitive marine and coastal environment around the Bajuni Archipelago in Jubaland should be considered as an “off-limits area” for all oil and gas activities.
- Preparation of coastal environmental sensitivity maps will greatly assist the petroleum sector to understand and mitigate impacts on the sensitive nature of the south-east Somalia coastline. Such maps would depict estuaries such as Gobweyn (Juba-Shabelle), along the Bajuni Archipelago coast, coastal lagoons, mangrove forest and other sensitive environmental receptors, as well as hotspots of human and socio-economic activities associated with the coast, namely fisheries but also solar salt production. The expertise to develop such a tool now exists in-country and the opportunity exists to develop this tool and to regularly update it as needed.

Artisanal fisheries

- Artisanal fisheries are highly important for large sections of the coastline between Hobyo and the Kenya border, and all efforts should be focused on mitigating any possible impacts on this socio-economic activity whenever oil and gas activities are considered that potentially impact on the inshore waters and coast.

Management of waste

- The management of waste is often a challenge for countries that are embarking on development of the oil and gas sector, with Somalia being no exception. Therefore, it is important that a strategy be developed that focuses on this service sector from the outset, working with the oil companies, development partners and encouraging private sector participation, to ensure that there is no legacy of “oil waste” in the country.

Technical capacity across the institutions

- Technical capacity across the institutions involved with the oil and gas sector must be strengthened, at the central FGS level as well as, and especially at the FMS levels.
- Dialogue and collaboration between the FGS institutions and those at the FMS level need to be strengthened, open, transparent, and constructive to ensure co-benefits as exploration activities get started and should endure when the production phase commences.

Oil pollution emergency preparedness

- Oil pollution emergency preparedness and cooperation, with training and drafting of a Somalia national oil spill contingency plan (OSCP) is an important prerequisite to supporting offshore activities of the sector. It is critical that some form of guideline document be in place in case of accidental oil spills. Collaboration with all stakeholders is a requirement for development of such guidelines; assisted by development partners where appropriate. The OSCP should also be part of a transboundary spill preparedness which will necessitate regional collaboration, especially with neighbouring countries, for instance associated with the Nairobi Convention.

Climate change and sustainable energy sources

- Responding to climate commitments, Somalia needs to ensure oil and gas development is considered hand in hand with their climate goals, focused on reducing greenhouse gas emissions from oil and gas activities, and reducing the energy transition risks for the country in the future. On the latter, focused studies on climate and energy policy for Somalia are needed, that also examine renewable energy potential especially wind and solar.
- A revised climate and energy policy will need to take into account the urgency and huge challenge with regards to energy supply and access in Somalia given that 90% of population still relies on biomass for fuel which is driving deforestation and the illicit charcoal trade (see UNEP 2005a).

1. INTRODUCTION

1.1 Recent Developments in Somalia

The Federal Government of Somalia (FGS) has been pursuing efforts towards stabilizing the country and, since 2012, there have been significant improvements towards peace and security through establishing a federal structure of governance. This improved peace and security situation in the country has arguably paved the way for strategizing on how to tap resources that have remained dormant for over two decades, some of which have never been exploited.

Somalia covers a land area of 637,657 km², with an exclusive economic zone (EEZ) of over 830,000 km², bordered in the north by the Gulf of Aden and in the east by the Indian Ocean (Figure 1).

1.2 Developments in the Oil and Gas Sector in Somalia

Based on the review by Purcell (2014), there was a global exploration surge during the 1950s, with the Horn of Africa seen as a potential extension of the Arabian oil province. Various international oil companies (IOCs) commenced field work in Somalia and Ethiopia scanning the region for structures similar to Saudi Arabia's legendary Ghawar. In all, 28 wells were drilled in Somalia during the '50s, with many being stratigraphic rather than structural tests (Purcell 2014). There were encouraging oil and gas shows including close to Mogadishu.

Exploration decreased slightly in the 1960s with reduced permit areas in northern Somalia, and only 25 wells were drilled, with the gas flow at Sinclair's Agfoi-1, close to Mogadishu the high point of the decade onshore, with another oil show in the Daga Shebel area of Somaliland (Purcell 2014). The military coup and war with Somalia in the 1970s brought exploration to an end, with only five wells drilled. Activity rose again in the 1980s, driven by high oil prices, with 14 wells drilled, with two wells trying unsuccessfully to prove commerciality at the Agfoi gas field in Somalia close to Mogadishu.

By the late 1980s though, the oil price had collapsed, through to the 90s, with promising exploration efforts in Somalia aborted after the 1991 Somalia coup and the civil war that followed, but not before Conoco's Nogal well encountered oil in the Upper Cretaceous/Tertiary Nogal Rift, in Somaliland (Purcell 2014).

There was no drilling activity in the first decade of 2000s, but there was a massive surge in permitting in the East Africa region since 2010 in response to the discoveries and almost all basin areas are under permit, except in areas where security remains a major problem. In summary, since the 1950s, about 70 exploration wells have been drilled in Somalia. Most were on land, with some close to the shore, and only four in what appears to be shallow, inshore waters, and none in the deep sea. Of these, there was a significant occurrence of oil detected, one gas discovery and 13 significant occurrences of gas detected, and 52 dry wells. This is in contrast to enormous gas discoveries in Tanzania and massive oil discoveries in Uganda over the last fifty years.

1.3 Renewed Exploration Interest in Somalia

Despite enormous potential for sustainable forms of energy, including from wind and solar sources, there has recently been renewed interest in hydrocarbon exploration in Somalia. Offshore oil and gas development in particular has recently become the focus of the FGS to restart exploration after a period of dormancy for almost thirty years. Given Somalia's proximity to the oil-rich Red Sea and Gulf of Aden in the north, there are expectations of its potential oil reserves.

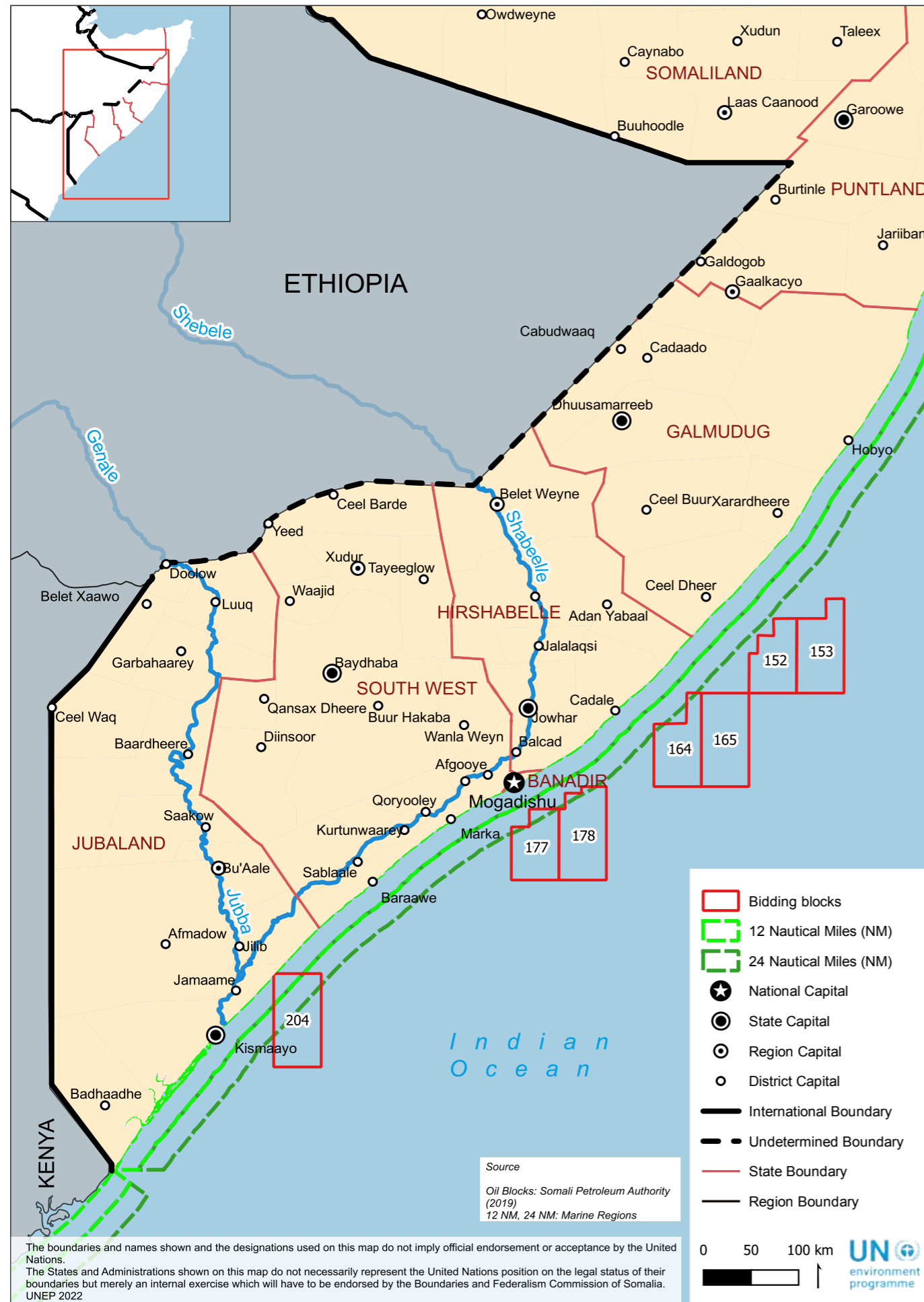
Between 2014 and 2016, the FGS in cooperation with Spectrum Geo and Soma Oil and Gas, completed two phases of acquisition and processing of offshore seismic data covering approximately 40,000 km in total in the Indian Ocean (Spectrum Geo 2018). The seismic operation is part of the exploration phase, but it has been implemented without the establishment of the conditions ensuring marine environmental protection and in the absence of the necessary environmental legal framework (Somalia, Ministry of Fisheries and Marine Resource 2014).

In June 2018, a petroleum management and revenue sharing agreement between the FGS, and its federal member states (FMS) was signed in Baidoa (Africa Oil and Power 2018). The purpose of this agreement was to establish a clear understanding between the stakeholders on the management and administration of the resources and to bring sustainability by achieving inclusivity, equitable benefit-sharing, transparency, and accountability (Somalia, Ministry of Petroleum and Marine Resources [MOPMR] 2019a).

Figure 1: Federal Republic of Somalia. Source: UNEP (2022).



Figure 2: Offshore exploration blocks from the August 2020 -March 2021 round, with the seven priority offshore blocks shown. Source: Modified from Somalia, Ministry of Petroleum and Mineral Resources (2019b).



It is also expected that other stages of exploration and production will start in the near future (Somalia, MOPMR 2019b) with a round of exploration block licensing that started in early 2018 when the FGS embarked on a number of roadshows around the world to showcase the seismic report findings, announce fiscal terms, and unveil 50 blocks covering a total area of over 173,000 km² (Spectrum Geo 2018). The most recent round was extended to 12th March 2021, when Somalia opened its offshore exploration license round (Figure 2) (Somalia, MOPMR 2019b).

1.4 Phases and Timing of Oil and Gas Activities

To obtain a realistic image of the opportunities and risks related to oil and gas development in Somalia, understanding the possible phases and timing of activities is important. Environmental aspects and potential impacts associated with exploration and production are closely linked to the nature of the hydrocarbon(s) being recovered and the activities involved. The main phases in the upstream exploration and production lifecycle, as well as the key activities that typically occur in each phase are depicted in Figure 3, with an approximate indication of timescales.

In Somalia, seismic surveys are mostly completed, some drilling has been conducted as described above, but more exploration drilling is needed. At the end of the exploration phase there will potentially be an announcement of commercial discoveries which could then be investigated further into the development phase. Should commercially viable reserves be found, start production of oil or gas could then occur at the end of the 2020s.

1.5 The Need for a Strategic Environmental Assessment

In the last decade, the East Africa region has garnered increased attention for oil and gas exploration as there have been major discoveries in both onshore and offshore (Purcell 2014; Rochette and Wright 2015; Richmond 2015). Oil and gas development in Somalia is seen as one of the major components of the blue economy, vis-à-vis other socio-economic sectors.

The initiation of the offshore oil exploration process raises the usual concerns, typically related to the following aspects:

- Legal framework to regulate oil and gas activities
- Technical capacity to implement regulations and monitor activities
- Logistical challenges faced by operators related to importation, storage, transportation of chemicals and equipment to well locations
- Supply of local materials such as water, fuel, and fresh foods
- Available workforce for skilled and unskilled tasks
- Understanding sensitivities of the offshore, coastal, and onshore environments
- Waste management challenges
- Health and safety issues
- Emergency preparedness

A Strategic Environmental Assessment (SEA) is generally undertaken to guide preparations and connect decision makers across sectors over plans and future potential of the sector in a country. It is an impact assessment

Figure 3: Exploration and production lifecycle phases and activities. Source: International Association of Oil and Gas Producers and IPIECA (2020).

ACTIVITY	PHASE			
	Exploration/ Appraisal	Project Development	Operations	Cessation of Production
SEISMIC	2D and 3D	3D	3D and 4D	
DRILLING	Exploration/ Appraisal	Appraisal/ Development	Development	Well Plugging and Abandonment
CONSTRUCTION		Installation Commissioning	Modifications Expansion	Dismantling Removal
PRODUCTION			Production Operations	
DECOMMISSIONING				Decommissioning Restoration
TIMESCALE	2-3 years	2-5 years	10-40 years	Variable

tool that is strategic in nature and has the overall objective of facilitating environmental integration and the assessment of the opportunities and risks of strategic actions in a sustainable development framework. In practice, the SEA refers to a range of “analytical and participatory approaches that aim to integrate environmental considerations into policies, plans and programmes and evaluate the inter linkages with economic and social considerations” (Organisation for Economic Co-Operation and Development [OECD] 2006). SEA can be described as a family of approaches which use a variety of tools, rather than a single, fixed, and prescriptive approach; thus, a good SEA is adapted and tailor-made to the context in which it is applied (OECD 2006).

The time for preparation of an SEA is ideally before the sector has started development, to be applied at the earliest stages of decision making both to help formulate policies, plans and programmes and to assess their potential development effectiveness and sustainability. This distinguishes SEA from more traditional environmental assessment tools, such as Environmental and Social Impact Assessment (ESIA), which have a proven track record in addressing the environmental threats and opportunities of specific projects – but are less easily applied to policies, plans and programmes. SEA is not a substitute for, but complements, ESIA and other assessment approaches and tools. ESIA should continue to be undertaken for each specific individual or grouped set of activities in particular locations and circumstances. In the case of Somalia, having an SEA for the petroleum sector in place in the short term would contribute significantly towards guiding the development of this industry.

The SEA has four principal objectives:

1. Contribute to an environmental and sustainable decision-making process,
2. Improve policy, plan, and programme quality,
3. Strengthen and facilitate project’s ESIA, and
4. Foster new means of making decisions.

The goal of the SEA is to supplement the understanding of the existing challenges and to provide recommendations on how to protect and enhance the value of nature in the context of oil and gas activities for long term value creation and sustained livelihoods. A balanced co-existence with fisheries, agriculture, local industry, and other activities is a prerequisite towards this goal. The SEA takes a holistic view and comprises physical and biological aspects as well as socio-economic and cultural issues.

An SEA also raises some basic and overriding questions related to the understanding of the physical and biological environment, and the socio-economic and cultural aspects, such as:

- Should oil and gas exploration and potential further development take place in Somalia?
- Is the planned timing and placing of the oil and gas activities in Somalia appropriate when it comes to capacity of governmental institutions and knowledge levels of local communities and inhabitants?
- Are there any geographical exclusion zones which should be kept untouched by oil and gas activities in Somalia?
- In light of the current global emphasis on carbon-free development, is Somalia prepared to establish the pre-conditions for oil and gas activities mindful that there are risks associated early-stage exploration in the context of the global energy transition?

To build the platform for this overriding discussion, an SEA identifies the significant risks and opportunities related to a series of potential onshore and offshore scenarios for oil and gas activities in Somalia. This information is also used as basis for recommendations on sustainable input to relevant policies, plans and programs, and for updates of laws and regulations.

2. ASSESSMENT METHODOLOGY

The SEA process started in November 2020 and reached its final phases in mid-2022. The work undertaken during this 15-month period is described in more detail below. It includes the best practice categories or themes required for a successful SEA process, structured around the categories, information and understanding that need to be compiled as the SEA developed.

2.1 Defining the Terms of Reference

The initial focus served to define the detailed terms of reference (ToRs) for the development of the SEA. To achieve that, the following broad tasks represent the main scope of the work:

- 1) Define a methodology tailored to respond to the restrictions imposed by the COVID-19 pandemic, without site visits, and based around online consultative meetings and strengthen collaboration with relevant entities.
- 2) Work with the geographical information system (GIS) specialist in the UNEP SEA Core Team and counterparts and collaborators to define the data requirements for the SEA in order to establish an environmental baseline layer as well as proposed/ ongoing development sectoral plans data layer
- 3) Identify data needs, and gaps, data that is open access and those data that require to be purchased, and define an appropriate budget, in consultation with the GIS specialist in the UNEP SEA Core Team.
- 4) Investigate alternatives and propose solutions for storage of Preliminary SEA data (Cloud, Open Access), transfer to FGS mandated authority to maintain the data.
- 5) Review and comment on the on-going policy and legal review prepared for the SEA.
- 6) Work with the GIS specialist in the UNEP SEA Core Team and counterparts and collaborators to define appropriate development scenarios and present them in map form as the basis for consideration on opportunities and risks.

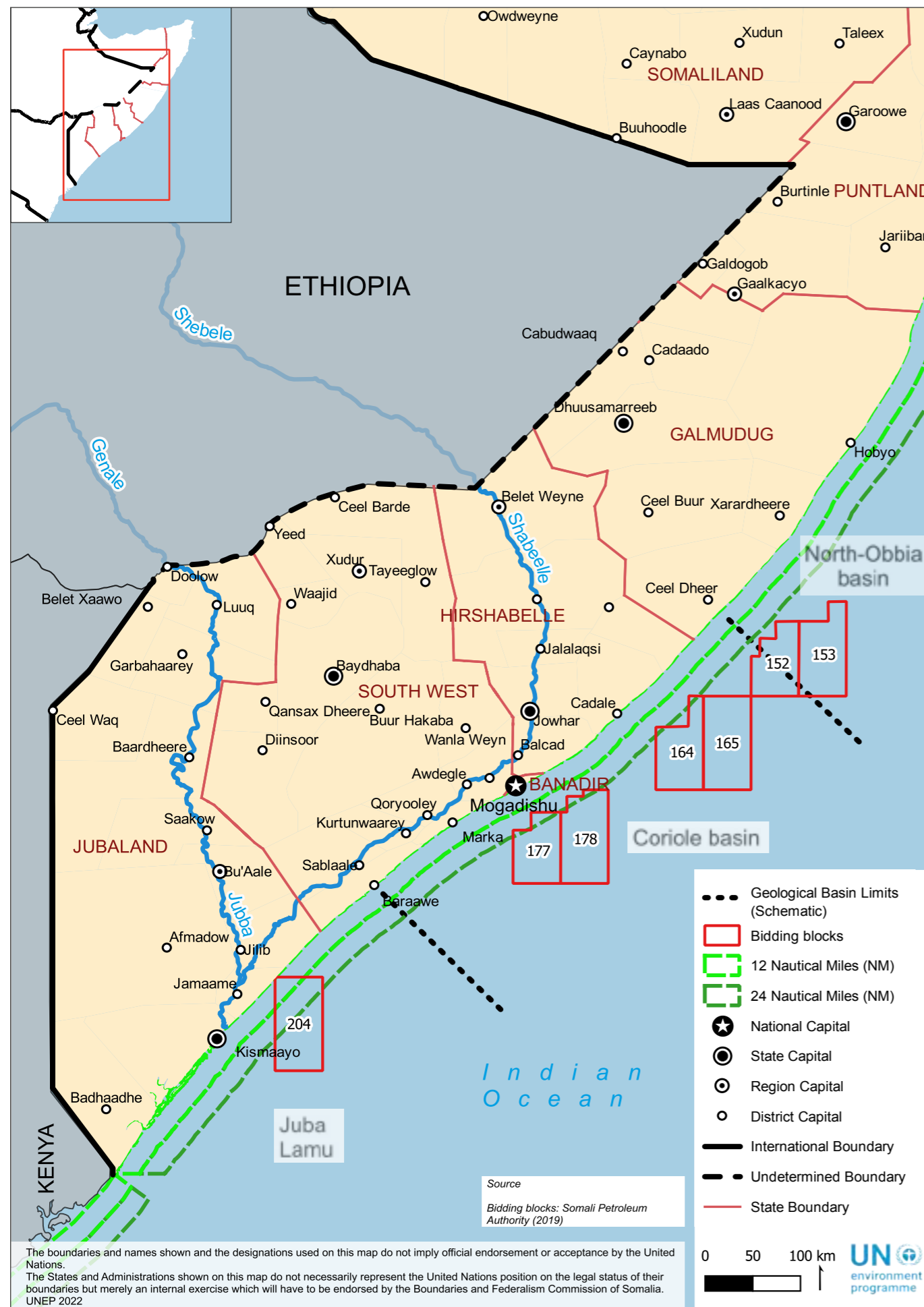
- 7) Ensure widespread and comprehensive stakeholder participation, review, validation, and ownership throughout the development of the SEA.
- 8) Identify “owners” of the Key Issues – the relevant institutions that have a responsibility for managing aspects related to the significant issues – and work with to solicit suggestions on how to meet the risks and opportunities (Key Issues) within their mandate.
- 9) Involvement of decision-makers to build understanding and ownership of the final recommendations so that these can effectively be carried forward and implemented.

2.2 Adapting the Scope to meet COVID-19 and Logistical Restrictions

The approach to prepare the SEA necessitated adjustment to meet with the requirements imposed by the COVID-19 pandemic, particularly with respect to travel to Somalia by the UNEP SEA Core Team, and regarding distancing and meetings. Due to constraints on travel and mobility and the time frame for the licensing rounds, there was no on-the-ground data collection; however, data was collected through virtual consultations with government functionaries and desk-based studies.

As a result, the outcome of this work will for the foreseeable future be referred to as a ‘preliminary’ SEA, which can over time may be expanded to the full document as needs arise. A similar approach was followed in Sri Lanka, Nepal, and Cote d’Ivoire, applying a rapid and adapted approach utilized by UNEP in other post-crisis contexts. The outputs from the *Preliminary SEA* will nevertheless serve as a sound basis from which to conduct a widespread and comprehensive validation process and make amendments over time.

Figure 4: Approximate distribution of three hydrocarbon basins off south-eastern Somalia, the focus of the Preliminary SEA, showing the seven exploration blocks currently on offer for exploration. Source: UNEP (2022).



2.3 Geographical Scope of the Preliminary SEA

A consensus was achieved on the geographic scope of this rapid SEA process. The focus for the scenario development would be on the three basins: Obbia Basin (north), the Coriole Basin (central, around Mogadishu) and the Kismayo (or Chisimayo) Basin bordering Kenya, which includes the seven exploration blocks that are of relevance to the ongoing licensing rounds (as depicted in Figure 4). The focus of this *Preliminary SEA* is therefore on the coastal zone between the town of Hobyo (or Obbia) and the Kenya border.

2.4 Use of GIS during the SEA process

GIS provide the means to integrate and spatially assess multiple environmental and planning considerations in a single interface, supporting the systematic prediction and evaluation of spatially distributed and cumulative impacts, a key assessment consideration in SEA. GIS has been used at various stages of the SEA process.

The sub-sections summarize the different GIS steps, procedures, data, and software that were used during the SEA process.

2.4.1 Main GIS steps

- **Screening/Scoping:** during this stage, GIS experts collated all information available covering a wide range of thematic and covering the entire geographic area of interest. Layers collated were environmental, socio-economic, population, transport, physical, biological, etc.
- **Baseline Status:** several thematic maps were produced to get an understanding of environmental assets and conditions as well as existing and future activities.
- **Map scenarios:** based on the different oil blocks currently tendered, several scenarios were designed and mapped for future discussions with SEA stakeholders.
- **Identify potential impacts:** spatial analysis was performed to identify geographic areas of potential impacts between oil and gas industry and others socio-economic activities of importance such as fishing; as well as analysing high level environmental sensitivities along the coastline.

2.4.2 Type of Datasets

GIS datasets were used when they were available, some of the datasets were vector files as point (cities, marine mammals sighting, etc.), lines (rivers, roads, etc.) or polygons (protected areas, mangrove patches, etc.). Other datasets were raster files at different spatial resolution (population density, bathymetry, land-use, etc.).

In some cases, information was provided without geographic coordinates and had to be spatialized.

2.4.3 Data Sources

Only data available publicly have been used during the process, either datasets downloaded directly as spatial datasets from recognized sources or extracted from reports and maps accessible on internet.

Local datasets, meaning data created or collected in the field have been used when they were available; but most of the datasets used in this process were data produced at global scale by international organisations or initiatives.

2.4.4 GIS Processing

During the process, the following geoprocessing were performed:

- **Georeferencing:** several maps shared by partners were lacking geographic coordinates and had to be georeferenced in order to be overlaid on other GIS datasets.
- **Digitizing:** some of the information used in the SEA process were not available as GIS datasets; information had to be digitized directly on the maps after they have been georeferenced properly.
- **Styling:** choosing a relevant symbology for the different layers and applying transparencies where relevant to optimize multi-layer visualisation.
- **Mapping:** a dedicated template was designed to produce a set of standard cartographic products with all relevant information like scale, legend, data sources, logos, etc.
- **Format Conversion:** some data had to be converted from one geometry type to another geometry type (i.e., polygon to line, points to line) and sometimes, it was necessary to convert from a data format to another one: raster to vector or vector to raster.
- **Clipping:** global datasets had to be clipped to cover only the geographic area of interest.
- **Spatial selection:** when analysing environmental datasets located close to oil blocks and future oil and gas facilities, spatial selection was performed.
- **Table calculations:** when analysing co-occurring environmental issues, table calculations were made to sum different overlapping layers.

2.4.5 Software used

All GIS steps and activities were performed using the free and open-source GIS software called QGIS (Quantum Geographical Information System) and accessible through the link: <https://qgis.org/en/site/>.

In this *Preliminary SEA*, there was no development of web-mapping applications or online data platform. It is recommended that in the future, all data, maps, and visualisations should be accessible through a dedicated platform to facilitate and improve the process and bring transparency to environmental and development data baselining and analysis.

2.5. Initial Collaboration Efforts and Stakeholder Consultations

In 2020, UNEP and the Government of Norway’s Oil for Development Programme initiated its work with FGS. Consultation meetings were held between the Norwegian Agency for Development Cooperation (NORAD), the Norwegian Environment Agency (NEA), UNEP, UNEP-World Conservation Monitoring Centre (WCMC), and the FGS, in February 2020. This led to the identification of three main areas of work for the next two years under the OfD collaboration:

- Undertaking an environmental legal and policy review, led by UNEP which was published in March 2022
- Undertaking a strategic environmental assessment process in the context of Somalia’s potential oil and gas sector, led by UNEP
- Initiating environmental baseline mapping, which was led by UNEP’s World Conservation Monitoring Centre (WCMC) in 2021.

In addition to this initiative, UNEP’s ongoing collaboration with the OfD Programme provides technical assistance and training support to Somalia, among other countries, which includes training in environmental data baselining, environmental legal/policy review, and SEA in relation to the oil and gas sector. This collaboration was coordinated through the UNEP Disasters and Conflicts Branch based in Geneva, but work involves other UNEP colleagues including the UNEP Africa Regional Office and UNEP-WCMC based in Cambridge.

It is under the collaboration between the UNEP Disasters and Conflicts Branch and the Government of Norway that the *Preliminary SEA* is being developed.

The following entities were briefed on the UNEP SEA initiative and were involved in introductory meetings held during 2020:

- Director General, DECC at the Office of the Prime Minister (OPM)
- Director of Planning, Research and Development, DECC at the Office of the Prime Minister (OPM)
- Directorate of Environment & Climate Change (DECC)*
- Ministry of Petroleum and Mineral Resources (MOPMR)
- Ministry of Ports and Marine Transportation (MOPMT)
- Ministry of Humanitarian Affairs and Disaster Management (MOHADM)
- National Bureau of Statistics
- Somali Marine Resource Research Centre (SMRRC)
- Ministry of Justice (MOJ)
- UNEP Africa Regional Office

- UNEP Environmental Advisor in Somalia
- UNEP Disasters and Conflicts Branch
- Norad
- Norwegian Coastal Administration
- UNEP-WCMC

The additional objectives of the scoping process included identifying all relevant SEA parties in a systematic and supportable discussion process that focuses on identifying relevant risks and opportunities that could arise from the nearshore and offshore oil and gas development in Somalia. Online stakeholder meetings were held with several FGS stakeholders and others to discuss general oil and gas information, the *Preliminary SEA* approach and scenario examples from other countries (see Appendix 1 for the list of meetings and workshops held).

2.6 The Phases of the SEA Process

The development of and methods used for the *Preliminary SEA* on the oil and gas sector of Somalia was modelled on the SEA of oil and gas activities in the Albertine Graben in Uganda (Uganda, Ministry of Energy and Mineral Development and Ministry of Water and Environment 2013) and informed by similar SEAs for the petroleum sector of Kenya (Kenya, Ministry of Energy and Petroleum 2016) and for the petroleum and mining sectors of Mozambique (Mozambique, Ministry of Mineral Resources and Energy [MIREME] 2017). The *Preliminary SEA* for Somalia followed a systematic and stepwise process involving three sequential phases. The final content of the *Preliminary SEA* provides the documentation of all activities and deliverables developed throughout the three-phase process.

2.6.1 The Pre-Scoping Phase (Dec 2020 – Mar 2021)

The review and agreement on the ToRs for the *Preliminary SEA*, included undertaking online consultations with the relevant stakeholders, developing questionnaires, conducting desk-based research, and identifying data sources. This also included incorporating feedback/comments from the FGS, UNEP, and Norway.

The essential time perspective for the *Preliminary SEA* is the next 5-10 years. This is reflected by the scenarios and the further analysis. As already explained, the exploration phase may or may not lead to commercial discoveries which may or may not lead to development and production. All these uncertainties were reflected during *Preliminary SEA* discussions since all activities will offer opportunities and expose risks to the society and the environment.

2.6.2 The Scoping Phase (Mar 2021 – Aug 2021)

The Scoping Phase continued to involve engagement of national and other entities, the identification and documentation of baseline conditions on the terrestrial and marine environment, and on the socio-economic and cultural settings in Somalia. Understanding the baseline conditions (Section 3) and developing the scenarios (Section 4) is the stepwise approach to evaluate exploration activities and identify the Key Issues that are the basis for discussing and identifying the risks and opportunities related to the development of the sector.

The scoping process engaged the UNEP SEA Core Team members and all relevant stakeholders in a comprehensive dialogue during meetings, interviews, including online interviews and consultation, as feasible, developing and administering questionnaires and surveys, and reviewing Key Issues.

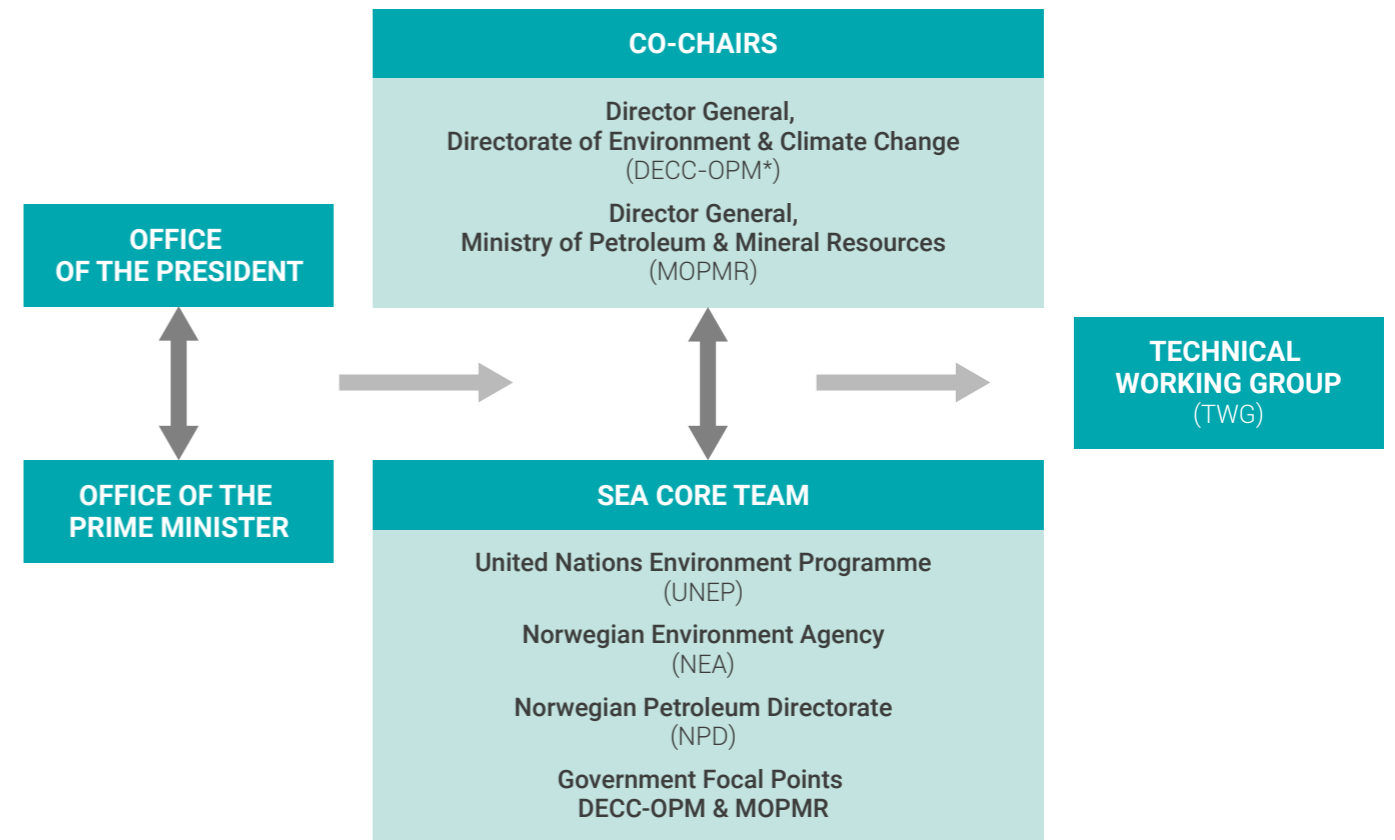
The local partnership technical involvement was co-chaired by an appointed representative of the

Ministry of Petroleum and Mineral Resources (MOPMR) and of the Directorate of Environment and Climate Change (DECC*) under the Office of the Prime Minister, with the SEA Technical Working Group (TWG) including members of the selected Federal States, as presented in the organigram (Figure 5).

The TWG currently comprises participants from the relevant ministries and other government institutions that have jurisdiction over the three hydrocarbon basins that are the focus of the *Preliminary SEA*. The institutions involved are shown below (with names of identified representatives provided in the Appendix 2):

1. Ministry of Petroleum and Mineral Resources (MOPMR)
2. Directorate of Environment and Climate Change (DECC*), Office of the Prime Minister
3. Ministry of Ports and Marine Transportation (MOPMT)
4. Ministry of Fisheries and Marine Resources (MOFMR)
5. Ministry of Planning (MOP)

Figure 5: Structure of the collaboration between the SEA Core Team, Co-chairs, TWG and Government Offices involved in the Preliminary SEA for the petroleum sector of Somalia.



*As of September 2022, the DECC is being reconstituted into the new Ministry of Environment and Climate Change.

6. Ministry of Finance (MOF)
7. Ministry of Energy and Water Resources (MOEWR)
8. Ministry of Humanitarian Affairs and Disaster Management (MOHADM)
9. Somalia Marine Resources Research Centre (SMRRC)
10. Somalia National University (SNU)
11. Somali Petroleum Authority (SPA)
12. Ministry of Petroleum and Energy – Southwest State
13. Ministry of Fisheries equivalent – Southwest State
14. Ministry of Environment – Southwest State
15. State Ministry of Ports and Transport equivalent – Southwest State
16. Ministry of Petroleum and Minerals – Galmudug
17. Ministry of Fisheries equivalent – Galmudug
18. Ministry of Ports and Transport equivalent – Galmudug
19. Ministry of Environment – Galmudug
20. Ministry of Energy, Water & Minerals – Jubaland
21. Ministry of Fisheries – Jubaland
22. Ministry of Ports and Transport equivalent – Jubaland
23. Ministry of Environment – Jubaland
24. Ministry of Petroleum and Mineral Resource, Hirshabelle
25. Ministry of Ports and Transport equivalent – Hirshabelle
26. Ministry of Environment – Hirshabelle
27. Ministry of Fisheries equivalent – Hirshabelle
28. Benaadir Regional Administration (Petroleum and Minerals Representative)
29. Benaadir Regional Administration – Environment Department

2.6.3 Key Issue Validation and Recommendation Phase (Sep 2021 – Jun 2022)

The outcome of the scoping process is the inventory of Key Issues for which broad recommendations were developed and collectively agreed with the TWG. The recommendations will need to be carried forward with identification of their “owners” – the relevant institutions that have a responsibility for managing aspects related to the significant issues.

The Legal and Policy Review (LPR) findings and consultations with stakeholders during the preliminary SEA process revealed that discussions on institutional

mandates and conflicts and overlaps among such mandates are ongoing at the federal government level in Somalia. Keeping this in mind, the UNEP SEA team only provides an initial identification of institutions that may be relevant to the key issues in its recommendations. However, the final assignment of roles and responsibilities will need to be undertaken by a government-led process. In order to inform this future process, UNEP included discussions on this matter at the Somalia National Training of Trainers (ToT) Workshop on SEA and GIS Components held from 20-23 June 2022 in Nairobi, Kenya.

The ToT workshop aimed to enhance institutional skills and knowledge in the SEA process which will facilitate similar initiatives in the future. As GIS is also an essential part of the SEA and is used at all stages (to visualise baseline datasets, to lead discussions during the process, to identify potential impacts, and build scenarios and summarize findings) many GIS datasets were collated and used to produce several thematic maps that are part of the SEA process. These and other scenario maps were a central part of the workshop training program. The workshop also provided the opportunity to conduct an additional Key Issue prioritization exercise (see Section 4.4.2) and a provisional assignment of ‘owner’ institutions to implement recommendations associated with the Key Issues (see Section 6.1).

The *Preliminary SEA* should feed into the current ongoing licensing rounds and decision making by providing information on the strategic impact areas that require addressing as oil and gas activities are undertaken in Somalia.

2.7 Beyond the Preliminary SEA

Typically, a full SEA would include two further phases: Assessment of the recommendations and Implementation Phases. These are integrated in this *Preliminary SEA* but will require further follow up by the lead Federal Government institutions. Some of the main elements in these final phases include delivery of the recommendations on overriding questions and integration of relevant environmental, socio-cultural, and economic issues related to the oil and gas development into policy, plans, program, laws, and regulations, followed by an implementation plan to develop the recommendations. These issues are discussed in the final section (Section 6).

3. BACKGROUND TO THE ASSESSMENT

3.1 Environmental Legal, Policy and Regulatory Regime

A legal and policy review on environment and oil and gas to support harmonization across national and federal states is important for a consistent, national approach to support this emerging sector. From such a review, gaps can be identified to guide improvements to the legal and regulatory capacities to adequately address the risk of environmental pollution and achieve a balance of economic development and environmental protection (Abubakar 2019). A strong regulatory regime is fundamental for effective implementation of laws and regulations. Given the nascent state of many institutions, concerns have been raised about the capacity and preparedness to address environmental pollution and respond to oil spill incidents (e.g., Stiftung 2018).

In collaboration with Somali counterparts, UNEP undertook an independent review of the environmental legal and policy to establish a high-level, strategic understanding of current policy, legal and regulatory frameworks at the FGS and FMS levels in Somalia. It also considered the roles and mandates of the institutions involved. The review addressed three main thematic areas: the legal, policy and regulatory frameworks; institutional architecture; and coordination mechanisms. The full report (UNEP 2022) provides 10 key findings and 23 recommendations. In more detail, the review process covered the following:

- Institutional arrangements related to oil and gas governance
- Analysis of key national policies
- Analysis of key Acts and regulations
- Analysis of relevant international conventions and multilateral environmental agreements

A summary of that review is provided in the sections that follow.

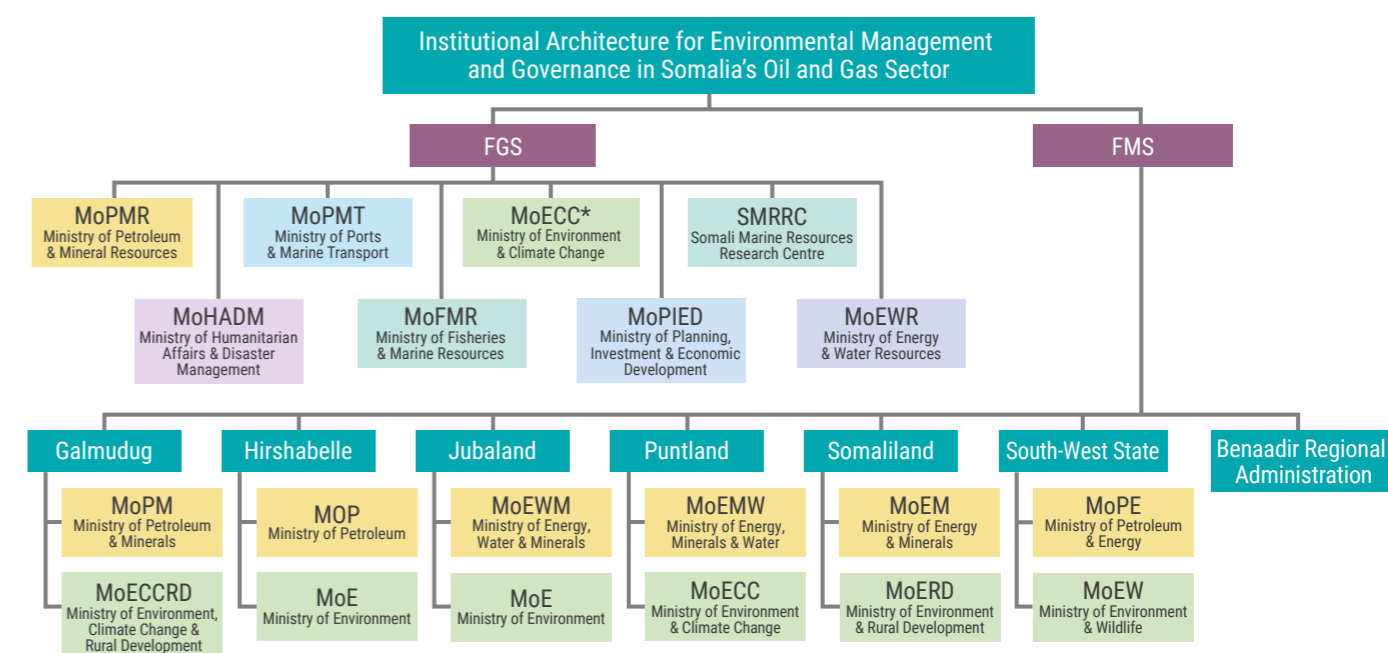
3.1.1 Primary Legislation

With regards to environmental governance in the oil and gas sector, the MOPMR and the DECC-OPM hold the most significant mandates. The MOPMR is the sole authority empowered to enter into negotiations and enact regulations that govern the production and exploration of petroleum in the territory of Somalia. It derives its mandate from the Petroleum Law 2020.

The primary legislation that will govern and support the environmental governance and management in the emerging oil and gas sector of Somalia are the Petroleum Law 2020, the Petroleum Environmental Regulations 2017, the draft Environmental Management Act (EMA) 2020 and the draft Environment and Strategic Impact Assessment Regulations 2020. Some are newly enacted or are in the final stages of Parliamentary approval.

The FGS has several ministries, departments, and agencies (MDAs) linked to environmental management

Figure 6: Institutional Architecture for Environmental Management and Governance in Somalia's Oil & Gas Sector. Source: UNEP (2022).



*As of September 2022, the DECC under the Office of the Prime Minister is being reconstituted into the newly-established Ministry of Environment and Climate Change.

and environmental regulations (Figure 6). There are also similar institutions that have been established in the FMS that are responsible for environmental regulation. However, there is considerable variability in the development of relevant policies, primary legislation, and regulation among the FMS. Also, stakeholders consulted in the process highlighted the potential role that the Xeer system may play in terms of environmental governance in the emerging oil and gas sector. The major challenge regarding applying the Xeer and Shari'ah is that the two are not well incorporated in the statutes.

3.1.2 International Commitments

Somalia is party to several International Treaties and/or Multilateral Environmental Agreements (MEA) which have relevance to the oil and gas sector (Table 1). It is also party to regional environmental agreements/protocols including the Nairobi Convention, and the Regional Convention for Conservation of the Red Sea and the Gulf of Aden (Table 2). However, it is yet to become party to the Ramsar Convention on

Wetlands, the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter, the Protocol to the London Convention, and the Ballast Water Management Convention.

Somalia also adopted its National Biodiversity Strategy Action Plan (NBSAP) in 2015. The Somalia Vision 2050 for Biodiversity envisions that by 2050 its biodiversity should be restored, conserved, and used sustainably. Somalia's NBSAP addresses the protection of migratory species and their habitats. It last submitted its National Report to the Convention on the Conservation of Migratory Species of Wild Animals in 2014. The NBSAP notes that by 2026 the areas of particular ecological importance (mainly Protected and Marine Protected Areas) will be prioritised, and at least 33% be conserved and protected. In coastal/marine resources, these include mangroves, coral reefs, sea/migratory birds, crustaceans and pelagic fish, marine turtles' nesting and feeding grounds.

Table 1: Multilateral Environmental Agreements that Somalia has Signed and/or Ratified.

Multilateral Environmental Agreement	Entry into Force	Ratification/Accession
United Nations Framework Convention on Climate Change (UNFCCC) (1992)	Apr 2016	Apr 2016
Protocol to the United Nations Framework Convention on Climate Change (Kyoto Protocol) (2005)	Oct 2010	Jul 2010
Paris Climate Accord (2016)	Nov 2016	Apr 2016
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1989)	Oct 2010	Jul 2010
Convention on Biological Diversity (1993)	Sep 2009	Sep 2009
Cartagena Protocol on Biosafety to the Convention on Biological Diversity (2003)	Oct 2010	Jul 2010
Rotterdam Convention on the Prior Informed Consent Procedure	Oct 2010	Jul 2010
Stockholm Convention on Persistent Organic Pollutants (2004)	Oct 2010	July 2010
United Nations Convention to Combat Desertification (UNCCD, 1994)	Jul 2002	Jul 2002
Montreal Protocol on Substances that Deplete the Ozone Layer (1987)	Aug 2001	Aug 2001
Vienna Convention for the Protection of the Ozone Layer (1985)	Aug 2001	Aug 2001
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	Mar 1986	Dec 1985
Convention on the Conservation of Migratory Species of Wild Animals (CMS)	Feb 1986	Nov 1985
Ramsar Convention on Wetlands of International Importance, especially as Waterfowl Habitat	Dec 1975	NA
UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage	Dec 1975	July 2020
UN Convention on the Law of the Sea (UNCLOS)	Nov 1994	Feb 1989
International Convention for the Prevention of Pollution from Ships (MARPOL)	Oct 1983	Jan 1989
Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention)	Aug 1975	NA
Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (1972, revised 1996)	Mar 2006	NA
Ballast Water Management Convention	Sept 2017	NA
Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing	June 2016	Dec 2015

Table 2: Regional Environmental Agreements/Protocols that Somalia has Signed and/or Ratified.

Multilateral Environmental Agreement	Entry into Force	Ratification/Accession
Memorandum of Understanding on the Conservation of Migratory Birds of Prey in Africa and Eurasia	Nov 2008	Dec 2012
Regional Convention for the Conservation of the Red Sea and the Gulf of Aden Environment (PERSGA)	May 1988	Feb 1982
Protocol concerning Regional Co-operation in Combating Pollution by Oil and other Harmful Substance in Cases of Emergency	May 1988	Feb 1982
Protocol concerning Protected Areas and Wild Fauna and Flora in the Eastern Africa region	May 1996	Jun 1985
Protocol concerning Co-operation on Combating Marine Pollution in Cases of Emergency in the Eastern African region	May 1996	Jun 1985
Convention for the protection, Management and Development of the Marine and Coastal Environment of the Eastern Africa Region (Nairobi Convention)	May 1996	Mar 1988

Regarding its international commitments to protecting the marine environment, the Fisheries Law 2016 and the Fisheries Bill 2020 take this into account. A law was passed in 1989 ratifying the International Convention for the Prevention of Pollution from Ships 1973 as amended by the Protocol of 1978. The Convention and the Protocol have the force of law in Somalia. As a signatory to the Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment and its Protocol, Somalia can directly request assistance in a marine emergency from any other contracting party. The contracting parties are also obliged to cooperate to combat pollution by oil and other harmful substances and maintain and promote contingency plans.

Similarly, the Protocol concerning Co-operation on Combating Marine Pollution in Cases of Emergency in the Eastern African region, under the Nairobi Convention, provides a framework for a coordinated response in major oil spills and of other harmful substances in the convention area. It provides contracting parties with a platform to cooperate on undertaking all necessary measures for the prevention and remediation of a marine pollution incident. This includes the development of legislation and contingency plans and the exchange of relevant information. The MOPMT has received training from the Kenyan Maritime Authority as part of regional agreements and from the International Maritime Organisation (IMO) on marine pollution. Under the Nairobi Convention and the UNEP-OfD Partnership, UNEP has also provided training on oil spill contingency planning to Somalia.

3.1.3 Challenges related to the Development of the Petroleum Sector

Possible overlaps or lack of clarity in mandates has been identified in relation with granting of ESIA licenses, regulations related to hazardous waste management and chemicals management onshore, and regulations on offshore installations. Presently, Somalia has not

established a Ministry of Environment at the FGS level, nor a National Environmental Regulatory Authority. DECC-OPM* remains the foremost institution with environmental regulatory powers, which may face important challenges as environmental governance and management requirements increase over time. Pending the passage of the Environment Management Act (EMA) and ESIA Regulations, there is currently no legally mandated procedure for the conduct of ESIA/ESIAs or the issuance of ESIA permits. Environmental compliance monitoring, audits and inspections are not yet institutionalised as practice. The draft ESIA Regulations envisions the constitution of a National Environment Committee that will act as an appellate body on decisions from the DECC-OPM on approval of ESIA permits. However, the composition and terms of reference of this body have not yet been defined.

Most FGS and FMS institutions are not yet fully constituted and capacitated. Notably, it was observed that FGS and FMS institutions disagree on how effectively the existing legislations address ownership of resources. These institutions are either understaffed or inadequately staffed to address the technical needs of such institutions, including limited capacity to review instruments such as the ESIA. At the FMS level, in particular, there is reportedly limited budget.

There is no formal legally mandated inter-ministerial coordination committee that deals with environmental governance in the oil and gas sector. There is also variability in the degree of coordination across FGS line ministries. Statutorily mandated FGS-FMS level coordination applicable to environmental governance in this sector, such as the Somali Petroleum Authority (SPA) and the National Environment Council, are either still nascent or yet to be constituted. Furthermore, in collaboration between the FGS and FMS, the MOPMR is committed to the implementation of the National Communication Strategy to empower the Somali Public to access, participate and understand the benefits and

*As of September 2022, the DECC is being reconstituted into the new Ministry of Environment and Climate Change.

the importance of the ongoing dialogue on using the petroleum reserve deposits as a source of income and national wealth. These newly established statutory coordination mechanisms provide an invaluable opportunity to also ensure that greater gender balance is brought into the institutional structures governing this space.

At FMS level, inter-ministerial/inter-institutional coordination is generally reported to be limited. Xeer and its institutional structures could also be instrumental in providing legitimacy to the newly formed state institutions; in this regard, the Xeer system may warrant further consideration in future development and enactments of environmental policy and legal frameworks.

Climate change issues pertaining to the oil and gas sector are not adequately addressed in the existing environmental legal and regulatory framework.

3.2 Baseline Conditions of the Environment

Developing a comprehensive understanding of the baseline conditions is one of the most important requirements of an SEA. UNEP-WCMC, in collaboration with the NEA and several data holding organisations operating in Somalia, undertook a review of existing marine and coastal environmental datasets and data portals of relevance to Somalia, based on an extensive online search where all information was consolidated, for which a metadata inventory has been produced. The WCMC report (Somalia Baseline Data Review Report: A preliminary assessment of available coastal and marine environmental data for Somalia) presents a baseline review of coastal and marine biodiversity and environmental data for Somalia, derived from 37 global-scale datasets and 37 national-scale datasets. Many of the global datasets were identified from UNEP-WCMC's curated or hosted resources or existing partnerships with global biodiversity data providers. These and additional sets of data contributed to developing the baseline maps used in the development of scenarios in this *Preliminary SEA* (see Section 4).

An update of the baseline conditions of the environment will be a feature of the *Preliminary SEA*, typically covering but not limited to the following information:

- Weather and climate
- Terrestrial environment
- Marine and coastal environment
- Marine and coastal areas of conservation status
- Social and economic setting

3.3 Weather and Climate

3.3.1 Southeast Coast Conditions

A simulation based on Mogadishu for the year 2021 serves to describe the overall annual pattern of air temperature, precipitation and wind regimes that prevail

during the year (Meteoblue 2022). The graphs show temperature, including relative humidity, in hourly intervals, cloud cover (grey background – darker being denser) and clear sky (yellow background) and wind speed and direction.

Daily air temperatures range from 20° C - 33° C all year, with the warmer months being November to May, the winter season. Relative humidity is between 70 and 90 percent, highest during the summer months. Rainfall is low and sporadic throughout the year, but October to December are the wetter months. In the summer months of June to August, the prevailing winds are from the southwest, averaging 25 km/h, with maxima of 35 to 40 km/h. Transition periods (April-May and October/November) exist before and after the summer months during which the lowest wind speeds are recorded, typically easterly and averaging 15 km/h, with maxima of 25 km/h. During the winter months of December to March, north-easterly winds predominate, averaging 25 km/h, with maxima of 35 to 40 km/h.

3.3.2 Climate Change

Climate change is not globally uniform and affects some regions more than others. Based on atmospheric re-analysis of the global climate covering 1979 to 2021 (see Meteoblue.com for more details), climate change can be seen to have already affected the region of Mogadishu during the past 40 years. The linear climate change trend for Mogadishu temperature is positive, and it is getting warmer, due to climate change. Some of the impacts throughout the western Indian Ocean include reduction in coastal fisheries production, degradation of coral reefs due to bleaching, saltwater intrusion, increased flooding of low-lying areas, famine, displacement of coastal populations and loss of coastal infrastructure (Agulhas and Somali Current Large Marine Ecosystems Project [ASCLME] 2012). Although there is evidence of climate change affecting Somalia's terrestrial environment, little is known at present of consequences of climate change on coastal upwelling and currents that are so critical to the fisheries sector.

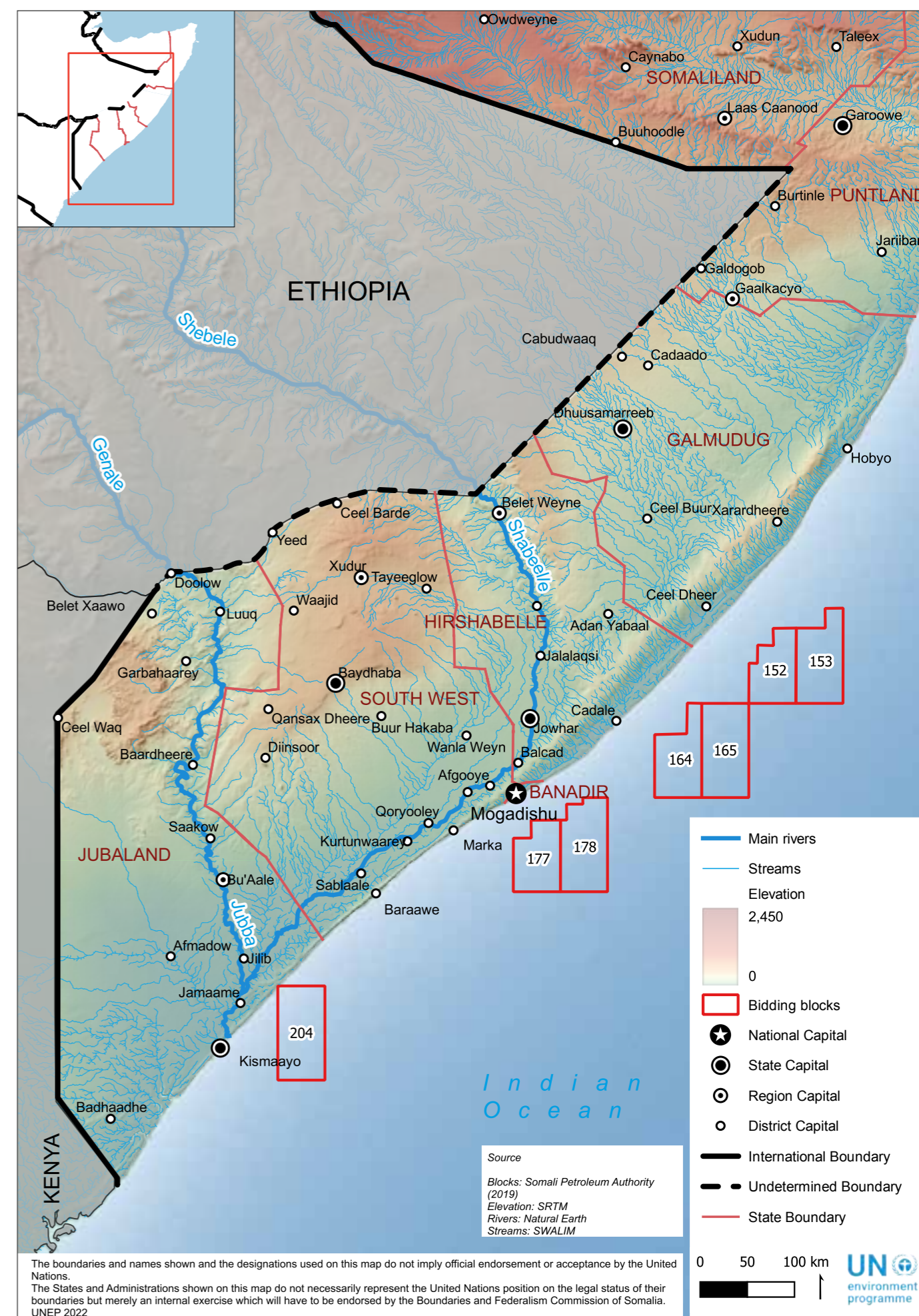
3.4 Terrestrial Environment

3.4.1 Coastal Features

Somalia's coastline is divided into two portions: the north coast, which borders the Gulf of Aden, and the east coast, which forms the western edge of the Indian Ocean. The coastal plain along the Indian Ocean is narrow in the north but widens to 125 km in the south and to 200 km in the Jubba River valley.

The Somalia coastline is longest in Africa, extending 3,025 km from Djibouti in the north to Kenya in the south, yet along those shores there are only two permanent rivers, the Jubba and Shabelle, which are shared with Ethiopia, and which flow into the Indian Ocean (Figure 7).

Figure 7: Surface waters in southern Somalia.



The scarcity of surface water has a marked influence on the soil, vegetation, and land-use patterns. These semi-desert conditions extend to many parts of Somalia including the south-eastern coastal region.

A large proportion of the Somali arable landscape is severely degraded due to unsustainable natural resource use, environmental pollution, lack of good governance and prolonged civil conflict. Extreme climate events, expressed as flooding and drought, have added to uncertainty, and affected the livelihood of most Somalis. Some of the most stressing environmental problems and challenges include desertification, sand dune movement, deforestation, and ecosystem degradation. These have resulted in water scarcity, habitat change, biodiversity losses and invasive species.

Three prominent features found along the southern part of the east coast are: the Merka red sand dune complex; the estuary at Jumba, Gobweyn, where the Jubba River drains into the sea; and the Bajuni Archipelago that forms a protective barrier for the mainland coast across a narrow channel (Carbone and Accordi 2000).

The Merka red sand dune complex comprises a wide dune ridge which runs parallel to the coast from 6°N (north of Hobyo) to 2°S (close to the Bajuni Islands), varying in width from 8-10 km along the Jubba to Mogadishu section (Figure 8), and reaching its maximum width of 100 km further north, close to Adale (Carbone and Accordi 2000). Large parts of this distinctive ridge are vegetated, covered with scattered scrub and grass clumps where rainfall is sufficient.

The Gobweyn estuary north of Kismayo, that drains the Juba-Shabelle basin, is considered to be highly sensitive, especially to any form of coastal pollution (Figure 8). This estuary region, which encompasses the Shabelle and Jubba rivers, is relatively well watered and constitutes the country's most arable zone. The lowland between the rivers supports rich pasture, and the vegetation types include arid to subarid savanna, open woodland, and thickets that include frequently abundant underlying grasses. In the far southwest, near the Kenyan border, some dry evergreen forests are also found (Federal Division of the Library of Congress (1998-1999)).

Figure 8: Estuarine portion of the Juba-Shabelle basin at Gobweyn also visible is a portion of the Merka red dune complex inshore of Kismayo. Source: Google Earth (2022).



The Bajuni Archipelago is located off the coast of Jubaland south of Kismayo and consists of 20 main islands and small islets. From the north, the four major islands are Koyamani or Koyami), Guumme (or Ngumi), Jasiirada Chovaye (or Jofay) and Juula. This chain of islands starts from the Bay of Kismayo and continues south to the creek of Buur Gabo (or Burgabo), covering a coastal area of approximately 160 km (Figure 9). All are of limestone fossil coral formation, and most are small. This string of islands provides sheltered western shores, for some of the larger islands, developing into small settlements. Within the sheltered inner waters and along the mainland coast sand beaches, mangrove forests, narrow lagoons, seagrass beds and coral reefs have developed, greatly contributing to the coastal marine and biodiversity of this section of the Somali coast.

3.4.2 Coastal Geology and Hydrocarbon Prospects

Throughout the Cretaceous period, northern Somalia witnessed the deposition of a marly-mudstone sequence, whilst the southerly basins saw increased coarse clastic

input from the Jubba and Shabelle Rivers in the Early Cretaceous, depositing a significant post-rift sequence. These pro-deltaic sediments provide a potential source rock interval in the south (Stanca *et al.* 2016).

Offshore south-eastern Somalia can be divided into three basins, each defined by their own individual structural regimes: north Obbia Basin, the central Coriole Basin, and the southerly Juba-Lamu Basin. These form the focus of this *Preliminary SEA* as described in Section 2.3 (and shown in Figure 4.). Within these three basins there are expectations of structural and stratigraphic traps at Cretaceous and Tertiary levels which are likely to have access to oil-rich hydrocarbons generated from Jurassic and Cretaceous source rocks (Stanca *et al.* 2016). There are similarities to the outer regions of the Rovuma Basin that have yielded significant success offshore in Mozambique and southern Tanzania. Finally, a significant observation from preliminary satellite seep studies is the identification of an active oil seep which when correlated to subsurface geology is considered key to increasing the chance of hydrocarbon discoveries (Kearns *et al.* 2016).

Figure 9: Satellite image of December 2020 showing the Bajuni Islands, extending 160 km from close to Kismayo to Ras Kiambooni on the Kenya border. Source: Google Earth (2022).

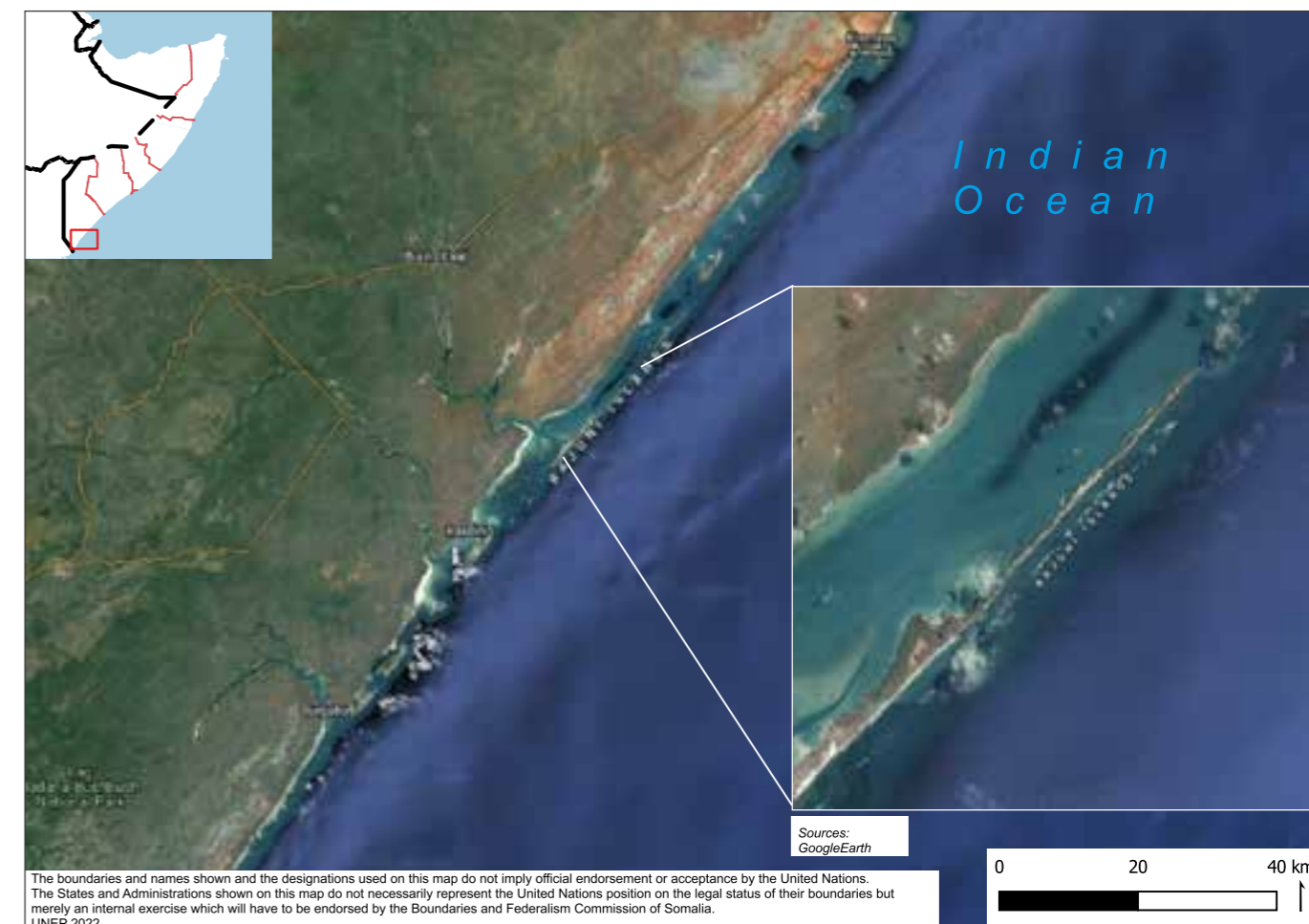
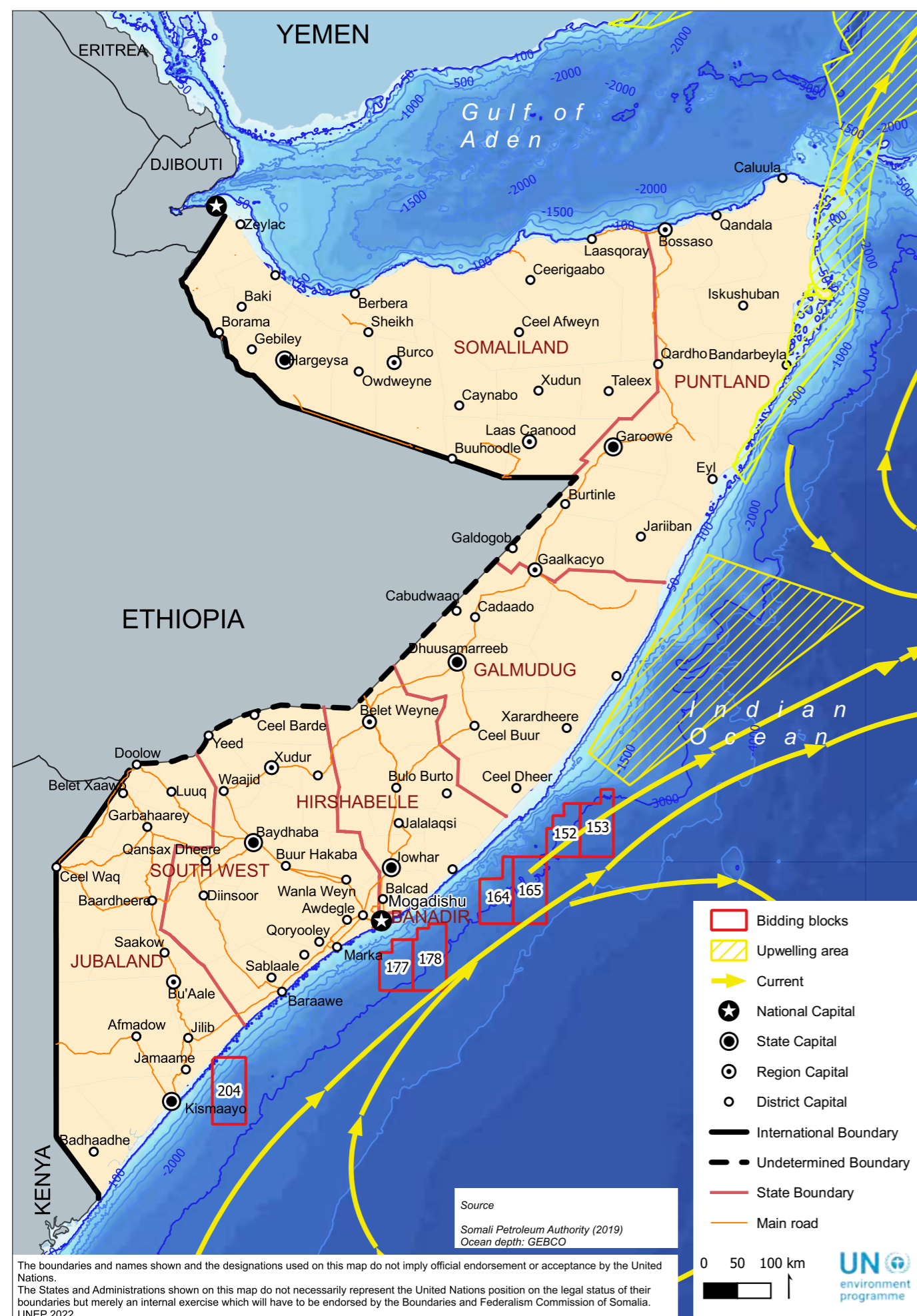


Figure 10: The bathymetry and oceanographic features of south-eastern Somalia.



3.5 Marine Environment

3.5.1 Oceanography

Seabed Features

The continental shelf covers a surface area of 56,000 km² and is relatively narrow in most places (averaging 15 km). The south-eastern coast is characterized by a fairly smooth and featureless shoreline (Figure 9), with the exception of the small group of islands that comprise the Bajuni Archipelago in southern Jubaland. The continental shelf (to 200 m depth) is narrow from Puntland to Galmudug, rarely wider than 25 km. Thereafter the slope is steep in places, to 2,500 m depth within 60 km, but generally more gradual, to 3,500 m within 200 km from the coast, extending to a flat abyssal plain that represents the Somali Basin.

The central Galmudug coast is distinctive in having a much wider continental shelf, over 60 km, with a series of shelf protrusions ('bights' or 'wedges') of shallow water that gradually slope to 3,000 m over 200 km from the shore. The most pronounced wedge is located off the coast of Xarardherre, south of Hobyo. In some parts of the world, such a structure would be referred to as a 'bight.'

Tides and Wind-driven Circulation Patterns and Currents

The Somali southeast coast experiences a semi-diurnal tide, with maximum tidal range of about 3 m during spring tides and about 15.5 m during neap tides. This tidal range results in a wide intertidal expanse and especially during spring tides strong inshore reversing tidal current.

The Somali maritime zone is one of the largest in the western Indian Ocean and has one of the most important large marine ecosystems – the Somali Current Marine Ecosystem – in the Indian Ocean (Fielding and Mann 1999). The Somali Current (SC) is a boundary current that runs along the coast of Somalia and Oman in the Western Indian Ocean, heavily influenced by the monsoons. The SC flow is supplied by the westward South Equatorial Current and the north-eastward East African Coastal Current (EACC), both of which are supplied by the Indonesian Throughflow (Schott *et al.* 1990). The SC velocity and direction are linked to the monsoon that dominates the meteorological and hydrographic regime of the Indian Ocean. The SC along the Somali coast flows north-eastward in the summer months (during the southwest monsoon) and south-westward during the winter (northeast monsoon) (Figure 10).

In summer, along the SC three major anticyclonic circulations develop that re-distribute the surface and deeper waters: the Socotra Eddy (SE), the Great Whirl (GW), and the Southern Gyre (SG). North of the Equator, the SC is deflected eastward, thus resulting in the upwelling of cold, nutrient-rich waters along the Somali coast, creating one of the most productive ecosystems in the ocean, giving rise to high levels of biological

productivity which in turn sustains rich fishing grounds, most notably in the northern area between Ras Asir and Ras Mabber from May to August (TRAFFIC 1997).

Seawater Temperature

During the summer period, because of the effect of southwestern monsoon, Ekman transports induce a double-pronged wedge-shaped upwelling centred at 5° N and 10° N during June and July on the area off Somalia (Figure 10), causing drastically reduced coastal sea surface temperatures (SST) as low as 17 °C (Schott and McCreary 2001).

The cold water associated with the large northern and smaller southern Somali eddy systems described above can be traced several hundred kilometres offshore, carrying large nutrient-rich water, contributing abundant nutrients for primary production from June to September, resulting in summer phytoplankton blooms. By late August, the cold wedge at 5° N moves north-eastward as far as 10° N (Brown *et al.* 1980). With the advent of the winter monsoon, the reversed northeast winds shut down the coastal upwelling and cause downwelling along the coast (Belkin *et al.* 2009).

The strength of the upwelling, and thus the productivity of the Somali water varies between years. Anomalous or 'weak' summers result in only a very small areas of the Somali EEZ experiencing cooler upwelled waters (Trott 2019), compared to more typical and much wider upwelling area that is especially noticeable in July, as seen in Figure 10.

Seawater Nutrients and Chemistry

Ocean productivity is created by physical processes that may vary on inter-annual, seasonal, and intra-seasonal timescales. Off Somalia, oceanography and primary productivity are affected by the seasonally reversing monsoon winds, described above. During the southeast monsoon, major upwellings of nutrient-rich waters and associated plankton productivity occur. These major upwellings break down during the northwest monsoon, although a slight upwelling sometimes occurs where the Somali Counter Current (SCC) and East African Coastal Current (EACC) converge and flow offshore from southern Somalia (McClanahan 1988). In 1979 two areas of upwelling were observed off Somalia, one near 10° N and one near 5° N. The areas of upwelling were characterized by sea surface temperatures between 17° and 22°C, high concentrations of surface nutrients and surface chlorophyll (Smith and Codispoti 1980).

During the autumn inter-monsoon (November–December) the ocean becomes stratified and the nutrient exhausted, whereas during the northeast Monsoon (January–March) a warm surface mixed layer develops with the nutrients entrained by deep wind mixing. At its height in January–February, the northeast Monsoon winds lead to upward mixing of nutrients into the euphotic zone, which enhances productivity again.

3.5.2 Marine Biological Environment

Somali waters encompass the convergence zone of the Gulf of Aden, the Arabian Sea, and the Indian Ocean and as such are regarded as a major ecotone (transitional region) between the fauna and flora of the three seas (Kelleher 2016).

Rocky and Sandy Shores

The northern coast, from Hobyo to Mogadishu includes extensive stretches of sand beach, extending from the sand dunes inland. These featureless sections of shore are only occasionally interrupted by rocky or reef outcrops, in some cases leading to formation of small bays, the larger once providing shelter enough to support the establishment of villages or small towns. From Mogadishu south, more sections of coast are rocky, with small cliffs, wave-cut platforms, and sequences of nearshore rocky reefs and islets, and eventually to a line of barrier outcrops and small islands, and south of Jazeera, the Bajuni Islands (see Figure 9).

Mangroves

Mangroves grow on the mid to upper fringes of the tidal belt, along tidal channels and protected soft substrate shorelines. Along the southeast coast, the most well-developed mangrove forests are in Jubaland, along the coast, on the sheltered Bajuni Islands, and

especially along the narrow, sheltered inlets of the three southern estuaries (from the north: Lac Badana, Lac Anole and Lac Busc Busc) located south of Kismayo. The intertidal abraded flats bordering the channels (Figure 11) are widely colonized by white and red mangrove (*Avicennia* and *Rhizophora*, respectively). Between the three channels, the coast between them and the western shores of the Bajuni Islands there are 30 to 40 discrete patches of mangrove forest, totalling some 2,500 to 3,000 Ha. One of the largest patches is 535 Ha in area, located 8 km north of Bur Gabo. There are no mangroves along the shore north of Jazeera. The only other mangroves are found in the north of the country, in Somaliland. Mangrove forests are extremely susceptible to oil spills, often requiring many years for recovery, if at all.

Seagrass Beds

All along the southern Somali coastal shelf there are vast areas of seagrass beds (ASCLME 2012), typically of *Thalassodendron*, which support benthic communities typical of mobile sandy substrates that are most common between Hobyo and Mogadishu, but also along many other sections of the coast. Around the Bajuni barrier islands and the channelized area there is more diversity of seabed habitats, with mixture of seagrass beds and coral reefs (Carbone and Accordi 2000).

Seagrass is an important stabilizer of sand substrates, an important food source for turtles and dugong and the primary component of the seagrass habitat on which so many marine invertebrates and fish species depend, especially as nursery grounds.

Lagoons

Along many parts of the southeast coast of Somalia there are rocky reef outcrops parallel to the coast, some of which provide enough shelter to protect shallow areas that have developed into important fishing centres for the local fleet. In other portions of the coast, especially the southern regions, these offshore reefs have led to the development of shallow lagoons. The most noticeable lagoon begins about 20 km south of Jazeera and extends along a 75 km stretch of coast, ranging in width from 100 to 300 m, and with few interruptions, one being the areas around Merca. This coastal feature appears to be unique to Somalia with the wider western Indian Ocean region.

Coral Reefs

Somalia has both fringing reefs and patches of coral reefs along the Gulf of Aden coast as well as in the south near the Kenyan border. There are no coral reefs north of Adale due to the presence of upwelled deep cold water at the surface. Fringing coral reefs appear at Adale and continue south to the Kenyan border. The only major break in this reef is off Mogadishu, where patchy coral reefs are scattered within seagrass beds.

Few studies have been conducted on these reefs but one off the northern coast east of Berbera highlighted extensive coral bleaching, with some reefs suffering almost total mortality (Schleyer and Baldwin 1999).

The southern Somali coast, in shallow water areas the abraded flats are colonized by scattered coral communities with variable cover. A true fringing reef is achieved in places only in the Bajuni Archipelago. This area, from Kismayo to Ras Kiambooni, is important for coral reefs (Carbone and Accordi 2000).

Marine Mammals

Marine mammals, such as dugong, dolphins and humpback whales, frequent Somali waters (Kelleher 2016). The delphinids include the common dolphin (*Delphinus delphis*), Spinner Dolphin (*Stenella longirostris*) and Spotted Dolphin (*S. attenuate*).

Whales

Sperm whales (*Physeter macrocephalus*) are likely to present year-round, while species of baleen whale (namely the Humpback whale (*Megaptera novaeangliae*)) are known to frequent Somali waters (Kelleher 2016) on a seasonal basis, though the sub-population from which they originate might include that of the Arabian

Sea as well as that of the southern hemisphere that migrate up the coast of East Africa. Of special note is the Blue whale, which according to the nineteenth century whaling records, were regularly reported in the western Indian Ocean off the Somali coast, especially in the Gulf of Aden during September and November (Anderson *et al.* 2012). Following decades of intense whaling in the Indian Ocean, sightings have reduced significantly. More recent records include those from Japanese scouting ships in March 1982 (Small and Small 1991), in late 1985 and of 30 sightings in September 2014 to January 2015 off northern Kenyan/southern Somali waters (Figure 12) between 3,000 and 4,700 m depth (Barber *et al.* 2016). These observations are consistent with the knowledge of the occurrence of this species within the wider western Indian Ocean. The presence of the blue whale led to the designation of an Important Marine Mammal Area (IMMA) in southern Somali waters (see Figure 12).

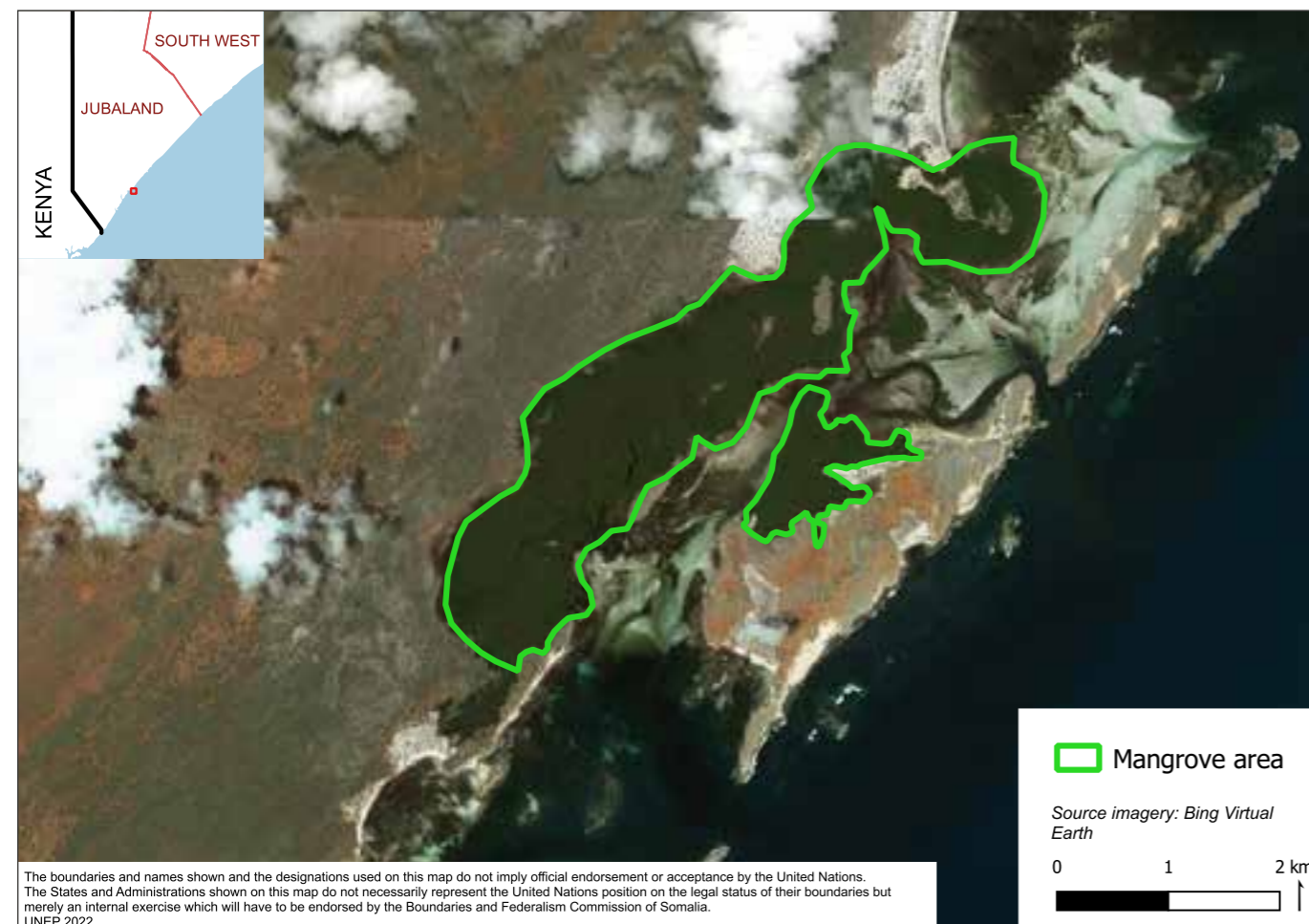
Blue whales are generally associated with deep water throughout most of their range, with occurrences in shallower water usually recorded from regions with narrow continental shelves or in areas immediately adjacent to deeper water (Branch *et al.* 2007). Their high energy demands, and distribution year-round are linked to areas of high productivity and high euphausiid density where they can feed during the winter, thus seeking high productivity areas during both winter and summer (Branch *et al.* 2007; Anderson *et al.* 2012).

The subspecies of the whales sighted could not be determined and might have been any of Antarctic blue whales, Madagascar pygmy blue whales or northern Indian Ocean blue whales, which might have been using the survey area as a feeding ground or could have been in transit, migrating through the area from major upwelling areas farther north (Barber *et al.* 2016).

Dugong

The eastern Africa coast/western Indian Ocean region is the western boundary of the dugong's global range. Here, they occur in small numbers off Somalia, Kenya, Tanzania, and Mozambique as well as off the islands of the Seychelles, Comoros, Madagascar, and Mayotte (Marsh *et al.* 2002; Secretariat for Eastern African Marine Ecoregion Programme [EAME] 2004). Somalia was reported to still have one of the last viable populations of dugong on the eastern African Indian Ocean coast, though the remaining populations are threatened by inappropriate fishing practices (ASCLME 2012). The dugong population in this region is severely depleted due to incidental catch and to direct take, and their future survival is uncertain (Marsh *et al.* 2002; WWF 2004).

Figure 11: The western sheltered shores of Tandras Island in the Bajuni Archipelago, showing large areas of dense mangrove forest and other intertidal habitats. Source: Google Earth (2022).



From the 1960s, various records exist of sightings and herds of 600 dugong, notably in the southern portion of the coast, from northern Kenya around Kiunga and Lamu to the Bajuni Islands and Kismayo. There are few recent data on the current status of dugong for the coast of Somalia, but anecdotal evidence suggests that the Bajuni Islands may continue to be an important area.

Dugong, a marine migratory species protected under the CMS Convention, that are known to undertake long-range movement through the Somali waters are not granted legal protection in Somalia. The MOFMR submitted its report on the Dugong Memorandum of Understanding Conservation and Management Plan (CMP) in 2019, where it noted the absence of such protection for dugongs and/or their habitats.

Marine Turtles

The green (*Chelonia mydas*) and hawksbill (*Eretmochelys imbricata*) turtle are reported to nest on northern Somali beaches, with important turtle nesting sites (Kelleher 2016). Three other species of marine turtle – loggerhead (*Caretta caretta*), hawksbill olive ridley (*Lepidochelys olivacea*) and leatherback (*Dermochelys coriacea*) – are known from Somali waters but there is no knowledge of these species nesting. Around Bajuni islands, hawksbill turtles occur, but there is no evidence of nesting (BirdLife International 2021). There are unconfirmed records of nesting along beaches north and south of Baraawe (Figure 12).

Seabirds

The whole country lies within the Somali-Masai biome, and 99 of the 129 bird species restricted to this biome are found in Somalia. The Central Somali coast is one of three endemic bird areas within Somalia, the other two being the North Somali Mountain and the north-west Somalia secondary area. In addition, parts of the East African coastal forests, the Jubba and Shabelle valleys and the Northern Ethiopia secondary area lie within Somalia (BirdLife International 2021).

The East African coast biome just extends into the southern parts of Somalia, and 13 of its 38 bird species have been recorded. There are a number of significant concentrations of waterbirds including breeding populations of terns.

Old breeding records exist of *Sterna dougallii*, *S. repressa*, *S. anaethetus*, *S. fuscata* and *Anous stolidus* from the Bajan islands. The coastal waters of this site are important feeding grounds for large numbers of terns, and mainland and island areas are used for roosting; it is possible that numbers of these and other waterbirds could exceed 20,000 (BirdLife International 2021). The most important sites along the coast include the Bajuni Islands for seabird nesting sites, and there are also important seabird nesting sites include islets off Mogadishu (UNEP 2005b).

3.6 Marine Species and Areas of Conservation Importance

As a signatory to conventions such as CITES, Nairobi Convention, CMS, and others (see Table 1 and Table 2), the FRS is committed to efforts that help to protect certain habitats and species that are threatened with extinction globally or at the regional level, or should not be traded. The list is frequently changing, but for Somalia this presently includes hard corals, sea cucumbers, certain fish, sharks and rays, turtles, and marine mammals.

3.6.1 Species and Species Groups of Importance

As a Contracting Party of the Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region which covers the coastal environment and EEZ of Somalia, the Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region requires that the listed species be protected under the convention. There is no legal obligation to protect any marine species, and the list of Red List and CITES species is frequently changing, thus it is important that the relevant authorities maintain themselves up to date on the status of marine species of conservation importance. The most commonly encountered and/or currently threatened in Somalia are discussed below.

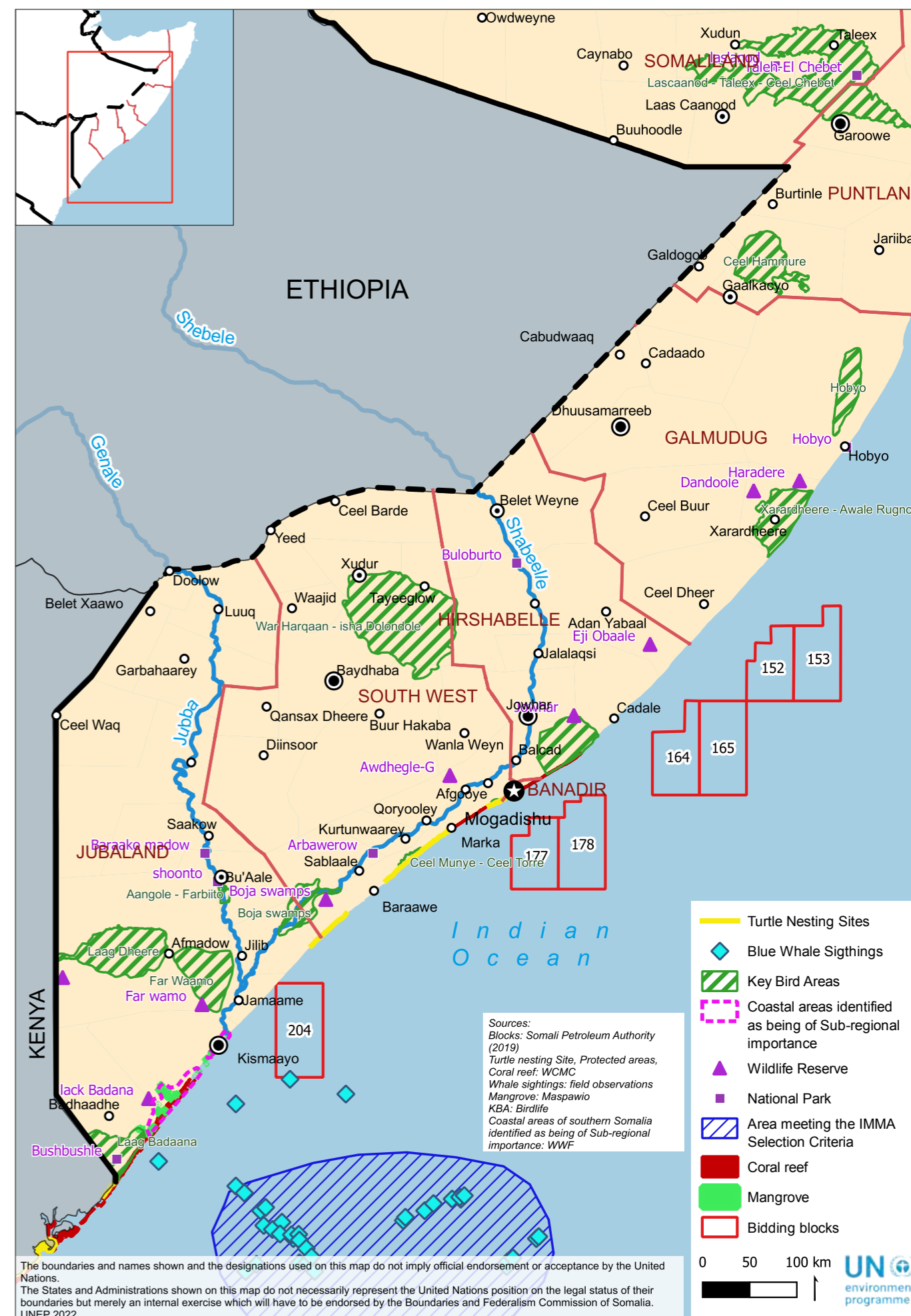
Elasmobranchs

The most prominent group of species that are currently of concern and rising rapidly up the Red List are the sharks and rays. Both groups are heavily fished in Somali. Sharks are especially targeted with only the valuable fins being landed, largely due to a lack of refrigeration (Schleyer and Baldwin 1999). A number of the once abundant shark species have allegedly disappeared in some areas, while the average sizes of some other shark species landed have decreased over the five years. Stocks in the 1970s were estimated at 40,000 tonnes for large demersal species, and 30,000 tonnes for demersal sharks and rays. Elasmobranchs such as sharks and rays represent 40% of the artisanal catches, exploited in both artisanal and industrial sectors (ASCLME 2012). The bycatch of shark gill nets in Somalia also includes sawfish which are of global concern as they have been overexploited worldwide.

Turtles

All five species that are reported from Somali water are endangered with the hawksbill turtle Critically Endangered. The major threat to turtles is from opportunistic harvest of green turtles, adults, and eggs, which happens all along the coast. Incidental gill-net entrapment also results in some mortality, and natural threats to the eggs include the flooding of nests and egg consumption by land mammals such as the hyena and jackal (Schleyer and Baldwin 1999).

Figure 12: Biodiversity and protected areas of southeast Somalia.



Marine Mammals

Six marine mammal species are currently listed as threatened: the Blue whale (*Balaenoptera musculus*) and the Sei whale (*B. borealis*) are categorized as Endangered as well as the recent addition of the Indian Ocean Humpback dolphin (*Sousa plumbea*) newly listed as Endangered due to the small size of the populations and threats over a large portion of its range. The Sperm whale (*Physeter microcephalus*), the Fin whale (*Balaenoptera physalus*) and the Dugong are listed as Vulnerable.

Threats in the Somali marine mammals include, but are not limited to, incidental and targeted catch in small-scale and commercial fisheries, habitat destruction and fragmentation, coastal pollution, and noise.

3.6.2 Sites of Conservation Importance

There are currently no marine protected areas (MPAs) and no legislation concerning their establishment and management, although the World Conservation Monitoring Centre (WCMC) Protected Areas Database lists Busc Busc Game Reserve as an MPA. The area from Kismayo to Ras Kiambooni is probably of highest priority, as it is important for coral reefs, marine turtles, and mangrove resources, although it is still poorly known (Carbonne and Accordi 2000).

In Somalia, there is potential for the development of marine parks in the Bajuni Archipelago and adjacent channelized coastal areas. The Lac Badana National Park could be extended to include part or the entire archipelago (UNEP 1987). This area, from Kismayo to Ras Kiambooni, is important for coral reefs, marine turtles, and mangrove resources although little is known about it.

Important Bird Areas

24 Important Bird Areas (IBAs) have been identified covering 47,689 km² or some 7.4% of the land area. These sites contain almost all the restricted range species and good selections of waterbirds. However, many of the sites have not been surveyed in recent years and updated surveys are needed. The regional priorities for the designation of marine IBAs in Somalia include four sites around Jazeera. In particular, Jazeera lagoon and Mogadishu islets (proposed IBA SO017) for with terns, Palearctic migrant waders, and sea caves for important breeding colonies of Forbes-Watson's Swift *Apus berliozi* (BirdLife International 2021).

Key threats to seabirds in the Somalia include oil pollution, overfishing and bycatch, conversion of coastal habitats for uses such as agriculture, port/harbour expansion and urban development, and invasive species.

Bajuni Archipelago

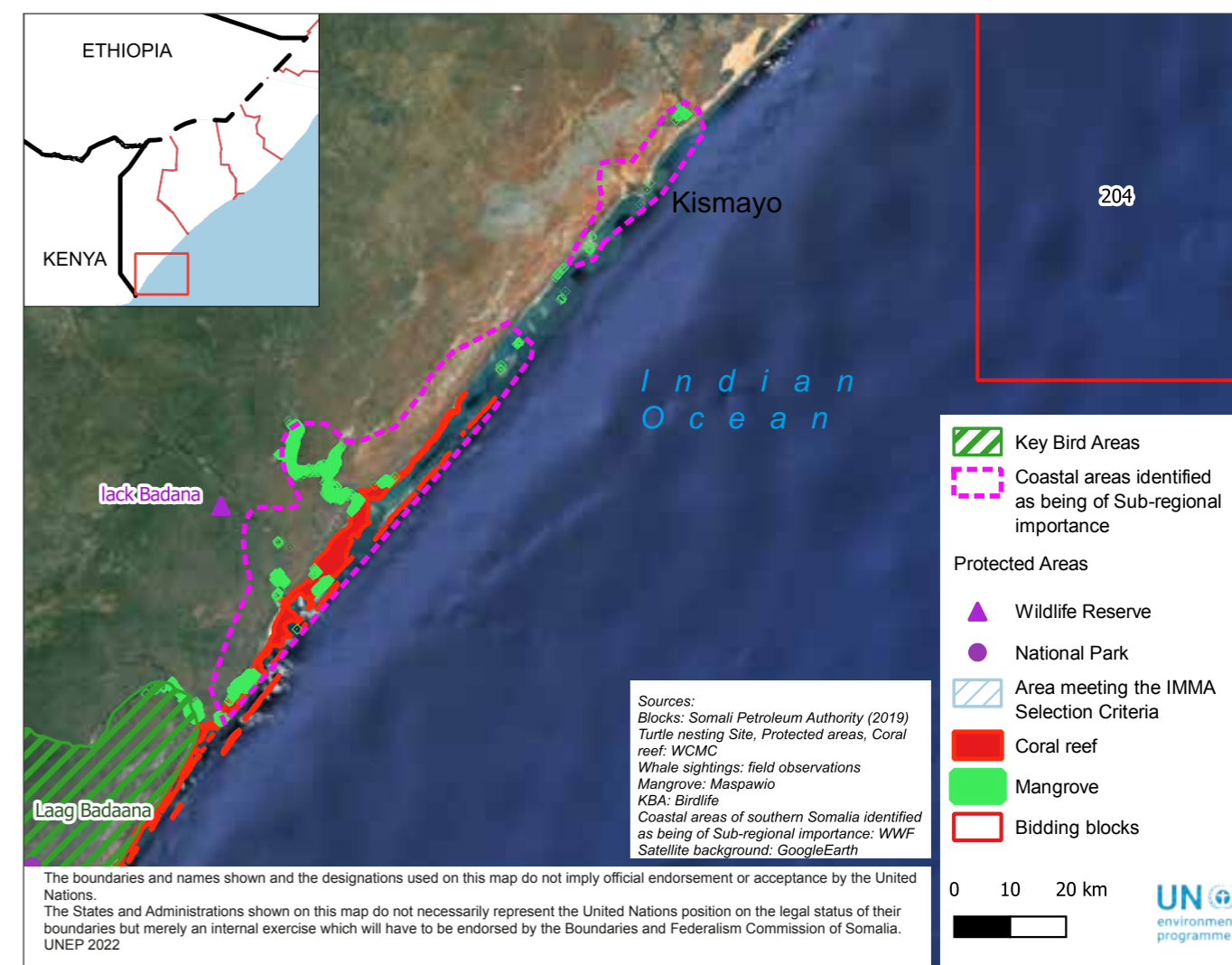
The Bajuni Archipelago islands are fringed with coral reefs and extensive tidal flats interspersed with large seagrass meadows and mangroves. The tidal creeks at Istanbul, Kudhaa and Bur Gabo villages are also lined with relatively dense mangrove forests, although some mangrove stands have been completely denuded for building poles and charcoal production. The entire stretch, from Kismayo to Ras Kiambooni is probably of highest conservation priority, as it is important for coral reefs, marine turtles, and mangrove resources, although it is still poorly known (Carbonne and Accordi 2000). The Bajuni Archipelago and facing mainland coast and estuaries, as well as the Kismayo coast and estuaries were identified as being of sub-regional importance for conservation (Figure 13) during the marine ecoregional analysis programme (WWF 2004).

Laag Badaana (Lac Badana)

This was the first national park to be established in Somalia in the late 1980s. Located in the extreme south of the country, it shares a common boundary with Boni Forest Reserve on the Kenyan side of the border. The vegetation includes c.100,000 ha of predominantly Acacia-Commiphora savanna over the drier, inland areas of the park. Along the coast, from sea-level to c.50 m altitude, there is c. 200,000 ha of forest-savanna mosaic on lime-rich, sandy soils at the northern extremity reached by coastal lowland forest in eastern Africa.

The site also includes 34,000 ha of mangrove, comprised principally of *Bruguiera gymnorrhiza*, *Ceriops tagal*, *Lumnitzera racemosa*, *Rhizophora mucronata* and *Sonneratia alba*. The mangroves are centred round the estuaries of three small rivers which flow through the site and reach the ocean near one another. Also included are several small islands of the Bajuni Archipelago, which lies immediately offshore. A series of coral reefs stretches between the islands, forming an almost continuous barrier.

Figure 13: Coastal areas of southern Somalia identified as being of Sub-regional importance (Source: Modified from WWF, 2004).



3.7 Social and Economic Setting

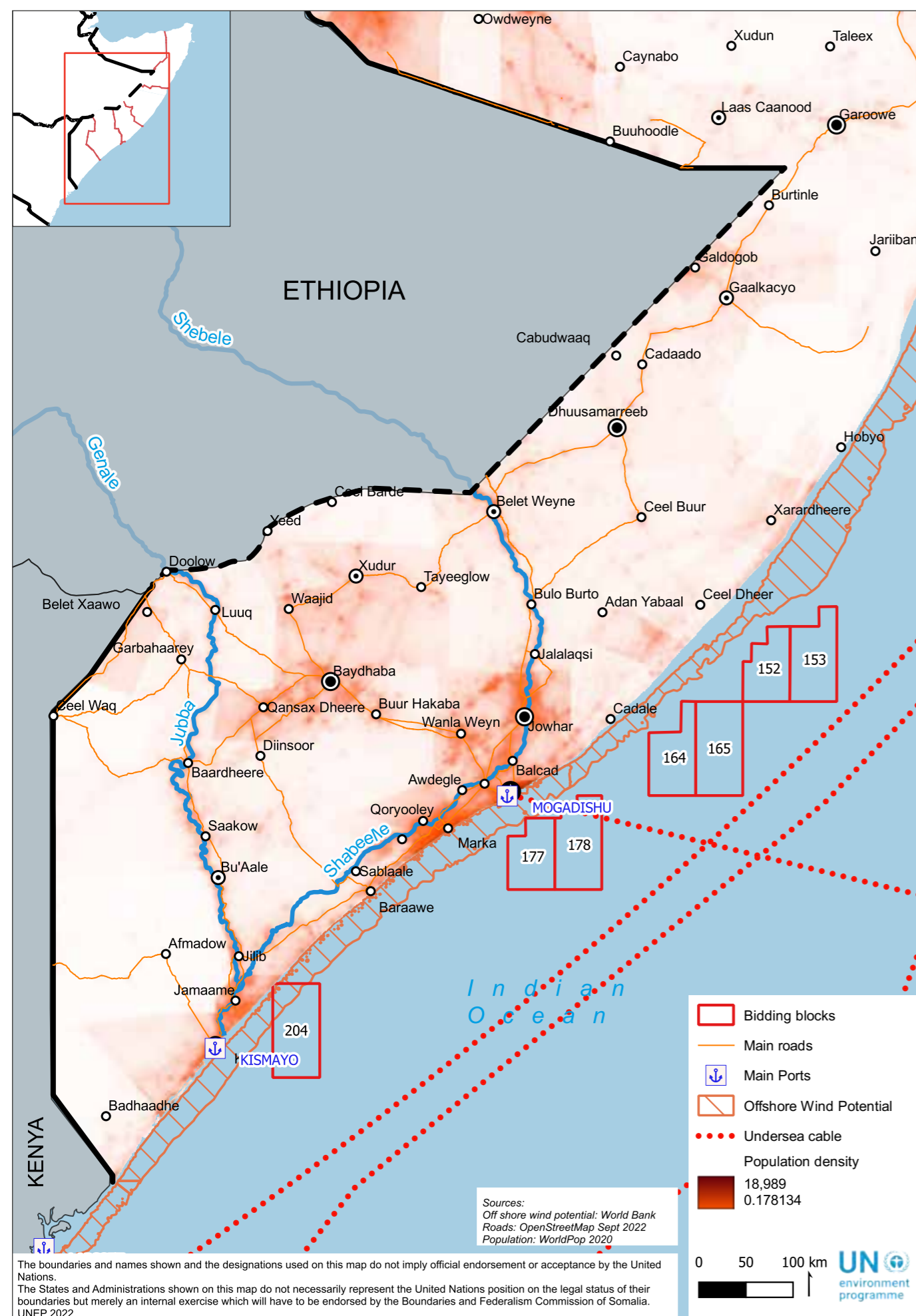
Identifying and describing the potential opportunities and risks associated with the oil and gas sector in Somalia requires a comprehensive and up-to-date inventory of the socio-economic setting. An update of the status of this vital category is an important feature of the *Preliminary SEA*, which focuses on the southeast portion of the Somalia coast and marine areas.

3.7.1 Administrative Governance

After more than 20 years without a recognized central government, the establishment of the FGS provided Somalis with formal international representation. However, the FGS is not the only authority in Somali

territory. Somaliland has been a self-declared autonomous republic with an independent government since 1991, but it is recognized by the FGS and international bodies as an autonomous region that remains part of the FGS. Puntland, a semi-autonomous region, has its own administration, as does Galmudug, and both have their own presidents but coordinate with the FGS. Other regions have developed their own administrations as well. For instance, Jubaland declared itself to be a semi-independent state in 2013 but has been coordinating with the federal government. Somali state formation is an evolving process, and newly declared states are considered part of the FGS.

Figure 14: Population map of south-eastern Somalia.



3.7.2 Population

Based on the 2005 census, 5.2 million Somalis are now urban, 2.8 million rural, 3.2 million nomadic and 1.1 million internally displaced persons, totalling 12.3 million (African Development Bank Group [ADB] 2015). Over the focus area of the *Preliminary SEA*, the greatest densities of human habitation along the coast are around Mogadishu to Merca and north of Kismayo (Figure 14). The most sparsely populated sections of coast are from Adale area to Hobyo.

3.7.3 Land-based Economy and Livelihoods

The Somali people have historically had a nomadic or agro-pastoral culture, similar to other countries in the region. Thus, despite their abundant fish resources, the Somalis in general have had very limited interest in fishing and their seafood consumption is thought to be among the lowest in the world. However, the coastal communities have a tradition of fishing, but the fraction of fishers compared to the total population has always been small (UNEP 2005b). Domestic fishing and fish consumption are mainly limited to coastal communities, including the Banjuni and Rermanyo, who have a fishing tradition.

The majority of Somalia, about 90%, rely on traditional biomass fuel, wood, and charcoal, which is rapidly decimating the country's forest resources (UNEP 2005a, ADB 2015). Energy access remains severely restricted. Without access to affordable energy, the vast majority of the population will continue to rely on biomass, worsening the deforestation and land degradation in Somalia. Sustainable energy development in Somalia is both a priority and challenge.

The vast majority of the population rely on the land for agriculture, firewood, and fodder for grazing animals (mostly goats and sheep). As such, many are vulnerable to the vagaries of rainfall patterns, with droughts and accompanying water shortages and disease an all-too-common feature that affect the poorest of the communities most. Further unpredictability of rainfall related to climate change will only worsen the situation for rural communities.

3.7.4 Marine-based Economy and Livelihoods

Shipping, fishing, and evaporation salt making are the main livelihood opportunities that currently engage Somalis and the ocean. Fisheries makes by far the greatest contribution to livelihoods and the economy. Rigorous data on fish catches is unavailable, particularly

for the last two decades, though realistic "reconstructed catches" estimate landings to be 65,000 t, including 15,000 t of offshore industrialized fishing, 42,000 t of local artisanal and semi-industrial fishing partly for export and trade, and approximately 8,000 t of non-marketed (subsistence) production (Cashion *et al.* 2018). After the government collapsed in 1991, total catches stabilized at 28,000 t-year⁻¹ until 1995, before rapidly increasing to 41,000 t-year⁻¹ by the end of the 1990s, continuing into the 21st century and levelled out at almost 65,000 t-year⁻¹ after 2006 (Cashion *et al.* 2018). This annual artisanal catch is harvested mainly by some 20,000-30,000 full-time and seasonal small-scale fishers along the entire length of the country (World Bank 2020).

Local catches come mainly from fishers with small vessels, however, commercial development is growing, and the political interest in this sector is evident in the steps taken to provide a regulatory framework. Initial findings reveal that the fisheries sector supports over 400,000 Somalis who depend upon it for their livelihoods, income, and employment, based on the artisanal subsector, within which the finfish fishery is the largest in terms of production, employment opportunities and revenue generation (Kulmiye 2020). Certainly, the Somali fisheries have the potential to bolster food and income security throughout the region and a more robust domestic fishery would increase jobs and wages in one of Somalia's most vulnerable employment sectors, while management of foreign fishing for decades engaged in IUU fishing within Somali waters requires significant management efforts (Glaser *et al.* 2015). Ensuring that fisheries are not impacted by offshore oil and gas exploration is also of vital importance.

The Southeast Coast Fishery

The upwelling area off Somalia coastal system described in the preceding section results in a highly productive marine environment, based on a narrow continental shelf containing several demersal fish and crustacean species. Interestingly, the great quantity of small pelagic fish usually associated with upwelling areas does not contribute to landings, though it is not clear whether this is an artifact related to their catchability rather than their absence. However, the region is known for the seasonally high abundance of large pelagic fish (tuna and billfishes) that has attracted distant water fleets (mainly from Europe and East Asia) to fish for these high value species (Bakun *et al.* 1998).

Seasonal fisheries and fishing camps

Traditional seasonal fishing sites exist where access to the sea is possible and there is road access. These also tend to be close to most urban centres. Fishing is a seasonal activity that ceases during the monsoon, with seasonal camps largely unoccupied between June and mid-September (the main summer months) due to wind and thus sea conditions preventing most from being able to operate.

The camps where the fishers stay have no facilities, often no shelter, no mechanics or spare part sales, and often there is no freshwater. Any water extracted from shallow wells is usually brackish. While in the field, most of the fishers, and their families at home, are given logistical and financial support by the boat owner businessmen who buy and sell the fish. In some cases, the businessmen are originally from the remote fishing centres (e.g., Adale to the north or Kismayo to the south) and but have moved to Mogadishu. The businessmen arrange to have water, food and other essential supplies brought to the camps by road. The camps are permanently inhabited during the fishing season, with individual fishers staying for periods of up to 4-5 weeks before returning home for short visits with their families (Lovatelli 1996).

Fishing vessels

Three vessel types comprise the bulk of the artisanal fleet: traditional wooden canoes or 'houris,' traditional planked dhows (smaller ones being 'mashuas') and moulded fibreglass skiffs, almost known as Glass Reinforced Plastic (GRP) boats. Houris carry a crew of between one and three; and larger ones can be fitted with small outboard engines.

All larger dhows and mashuas were fitted with inboard motors and small mashuas with outboards. The wood used for building the boats is imported from Kenya or even from Dubai. The GRP boats are fitted with Volvo engines and usually carry a crew of nine. Also, traditional wooden 'mashuas' fitted with lateen sailing rigs.

Target species

Due to the lack of facilities for processing and storing fresh fish, much of the fishing activity concentrates on sharks, especially at sites that are far from the main towns and cities to which fresh fish can be transported. Both the fins and the meat from the shark are harvested and sun dried – the dried shark products are regularly collected by the traders and transported to Mogadishu. Bags of salt are often buried in the sand to prevent it from solidifying (Lovatelli 2016).

In the small-scale fishery, a large number of different species are fished and consumed although pelagic species such as tuna and mackerel are commonly favoured (Costello *et al.* 2012). Furthermore, in some cases or areas, this fishery may focus on a narrow range of species for retention (UNEP 2005b). The spangled emperor (*Lethrinus nebulosus*) and yellowfin tuna (*Thunnus albacares*) were the most prevalent species in the total reconstructed catch, contributing 8.0% and 6.2% respectively. Rays and mantas (Batoidea) made up 6.0%, whilst the areolate grouper (*Epinephelus areolatus*) was 5.1% of the total catch, followed by the painted sweetlip (*Diagramma pictum*) at 4.3% (Cashion *et al.* 2018).

Challenges faced by the domestic fleet

The environmental conditions are not so favourable for the domestic fisheries sector; the coast does not have many natural harbours, and climate and ocean features give rise to large variation in the available resources between seasons and years (Haakonsen 1983). As with most of the fishing communities in south-eastern Somalia, the problems faced by the fishermen typically are: (i) lack of fishing equipment (nets, hooks, ropes, fishing line, floats, masks, flippers, etc.), (ii) lack of construction materials – mainly wood - and tools for new fishing boats, (iii) lack of fish drying and storage facilities, (iv) lack of freshwater on most of the islands and coast, (v) limited and poor market outlets (very few export markets for fresh fish). There is also loss of nets to illegal trawlers which move closer to shore during the night hours.

The FGS has set up federal licensing schemes for highly migratory species and regional licensing of coastal and demersal fish, and the country has committed to international frameworks such as the Indian Ocean Tuna Commission (IOTC) and has proclaimed its EEZ. However, the rise in foreign commercial interest in its waters and illegal, unreported, and unregulated practices present a serious challenge (see below).

Fish landing sites and fishers along the southeast coast

The southeast coast of Somalia has played an important role in the growth of the national fishery sector. In particular the rich fishing grounds along the 770 km coastline from Adale 155 km north of Mogadishu to Kiambooni has attracted some of the major structural investments since the early 1970s. Such development is not, however, attributed solely to the abundance of commercially important fish,

crustaceans, and other marine organisms in the area, but also to other factors such as the presence of an international airport, two large seaports (i.e., Mogadishu and Kismayo) and a good road linking Mogadishu to all the major settlements in the south (i.e., Merca, Brava and Kismayo).

Some of the major recent developments in the area included the Kudha Fish Processing Factory, the Somali Marine Products (SMP) plant in Kismayo, the GRP Boat Factory in Jazeera and the JICA Fresh Fish Market in Mogadishu, have benefited from the presence of the Central Government in Mogadishu and the relatively high concentration of Somali businesspeople in this region. Additional factors that may have contributed to the development of the fishery industry in southern Somalia include the presence of the Bajuni people, who are traditionally skilful fishermen, and the relatively large number of highly populated settlements along the coastline, thus providing a ready market as well as some fishing infrastructure (including ice and refrigeration facilities).

Much of the details provided here are from the comprehensive artisanal fisheries survey by Lovatelli (1996) to which is added information (notably the number of boats and other features) extracted from other sources and from open-access satellite imagery on Google Earth and Bing (see Table 3). Table 3 includes estimated vessel number data from images pre-February 2021, updated through access to many images that are more recent, up to March 2022, thus providing a means of verifying and understanding changes over this one-year period.

Along this coastline there is an estimated total of likely 79 fish landing sites (Figure 15), defined by the presence of at least one fishing boat either on the beach or in the water, seen from available satellite images. Except for the 11 towns and cities, and sites immediately associated with these, 33 others are considered temporary or seasonal fishing sites. The numbers of vessels recorded from the pre-February 2021 and those recorded subsequently have not changed significantly, from 1,724 to 1,933 (Table 3). Based on the latter figure of boat numbers, and allowing 5 to 8 fishers per GRP boat and 2 per houris, the number of fishers that are active along this coast is estimated at between 9,500 and 15,000.

Principal fishing centres

The sections that follow provide an update analysis of the situation with respect to the eleven main fishing centres along the coast from Hobyo to Kiambooni. These details are important to any petroleum activities that are proposed in the offshore blocks, particularly related to logistics and social and economic impacts.

With respect to the population levels in coastal settlements, these vary considerably because many people move to the highlands in search of a cooler climate during the hot summer months, and they move to the coast during the main lobster seasons (Fielding and Yusuf 2010). Refugees also move in and out of coastal communities.

Figure 15: Fish landing sites and main oceanographic features of the southeast coast of Somalia.

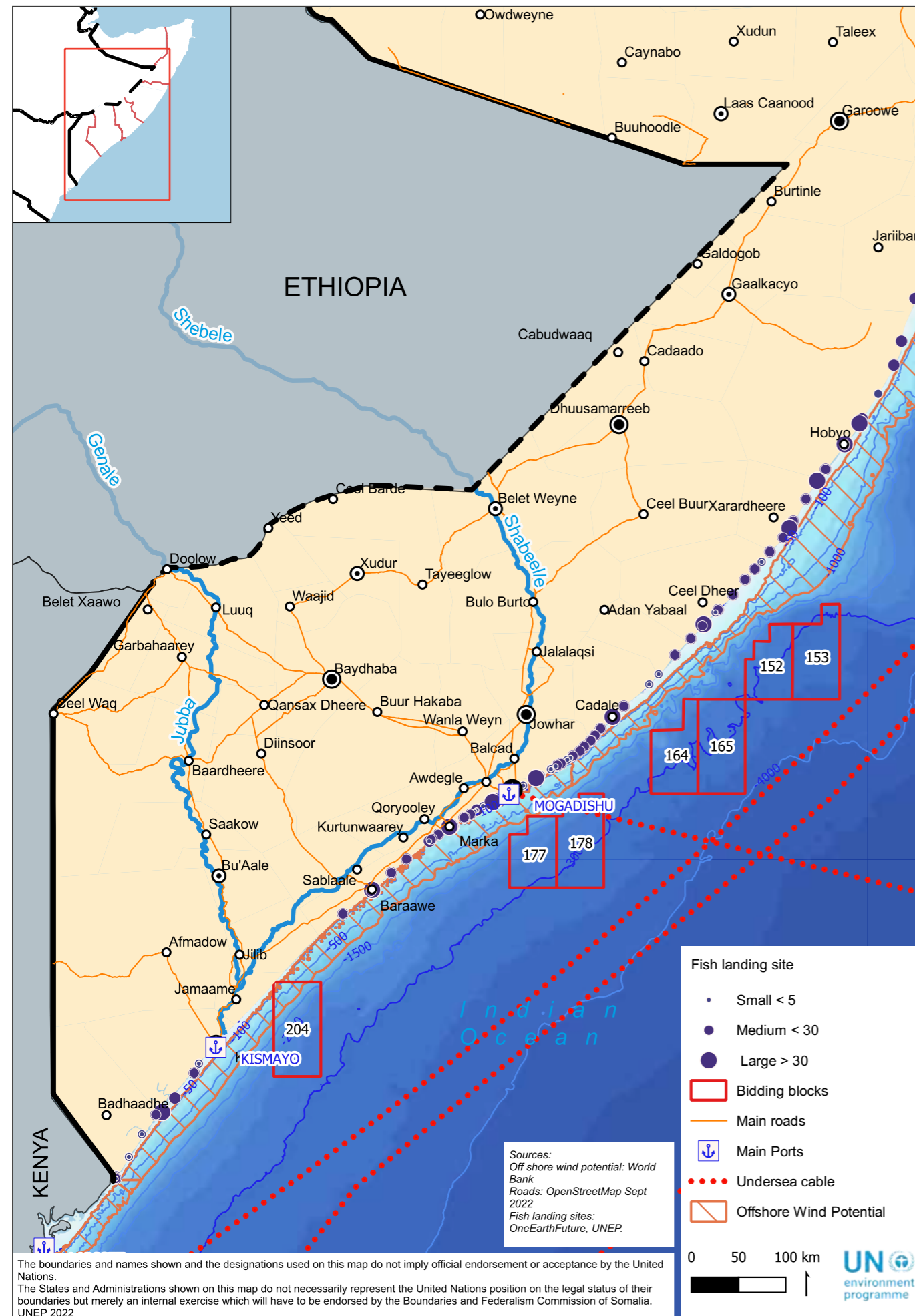


Table 3: Fish landing sites in south-eastern Somalia.

Site name	Site info	Boats	Image date	Boats	Image date	Site size
Hobyo	Large town	29	Nov-14	64	Mar-22	Large
Hobyo 2	Bay and new jetty, near large town	30	Nov-14	37	Mar-22	Large
Xin Barwaaqo	Small town	18	Jan-15	18	Jan-15	Medium
El Hur	Medium town, barrier island	46	Jan-15	53	Jan-15	Large
Faax	Temporary camp	30	Feb-13	5	Oct-17	Small
[no name]	Compound, maybe some huts, no real town	18	Dec-14	23	Dec-14	Medium
[no name]	Few buildings	41	Jun-15	37	Dec-14	Large
[no name]	Temporary camp	19	Dec-14	22	Dec-14	Medium
Waaxweyn	Few buildings down the beach 600 m	9	Jan-10	16	Sep-19	Medium
[no name]	Few buildings down the beach 700 m	4	Jan-12	6	Dec-19	Medium
[no name]	Temporary camp	10	Dec-16	10	Dec-16	Medium
[no name]	One building, probably temporary camp	6	Jan-17	7	Jan-17	Medium
[no name]	Few buildings in a compound nearby	7	Jun-16	7	Jun-16	Medium
[no name]	Some dwellings	7	Feb-21	6	Mar-21	Medium
[no name]	Some structures	5	Jan-10	8	Feb-21	Medium
[no name]	Close to small, scattered hamlet	34	Jun-06	0	Feb-21	Large
Mereeg	Some buildings	6	Jan-10	4	Feb-21	Small
[no name]	Probably abandoned temporary camp	6	Jan-10	3	Jun-12	Small
[no name]	Some buildings	8	Feb-12	3	Aug-19	Small
[no name]	Few small buildings	2	Jan-10	0	Jul-18	Small
[no name]	Few small buildings	2	Jan-10	0	Sep-18	Small
[no name]	Some buildings	7	Mar-13	8	Mar-13	Medium
Adale	Large town	33	Mar-13	66	Mar-19	Very Large
[no name]	Probably temporary camp	6	Jan-12	6	Jan-12	Medium
[no name]	Probably temporary camp	11	Mar-13	11	Mar-13	Medium
[no name]	Probably temporary camp	12	Jan-12	15	Jan-21	Medium
[no name]	Probably temporary camp	12	Dec-11	1	Jan-21	Small
[no name]	Probably temporary camp	8	Nov-11	0	Jan-21	Small
[no name]	Probably temporary camp	16	Dec-12	7	Dec-21	Medium
[no name]	Probably temporary camp	7	Jan-17	12	Apr-19	Medium
[no name]	Probably temporary camp	3	Jan-17	0	Apr-19	Small
[no name]	Probably temporary camp	2	Jan-17	2	Apr-19	Small
[no name]	Probably temporary camp	6	Jan-17	0	Apr-19	Small
Warsheikh	Medium size town	19	Jan-10	16	Feb-19	Medium
[no name]	Probably temporary camp	3	Apr-05	6	Feb-19	Medium
[no name]	Probably temporary camp	3	Jan-10	3	Jan-10	Small
[no name]	Town 600 m south	3	Feb-16	4	Feb-18	Small
El Maan	Large town	183	Feb-16	231	Feb-18	Very Large
[no name]	Small town nearby	5	Jan-17	0	Apr-21	Small
Degmaga C/Caziiz	At N end of Mogadishu outskirts	NA		12	Jan-22	Medium

Site name	Site info	Boats	Image date	Boats	Image date	Site size
Mogadishu 1	S side of old port	190	Feb-21	310	Jan-22	Very Large
Mogadishu 2	At S end of Mogadishu outskirts	90	Feb-21	142	Jan-22	Very Large
[no name]	Inlet on island, with town on island	58	Dec-20	38	Feb-22	Large
Jazeera	Large town	103	Dec-20	122	Feb-22	Very Large
[no name]	One compound/building	2	Jan-17	1	Nov-19	Small
[no name]	N of medium town		NA	3	Nov-18	Small
[no name]	Near medium town	2	Dec-11	0	Nov-18	Small
[no name]	One building	2	Feb-16	0	Dec-18	Small
[no name]	Near larger town	7	Dec-11	2	Dec-18	Small
[no name]	800 m from town	16	Dec-11	0	Dec-18	Small
Gendershe	Small town	8	Feb-16	0	Dec-18	Small
Merca	Main city	55	Mar-18	26	Jan-19	Medium
Merca Port	Main city	94	Dec-20	50	Jan-19	Medium
Al Ahmed	Near medium town, in trees	19	Sep-16	24	Mar-21	Medium
Munggiya	At town, lots of compounds	10	Sep-16	6	Apr-21	Medium
[no name]	Near compounds	8	Sep-16	4	Apr-21	Small
[no name]	Near wooded shore and village inland		NA	5	Apr-21	Small
[no name]	Near small town with compounds	4	Sep-16	5	Apr-21	Small
[no name]	Probably temporary camp	6	Jan-13	0	Jan-16	Small
[no name]	One building	6	Jun-11	0	Jul-12	Small
Baraawe	City port, by breakwater	41	Jan-14	34	Mar-17	Large
Barawe central	City port, close to charcoal depot		NA	9	Mar-17	Medium
Baraawe 2	City port	6	Mar-17	3	Mar-17	Medium
Baraawe 3	Inlet, some small buildings	17	Mar-17	26	Mar-17	Medium
[no name]	Maybe couple buildings	8	Sep-14	0	Jan-19	Small
Kismayo North	Small town	10	Oct-16	21	Jan-22	Medium
Kismayo Port	Port on a jetty, boats counted only small boats	3	Oct-16	3	Jan-22	Small
Kismayo	City	168	Jan-21	185	Jan-22	Very Large
[no name]	Few buildings	1	Sep-12	0	Sep-12	Small
Koyomani	Corner by rocks close to small village on island	6	Dec-14	6	Dec-14	Medium
Jasiirada Chovaye	Small rocky indent close to village on small island	7	Dec-14	1	Feb-19	Small
Juula	Small creek surrounding dense village		NA	32	Jan-13	Large
Madhowa	Long beach close to large village on Juula island	64	Dec-14	64	Dec-14	Large
Kudha	Sand stretches on side of river inlet close to village	8	Sep-13	8	Sep-13	Medium
Buur Gaabo	Medium town, not many boats, up a river	3	Mar-12	3	Mar-12	Small
Manaraani	Anchorage of small town	1	Jan-12	2	Feb-17	Small
Ras Kiambooni 1	Large town	20	May-11	32	Mar-21	Medium
Ras Kiambooni 2	Large town	5	May-11	9	Mar-21	Medium
Ras Kiambooni 3	NW side of large town		NA	28	Mar-21	Medium
	79 sites	1,724		1,933		

Figure 16: March 2022 satellite image of the new T-shaped small port facility at Hobyo. Also visible are GRP boats on the sand. Darker patches in the sea are likely washed-up seagrass. Source: Google Earth (2022).



Hobyo

A small coastal town, located about 500 m from the coast, with landing facilities or sheltered anchorage only available at very few sites and, therefore, in all other localities the mechanised fishing boats or large sailboats usually anchor outside the surf zone and the fish catch is simply carried ashore by wading through the water. Smaller houris, sailboats and boats with outboards land their catch directly on the beach. During consultations with the TWG, it was noted that there is interest in (or expectation of) Hobyo having a port to support the fisheries sector and trade in general. A 50-m long concrete T-shaped jetty was constructed between September 2017 and March 2022 (Figure 16). This structure and lack of any port facilities looks to be insufficient at present to support any offshore oil and gas exploration activities.

Limited fishing infrastructure existed in 1995 when there were an estimated 2,500 to 3,500 inhabitants (Lovatelli 1996), and the town serves as an important source of fish products to the hinterland of central Somalia. Based on the 2005 census, the population stood at 85,189 (ADB 2015).

Adale

Small town located approximately 155 km north of Mogadishu. It is the first main coastal town of fishing importance along the coast north of the capital. The population in 1995 was estimated at 2,000 to 2,500 inhabitants, thought to be permanent residents. A dried fish processing factory, and additional fishing centre, workshop and stores are no longer functional. Based on the 2005 census, the population of Adale stands at 59,183 (ADB 2015).

There are eight fishing sites along this stretch of shoreline, most located north and south of Adale rather than at Adale itself, from which fish were typically sold and smoked, and sold to Mogadishu. In 1995 there were an estimated 160 to 200 fishers using this site.

Figure 17 shows the southern part of the Adale village landing area in March 2013 and again in March 2019, revealing a dramatic increase in vessels and also showing the small, dark wooden 'houris' contrasting against the larger white GRP.

Figure 17: Google Earth image showing the south-central Adale village and landing area March 2013 (upper) and March 2019 (lower). Source: Google Earth (2022).



Warsheikh

An old coastal town, founded 170 years ago, Warsheikh developed into an important religious centre, with mosque and Koranic school, visited by Koranic readers and scholars, with a population in 1995 estimated at 1,500 (Lovatelli 1996). Located 63 km north of Mogadishu, the presence of rocky outcrops along this section of the coast has resulted in small, sheltered bays (Figure 17) that have facilitated fishing enterprises. An estimated 10 hours and 14 GRP boats were recorded, suggesting a minimum of 150 fishers based in the town, though that number is likely an underestimate (Lovatelli 1996). Most of the locally caught fish is consumed in the town, with shark products and lobsters traded in Mogadishu (Lovatelli 1996). Based on the 2005 census, the population of Warsheikh stands at 19,727 (ADB 2015).

El Maan

The most popular fishing site south of Warsheikh, where historically seasonal fishing camps were common, is visited by Warsheikh-based fishers with motorised boats. The site was also used to unload cargo destined for Mogadishu but prevented from being unloaded in the old port due to repeated closures (Lovatelli 1996). The small boat operators would transport goods from much larger cargo vessels to the shore from where it would be trucked to Mogadishu. Satellite imagery from February 2018 (Figure 18) suggests that the site continues to be an important fishing area along this stretch of coast.

Figure 18: Google Earth image of El Maan, from November 2018, showing GRP boats in the water and on the shore, as well as a few hours; with darker seabed probably seagrass, contrasting against the white sand, and part of the rocky reef that provides shelter to the town also visible. Source: Google Earth (2022).



Figure 19: Google Earth image from February 2022, showing possibly three landing sites and the two port areas of Mogadishu. Source: Google Earth (2022).



Figure 20: Google Earth image from February 2022, showing the small Jazeera town, plus adjacent evaporation salt pans and part of the lagoon system and inlet that feeds the salt works. Source: Google Earth (2022).



Mogadishu

Capital of the FGS, both the airport and port are the largest in the country. Two unpaved airstrips also serve the city, one 20 km to the north along the Adale Road, the other 26 km to the west, at Afgoye. Based on the 2005 census, the population of Mogadishu (including the entire Benaadir District) stands at 4.95 million (ADB 2015).

The largest fishing hub along the southeast coast, Mogadishu has a functional port, built to serve trade, which also supported and promoted the development of the fishery sector. The sea port is located next to the central area of town and is divided into the old and new port (Figure 19). The old port is situated to the northern end of an open bay and has remained inactive since the construction of the new one immediately south. The old port is badly silted, probably as a result of the closure of the culverts in the breakwater, which has impeded the free circulation of water through the basin. Although no dredging has been undertaken for several years, the levels of silt and sand appear to have stabilised. The minimum depth of water at low tide is approximately one metre. There are, however, channels through which vessels of 10 m or less can pass (Lovatelli 1996).

Various fishing infrastructure and buildings exist on the dockside, including two of the main jetties located within the port, but virtually all are in a state of disrepair. Two other jetties exist, one short jetty to the south, and one rock-filled jetty located to the north of the main entrance gate. The latter jetty, which is approximately 200 m long extends from the site where the Mogadishu Fishing Centre was being established (Lovatelli 1996). At Xamarweyne a fresh fish market, located between the two ports, and a fibre boat factory in Karaan District and several ice plants were operational in 1995 (Lovatelli 1996). Scattered around the city were also a number of houri workshops, using wood imported from Kenya.

Of the estimated 300 to 350 fishers operating off the coast of Mogadishu, many bring their daily catches of fresh fish to the main auction. In 1995 there were 30 houris and 20 GRP boats (Lovatelli 1996), though those numbers have risen significantly in recent years. Satellite imagery from February 2022 suggests well over 400 boats operating along this coastline from Mogadishu.

Jazeera

The small fishing village, in Benaadir District, 19 km south of Mogadishu, was a popular weekend resort for Mogadishu residents, the natural harbour protected by small islands providing calm inshore waters (Lovatelli 1996). At the time (1995) the population was estimated at 1,000. The previous glass fibre boat factory was destroyed, and the number of fishers was estimated as being at 35 to 45 in 1995 (Lovatelli 1996), with catches transported fresh daily to Mogadishu fish markets. From the satellite image of February 2022, (Figure 20), there is likely a significant increase in the number of fishers. North of the main town, one of the few evaporation salt works on the coast is also clearly visible.

Merca

Located in the Lower Shabelle Region, the town is approximately 110 km south of Mogadishu, with the old port of town located on a rocky promontory. In 1995 there were 35,000 to 45,000 inhabitants (Lovatelli 1996). Based on the 2005 census, the population stood at 244,409 (ADB 2015). There were two airstrips in 1995 (Lovatelli 1996) but their current condition is not known. The hinterland is an important agricultural area with dense farming and numerous large settlements. The town was famous for sea trading, with cargo vessels anchor off the town.

Fishing facilities were non-existent in 1995, but the remains of an old pier of ca. 60 m length are visible, testimony to times for more maritime traffic. The coral reef 500 m from and parallel to the coast provides sheltered anchorage for small boats, and gently shelving sandy shores ideal for launching fishing boats. There was a cold storage facility in 1995 and the number of active fishers was 250 to 350, mainly using small wooden houris, of which there were 150 in the district, plus another 15 motorised GRP boats (Lovatelli 1996).

Figure 21: Google Earth image from March 2017, showing the sprawling city of Baraawe and its likely fish landing sites. Source: Google Earth (2022).



Baraawe (or Brava)

The city is sheltered by a string of rocky reef outcrops parallel to the coast, part of a 70 km long lagoon and fringing reef system along this portion of the southern shores. All infrastructure that was used to support the fisheries sector was destroyed during the war. Fishing is an important activity, yet shortage of equipment precluded many from engaging and only some 200 fishers were active in 1995 when the population was estimated to be between 10,000 and 15,000 (Lovatelli 1996). Only a few GRP boats and 10-15 mashuas were present in 1995, though recent satellite imagery from March 2017 reveals that there is likely an increase in the fisher's population (Figure 21). Based on the 2005 census, the population stood at 60,364 (ADB 2015). Charcoal has been exported from Mecra since at least 2012 with the dark (blackened) area around landing sites attributed to decades of charcoal trading (Figure 21).

Kismayo (or Chismayo)

Kismayo is the largest and most important coastal city in southern Somalia, located in the Lower Juba Region. In 1995 the population was estimated at 50,000 to 70,000 inhabitants, many of whom were refugees at the time (Lovatelli 1996). Based on the 2005 census, the population of Kismayo stands at 211,129 (ADB 2015).

The port of Kismayo was up-graded and extended in 1986 and equipped with an L-shaped platform, linked to the mainland through an elevated road across the Kismayo Bay, with two piers and two ramps, customs block, a number of warehouses, and a large fuel storage tank. In 1995 the port was not functioning properly and only rarely visited by small cargo boats (mainly sailing dhows) arriving to buy charcoal. More recent satellite imagery taken in March 2021 suggests the port is possibly being used for received shipping containers and that fishing likely remains an important activity (Google Earth Pro 2022a). The city has a functional airport which also serves to export seafood to Nairobi and Mombasa (Lovatelli 1996).

In the mid-1990s the main focus of fishing was on lobsters, sold live to traders who exported them to Nairobi. Fishing was also undertaken for sharks (for fins) and salted meat, as well as demersal and pelagic species for export to Mombasa, with small quantities locally sold fresh (Lovatelli 1996).

Kudha (previously Kulmis)

A large village located along the mainland portion of the Bajuni Archipelago, on the southern shore of the Anole Creek (Figure 9), approximately 100 km south of Kismayo, and with a population of between 2,000 and 2,500 in 1995 (Lovatelli 1996). Before the war there were reportedly at least 30 fishing vessels at Kudha, but during the war many Bajuni fled the area and recent satellite images from September 2013 suggest that fisheries is not such an important activity at present. Some of the previous inhabitants remain, now mainly on the Bajuni islands. A processing plant and desalination plant were constructed before the war but are now abandoned and only destroyed structures remain.

Bajuni Islands

These were mostly uninhabited prior to the war, except for the main island where a Bajuni settlement has existed for five centuries, and seasonal fishing camps on some of the other larger islands. Estimates from before the civil war of the total number of Bajuni include between 3,000 and 11,000 people (Danish Immigration Service 2000). The principal occupation of the Bajuni was fishing the waters around their islands in small boats, with fish traded in coastal towns, mainly in Kismayo, although the Bajuni enjoyed trading links with the Brava (Barawe) further along the coast from Kismayo towards Mogadishu (Danish Immigration Service 2000). Since after the war, two permanent settlements developed on Juula (or Chula) Island. Juula is a small hamlet surrounded by mangroves in the NW of the island and the much larger Madhowa village is located on the more open SW shore, with populations of 50 and 700, respectively, in the mid-1990s (Lovatelli 1996). Based on more recent satellite imagery, these two villages appear to have increased in size, and their combined fleet of small vessels, mostly houris, was around 90 (January 2013 and December 2014), suggesting at least 180 fishers were active.

Based on February 2019 imagery the small settlement on Jasiirada Chovaye is still occupied, as is the one in Koyomani Island (based on December 2014 imagery). However, very few boats appear to be operating from these two settlements. During the Lovatelli (1996) survey, there were no facilities supporting the fishing sector, and he estimated there were 200 fishers operating from the Bajuni Islands. The current numbers are likely to be similar since most of the boats are houris that typically carry one to two fishers.

Kiambooni (or Chiamboni)

A small coastal town close to the Kenya border, 55 km south of Burgabo, with a mid-1990s population of 1,000 to 1,300, a reduced fishing fleet consisting of only 20 to 24 wooden mashuas and approximately 200 fishers who mostly catch lobsters, sharks, and other species (Lovatelli 1996). Recent satellite imagery from March 2021 suggests that the town has significantly increased its fishing fleet (Google Earth Pro 2022b).

Illegal, unregulated, and unreported fishing

Over-fishing is a serious issue for Somalia, partly attributed to illegal, unregulated, and unreported (IUU) fishing. It is an issue offshore where unlicensed trawlers from many nations fish the waters within the Somalia EEZ unmonitored, taking substantial amounts of fish. An additional problem affecting most communities is the loss of nets to illegal trawlers which move closer to shore during the night hours. Many of these vessels have been spotted off the coast of Adale. The problem of IUU fishing is particularly acute in Somalia, largely as a result of civil wars and the lack of a functioning government for the last decade (Gelchu and Pauly 2007).

Based on published reports, interviews with experts, analysis of satellite data, and reported catch data, Glaser *et al.* (2015) provided estimates of total catch by foreign vessels at over 132,000 t of marine life in 2013, nearly three times the amount caught by Somali artisanal and subsistence fishers. Iran and Yemen have the largest fishing presence, but vessels from Europe and Asia also have had a significant presence in Somali waters. Many foreign purse seine and longline vessels, fishing mainly for tuna, crowd the outside border of Somalia's EEZ, while others have been granted license to fish inside. At any time, there may be 10 to 50 vessels operating in or close to Somalia's EEZ.¹ However, the absence of monitoring and enforcement in Somali waters, coupled with the lack of transparency amongst international monitoring agencies in the Indian Ocean, has resulted in a lack of reliable data for the significant level of illegal and semi-illegal foreign fishing activity also taking place in Somalia's EEZ (Glaser *et al.* 2015). Somali authorities have asked for international cooperation to fight back against illegal foreign fishing. It is imperative to reduce foreign IUU fishing in Somali waters, and now is a critical time for the international community to act (Glaser *et al.* 2015). Opportunities exist for collaboration with the oil and gas sector, at a minimum to report sighting and details of fishing vessels that are active in the areas of exploration zones.

¹ Positions of fishing vessels recorded on 03/05/2022, showing 18 fishing vessels operating (or transiting) through the Somalia EEZ as well as vessel density data. Source: Marine Traffic (2022).

It is also of concern when unlicensed trawlers come close to shore catching lobster and shark and destroying reefs and inshore marine habitats. Bottom trawlers that drag nets along the seafloor in shallow waters are active in Somali waters during 75% of the year. Reduction in biodiversity, physical damage to seabed habitats diminishes fish populations long after trawling ceases. A strong recommendation exists for banning bottom trawlers in Somali waters, in line with Somalia's new fisheries legislation (Glaser *et al.* 2015).

The presence of some foreign vessels could be leveraged for the benefit of Somalis from licensing longline and purse seine tuna fleets. Licensing revenue would be even greater if vessels from Iran and Yemen were licensed. This potential revenue represents an important opportunity for investment in the Somali fisheries sector. To facilitate the sustainable development of Somali fisheries, foreign fishing (both legal and illegal) must be limited, licensed, recorded, and regulated as soon as possible (Glaser *et al.* 2015).

3.7.5 Maritime Traffic

Somalia has relied on maritime trade for centuries, dating from the dhow traffic to and from Oman to Zanzibar over 2,000 years ago. The range of imported goods include fuel, vehicles and manufactured goods, construction materials, timber, and certain foodstuff, while export include fish products, charcoal and some food crops depending on the season.

Along the southeast coast of Somalia, the ports that offer possibility for maritime traffic are Mogadishu and Kismayo, though smaller vessels can access several other small ports, including Hobyo, Warsheikh, Adale,

Merca and Baraawe. Understanding current maritime traffic is important for the planning of many offshore upstream activities, notably seismic surveys, but also drilling programmes. The open-access site marinetraffic.com allows real-time analysis of shipping of various vessel types and vessel density data (Figure 22). The map shows considerable maritime traffic (all vessel) off the south-eastern coast especially close to Blocks 177 and 178, most likely associated with maritime trade into and out of Mogadishu Port, while the level of activity seen within or close to Blocks 152, 153, 164 and 165 is mostly likely from fishing vessels. In contrast, for the southern exploration area, Block 204, there appears to be very little maritime traffic based mainly on vessels movement between Kismayo and Mogadishu.

3.7.6 Security

Although Somalia has a formally recognized central government and operational regional administrations, security remains a major concern. Al-Shabaab continues to pose a threat to stability and holds influence over large areas of Somali territory. Attacks to government infrastructure and random attacks on public and private facilities are an ongoing challenge.

Maritime security is also of great concern. Though piracy has significantly reduced since the first known hijacking in 2005, it remains present in the region.

International maritime resources are, therefore, needed to secure the Somali EEZ and address piracy problems and protective measures by ship operators are likely to be needed.

Figure 22: Maritime traffic (all vessel) off the south-eastern coast and offshore waters and the positions of the offshore exploration blocks.

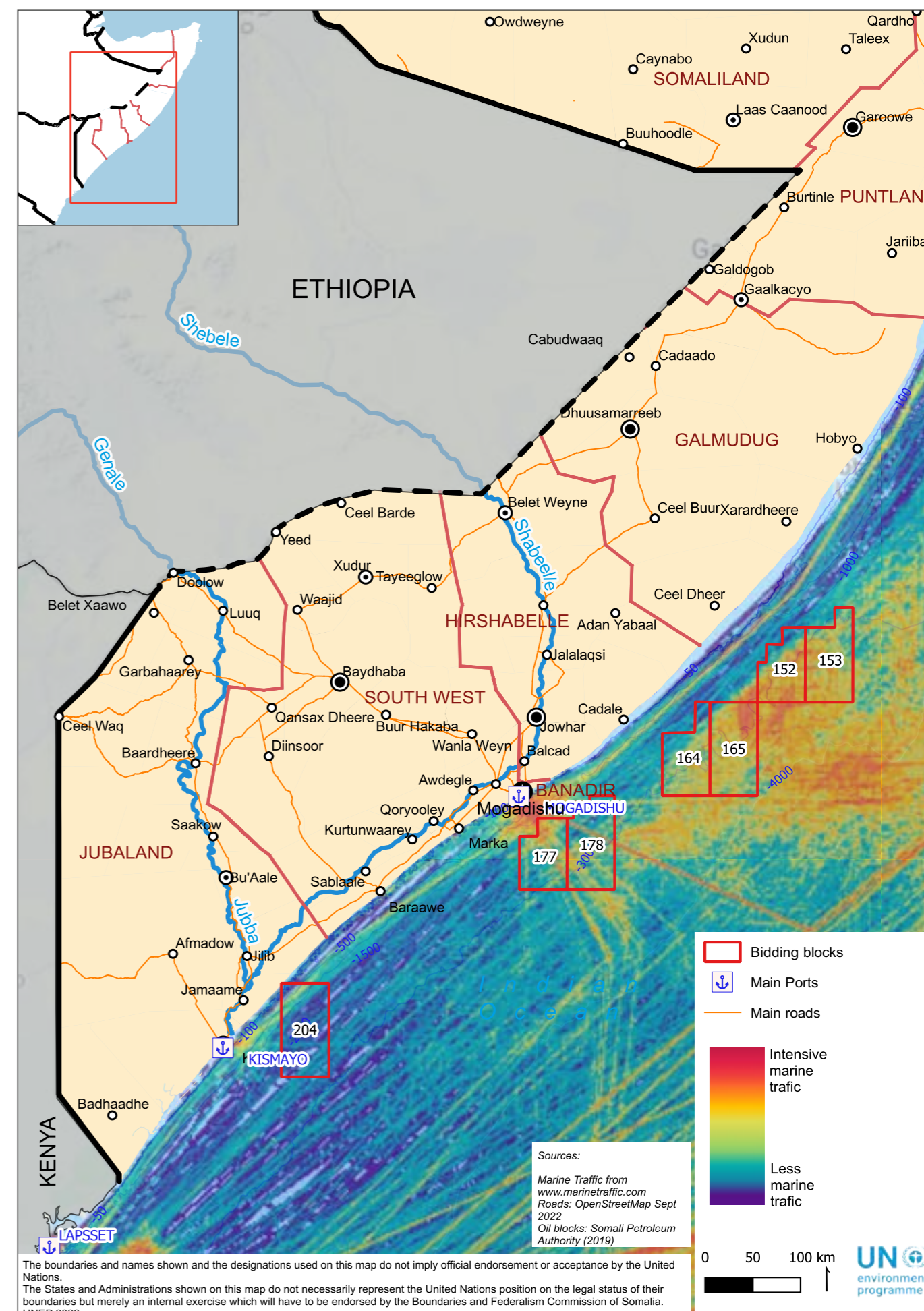
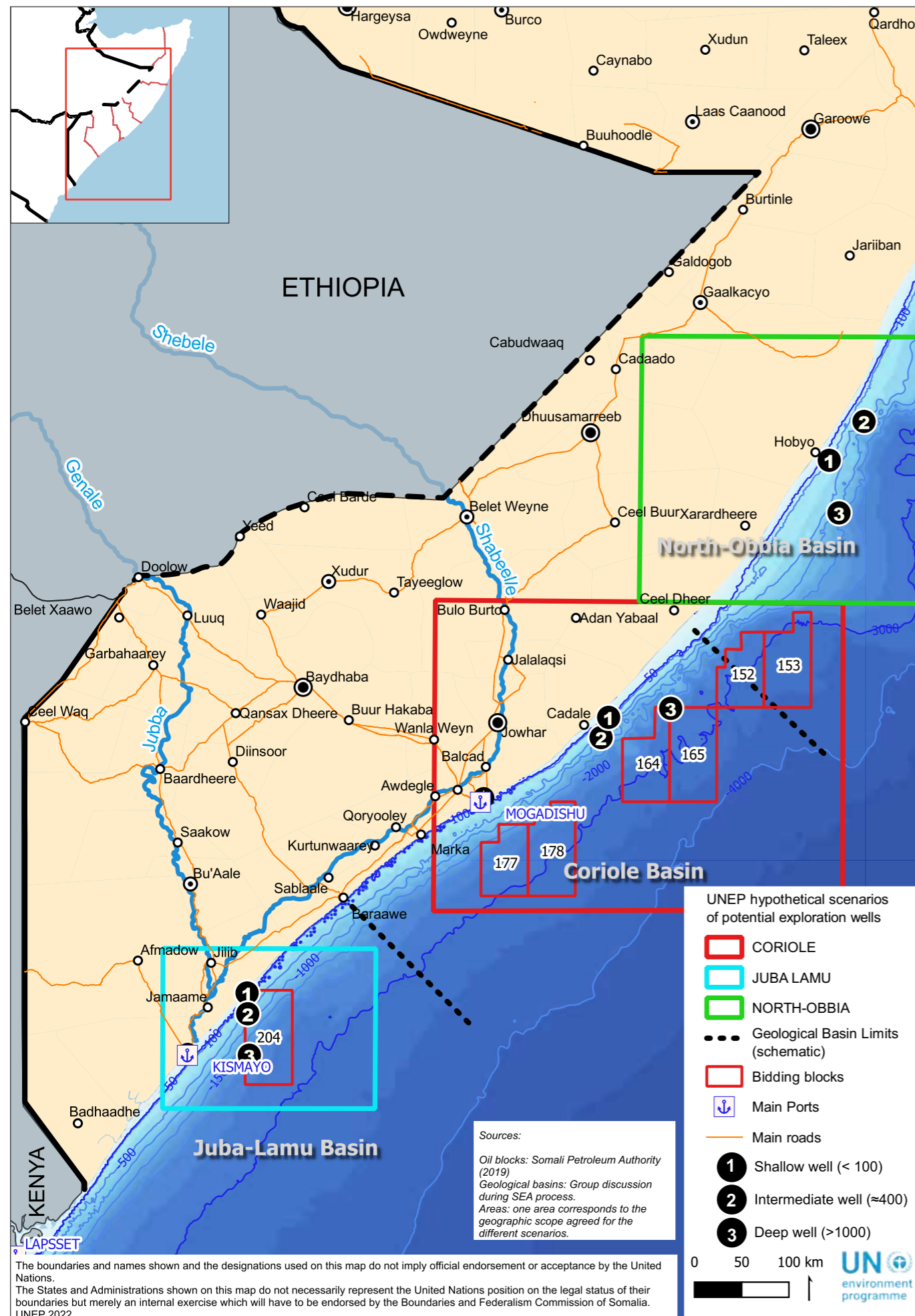


Figure 23: The three areas selected for the first scenarios to initiate the identification of issues.



4. STAKEHOLDER PARTICIPATION IN SCENARIO DEVELOPMENT

From the start of the work there was a strong focus on maximizing stakeholder participation throughout the various steps and the various meetings and workshops held (see Appendix 1). To date 70 individuals from a diverse range of institutions from both the FGS and FMS government as well as research institutions and NGOs were consulted. The names and institutions are listed in Appendix 2 together with the details and dates of meetings and workshops attended.

The methods employed during the development of the Preliminary SEA aimed to strengthen the capacity and understanding of the upstream petroleum sector activities, in particular how these can potentially impact on the socio-economic and environmental situation in Somalia. To achieve this, the following main steps were followed:

- Development of upstream exploration scenarios with associated risks and opportunities
- Investigation of risk and opportunities of the range of scenarios, with removal of those that have not added to an improved basis for the discussions
- Extracting a preliminary list of issues and concerns from the risks and opportunities matrices that were completed by stakeholders
- Expanding on the preliminary list of issues and concerns through an online survey
- Refining the Key Issues list and presenting to the stakeholders for validation through an online poll and follow up consultation meetings

- Finalizing and prioritizing the Key Issues and proposing recommendations

The steps are described in more detail below.

4.1 Development of Scenarios

As there is a very limited history of hydrocarbon discoveries, for establishing scenarios it has therefore been assumed that both gas and oil discoveries could be made offshore, or in the nearshore, depending on the basin, but that both scenarios are relevant to all three basins. Since data are available to serve as a basis for input to define realistic scenarios, these were developed in three geographic areas, associated with the three geological basins, as shown in Figure 23.

The UNEP SEA Core Team identified the most relevant risks and opportunities connected to the indicative scenarios for Somalia, based on existing information and regional experience. In addition to the scenarios, the typical activities, aspects and potential significant impacts for comparable oil and gas activities in other parts of the world were presented by the UNEP SEA Team at the convened workshops.

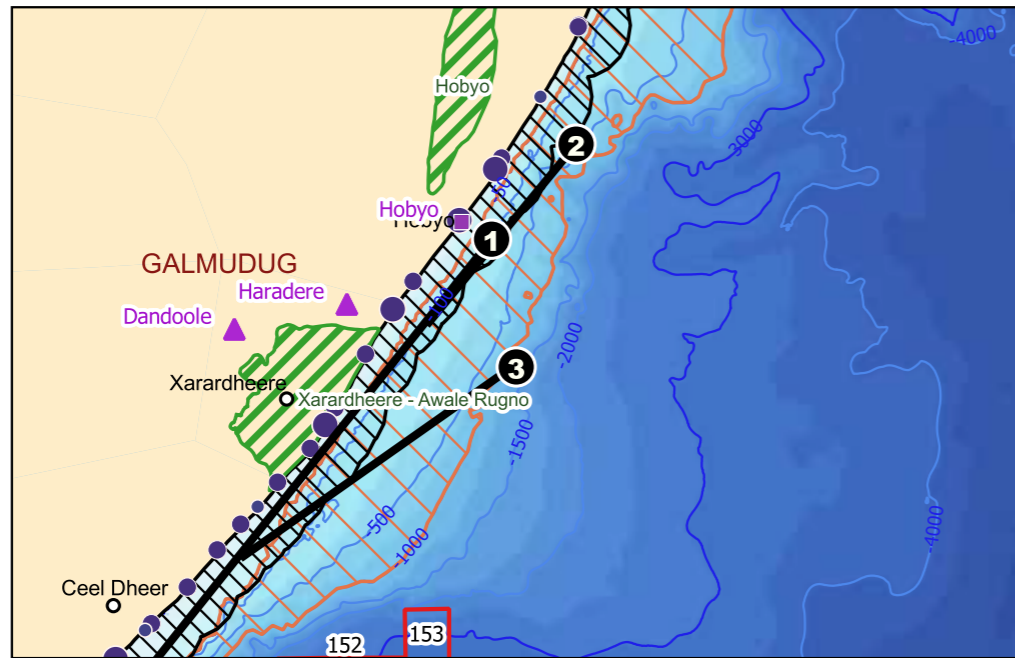
The purpose of the scenarios is to provide an entry point for stakeholders to begin to understand the activities, issues, risk, and opportunities involved. The first scenarios that were used for discussion are shown in Table 4.

Table 4: The first scenarios presented to stakeholders to initiate the identification of issues.

Basin	Well location	Water depth	Port/airport	Gas and/or Oil risks and opportunities
North-Obbia	1	Shallow (<100)	Mogadishu; Hobyo	Site specific
	2	Intermediate (≈400)	Mogadishu; Hobyo	Site specific
	3	Deep (>1,000)	Mogadishu; Hobyo	Site specific
Coriole	1	Shallow (<100)	Mogadishu	Site specific
	2	Intermediate (≈400)	Mogadishu	Site specific
	3	Deep (>1,000)	Mogadishu	Site specific
Juba-Lamu	1	Shallow (<100)	Mogadishu; Kismayo;	Site specific
	2	Intermediate (≈400)	Mogadishu; Kismayo; Lamu	Site specific
	3	Deep (>1,000)	Mogadishu; Kismayo; Lamu	Site specific

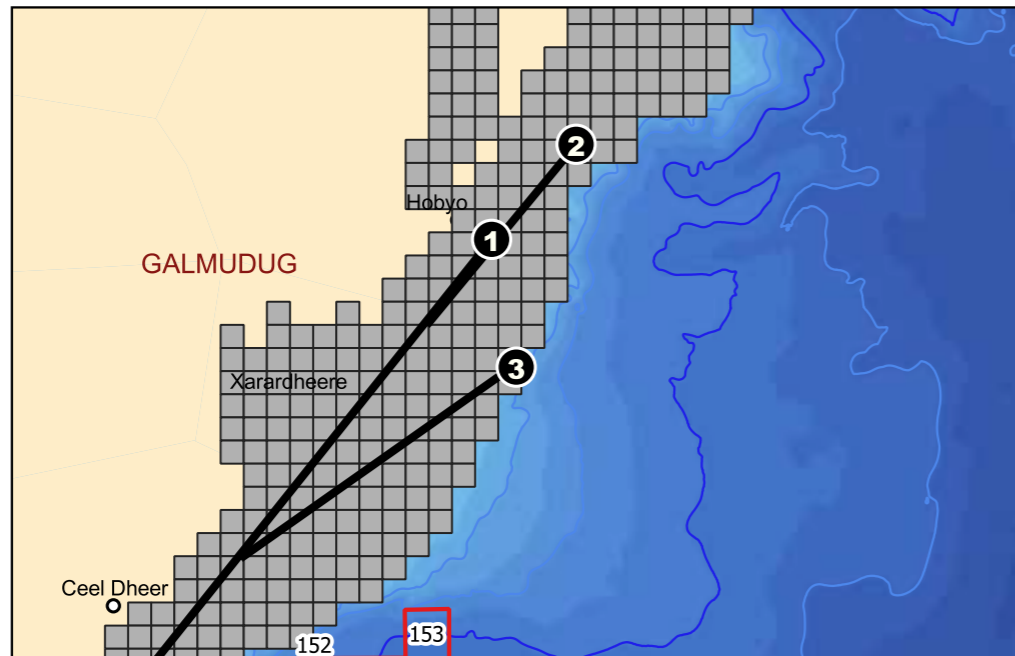
(a) socio-environmental layers along the coastline

- Exploration scenarios
 - 1-Shallow well (< 100)
 - 2-Intermediate well (≈400)
 - 3-Deep well (>1000)
- 7 Bidding blocks
- Fish landing sites (nb of boats)
 - Small < 5
 - Medium < 30
 - Large > 30
- Estimated fishing ground
12 Nautical Miles around fish landing sites
- ▨ Key Bird Areas
- ▲ Wildlife Reserve
- National Park
- Offshore Wind Potential
- Supply vessel navigation route



(b) identification of grids where at least one of the socio-environmental layer can be found

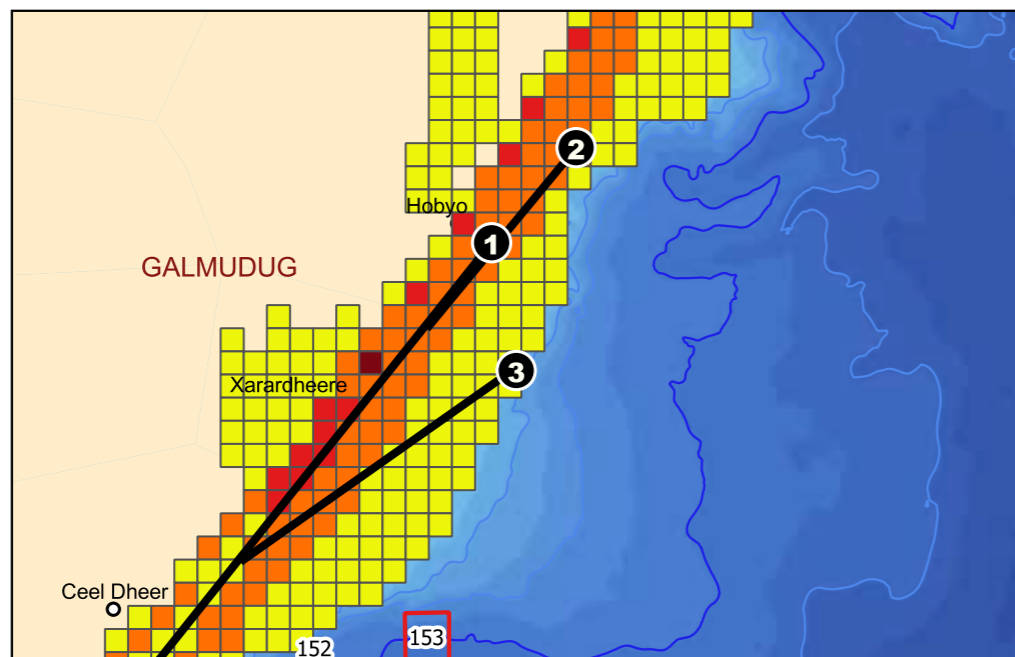
- 1



(c) number of socio-environmental layers that can be found per grid in the vicinity of potential supply route.

- 1
- 2
- 3
- 4
- Supply vessel navigation routes

0 25 50 km



4.2 Use of GIS for Scenario Visualization and Analysis

The GIS expert compiled a range of datasets from different sources associated with the environmental and socio-economic baseline, to develop layers that were used to create maps that showed areas of potential overlaps or sensitivities between environmental and/or socio-economic features and development activities. For each of the scenario areas associated with the three geological basins (shown in Figure 23) the GIS tool extracted discrete areas for focused analysis. All three basin scenario include exploration well drilling at three hypothetical well locations (shallow, intermediate depth and deep water), and includes the supply vessel route to and from the drilling rig to the supply base, assumed to be in Mogadishu.

Developing the scenarios is greatly improved by using the GIS-based maps, which served to demonstrate the locations where potentially “co-occurring” data layers might exist and help explain and visualize where the critical potential hotspots for consideration are. By gridding the maps to 500 m x 500 m squares, all layers that overlap, or co-occur within each square, can be summed to reveal with a colour coded scoring the grid square areas within the map where the greatest number of sensitive receptors.

Baseline data types that particularly lend themselves to be portrayed this way include marine habitats, distribution of selected species (e.g., whales), and fisheries landing sites (reflecting presence of fishing communities with indications of the scale of local operations, see Figure 15). However, not all risks can be visualized on maps. For example, absence or weakness in the legal and regulatory regime, insufficient technical capacity or means to enforce legal requirements are issues that are difficult to depict geographically and require instead more of a consultative approach to determine their relevance and importance.

This analysis helps understand the areas that hold the greatest risk of potential sensitivities (being impact on socio-economic or environmental sensitive receptors). Such potential socio-environmental sensitive areas might be considered where significant mitigation measures will be required, or further, areas that should be altogether avoided.

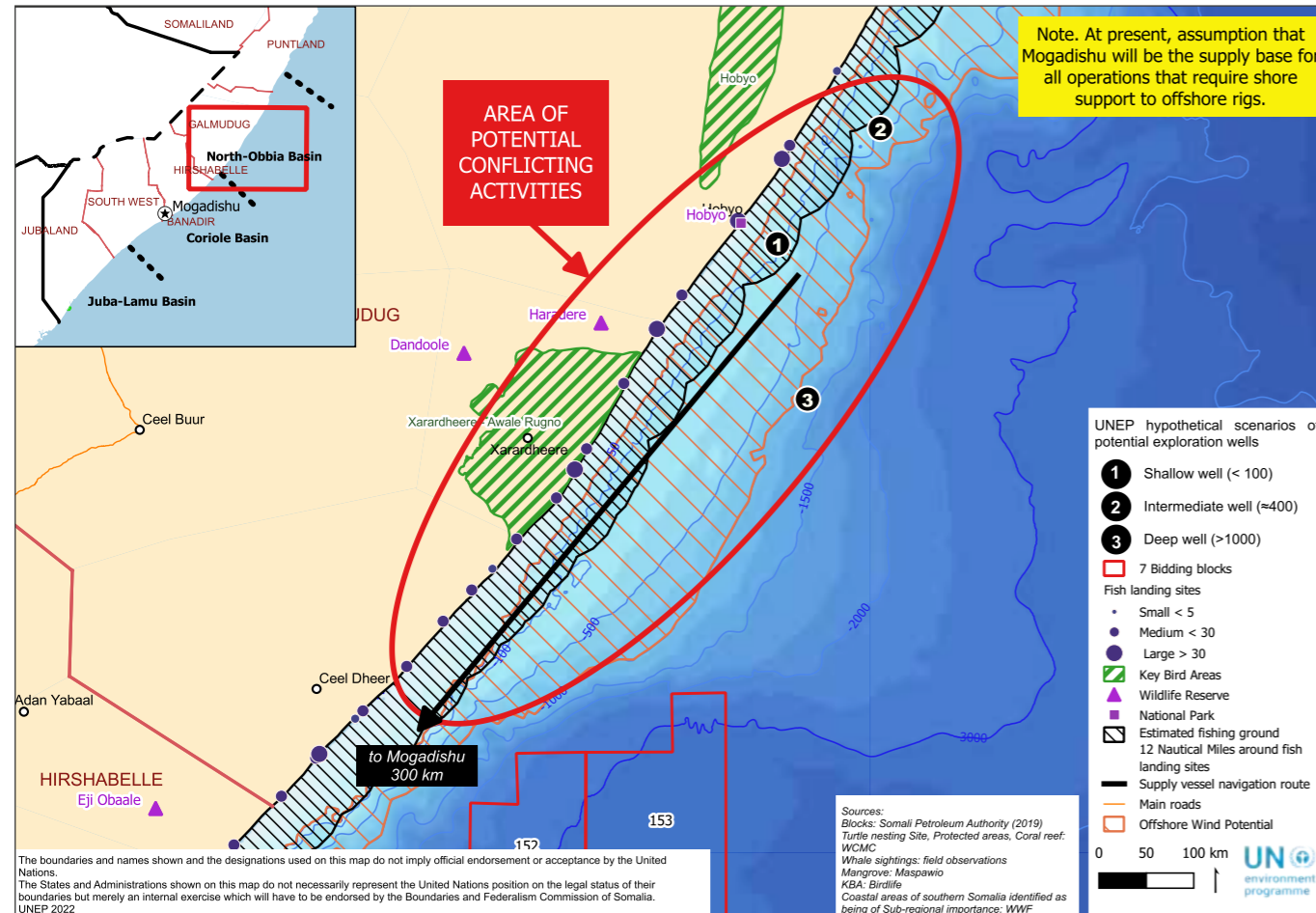
North Obbia Basin GIS Analysis

The scenario developed for the North Obbia Basin is outside of the nearest of the seven ‘best’ blocks that were recently offered (blocks 152, 153, 164 and 165) which are between 100 km to 300 km further south as shown in Figure 24a. This scenario is however very relevant to exploration of more northern blocks 131 and 142 (see Figure 2).

When these layers are combined for the North Obbia exploration well scenarios using the grid and sum functions in GIS, the outcome reveals an area within the map where numerous layers accumulate to reflect high probability of potential socio-environmental sensitivities (Figure 24c). In particular, the supply vessel route and the potential risk of spill from the route and vessel activity around the well locations are likely to significantly impact on local fisheries, including the installed Fish Aggregation Devices (FADs) that are present off the coast of Hobyo and coastal fishing communities (Figure 25). This section of the coast also has a larger area of offshore wind potential which also overlaps with the drilling scenarios, especially the drilling in shallow and intermediate water depths. Alternatives that would reduce some of the areas of potential socio-environmental sensitivities include conducting the drilling during the season that is least favourable for fishing (between June and mid-September – the main summer months) or using the Hobyo Port as the supply base rather than Mogadishu.

Figure 24: Geographical representation of a scenario showing three hypothetical explorations well locations in the North Obbia Basin with (a) a set of socio-environmental layers along the coastline, (b) identification of grids where at least one of the socio-environmental layers can be found, and (c) the number of socio-environmental layers that can be found in one grid with potential overlap of oil and gas activities.

Figure 25: Geographical representation of a scenario showing three hypothetical explorations well locations in the North Obbia Basin of interactions between socio-environmental receptors with potential oil and gas activities.



Coriole Basin GIS Analysis

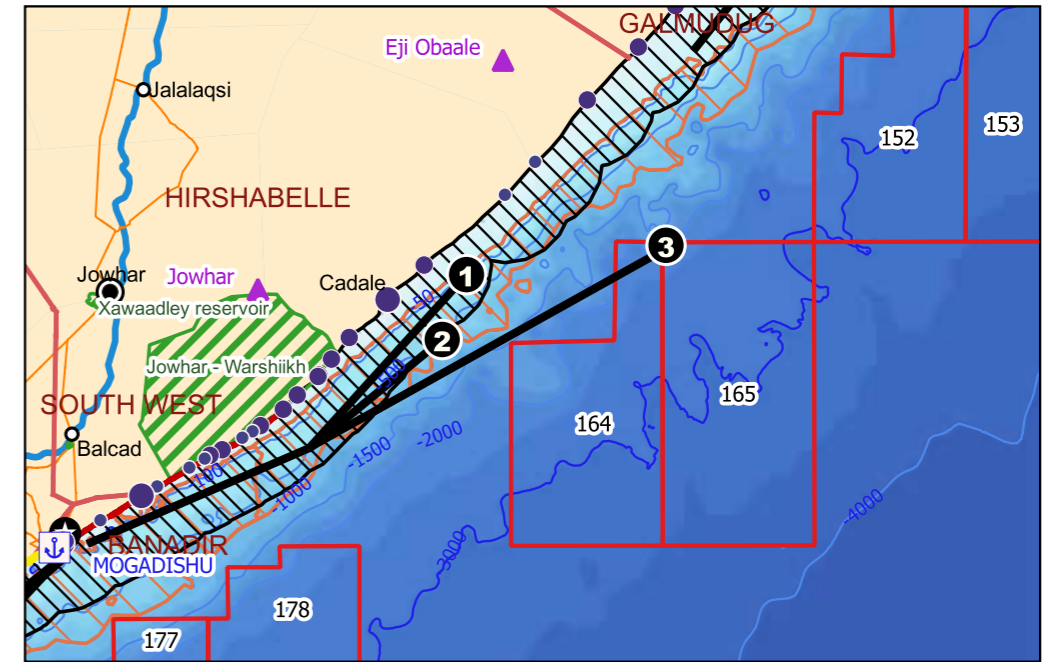
The scenario from the Coriole Basin is particularly relevant to exploration blocks 164 and 165, notably the intermediate depth and deep-water wells, as shown in Figure 26a. When these layers are combined for the Coriole Basin exploration well scenarios using the grid and sum functions in GIS, the outcome reveals an area within the map where numerous layers accumulate to reflect high probability of potential environmental sensitivities (Figure 26). In particular, the supply vessel route and the potential risk of spill from the route and vessel activity around the hypothetical well locations indicate potential significant impact on local fisheries and coastal communities (Figure 27). Other receptors that are present in this area of potential socio-environmental sensitivities include an area of offshore

wind potential which also overlaps with the drilling scenarios, especially the shallow water wells, plus turtle nesting sites along the shore and the presence of inshore coral reefs. The former is susceptible to noise and light disturbance while corals and nesting turtles are vulnerable to oil spills.

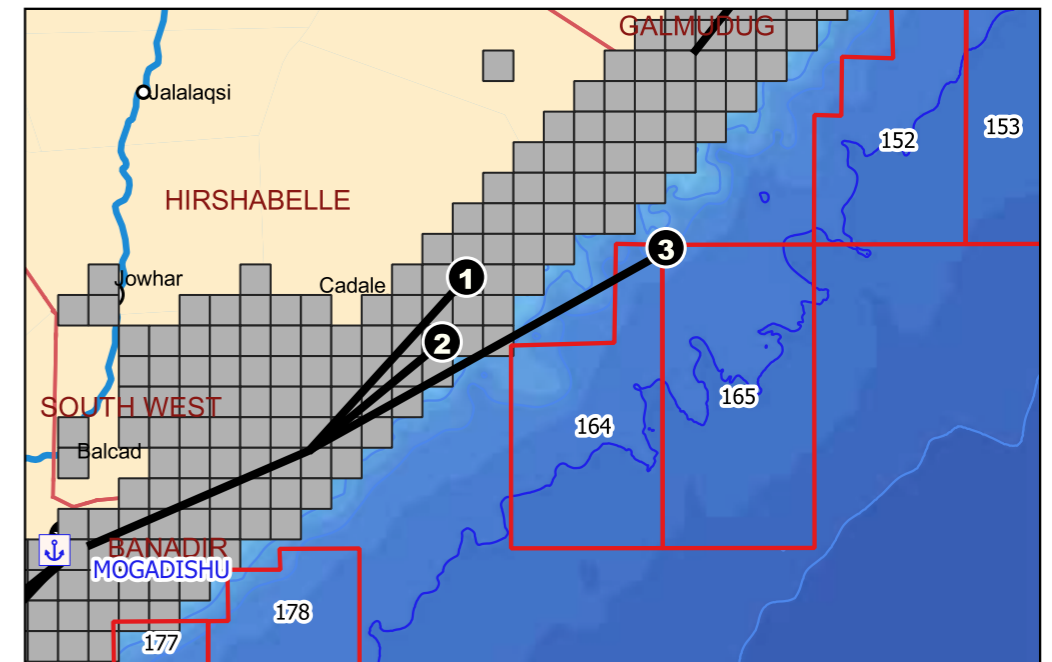
Alternatives that would reduce some of the areas of potential socio-environmental sensitivities include conducting the drilling during the season that is least favourable for fishing (between June and mid-September - the main summer months), restricting supply vessel movement to greater distances from the shore to reduce interference with local fisheries, and adapting all vessel light systems and speeds to reduce unnecessary ambient light pollution and underwater noise, respectively.

Figure 26: Geographical representation of a scenario showing three hypothetical explorations well locations in the Coriole Basin with (a) a set of socio-environmental layers along the coastline, (b) identification of grids where at least one of the socio-environmental layers can be found, and (c) the number of socio-environmental layers that can be found in one grid with potential overlap of oil and gas activities.

- (a) socio-environmental layers along the coastline
- Exploration scenarios
- 1-Shallow well (< 100)
- 2-Intermediate well (≈400)
- 3-Deep well (>1000)
- 7 Bidding blocks
- Fish landing sites (nb of boats)
- Small < 5
- Medium < 30
- Large > 30
- Estimated fishing ground 12 Nautical Miles around fish landing sites
- Key Bird Areas
- Turtle Nesting Sites
- Wildlife Reserve
- Coral reef
- Offshore Wind Potential
- Supply vessel navigation route
- Main roads



(b) identification of grids where at least one of the socio-environmental layer can be found



(c) number of socio-environmental layers that can be found per grid in the vicinity of potential supply route.

- 1
- 2
- 3
- 4
- Supply vessel navigation routes

0 25 50 km

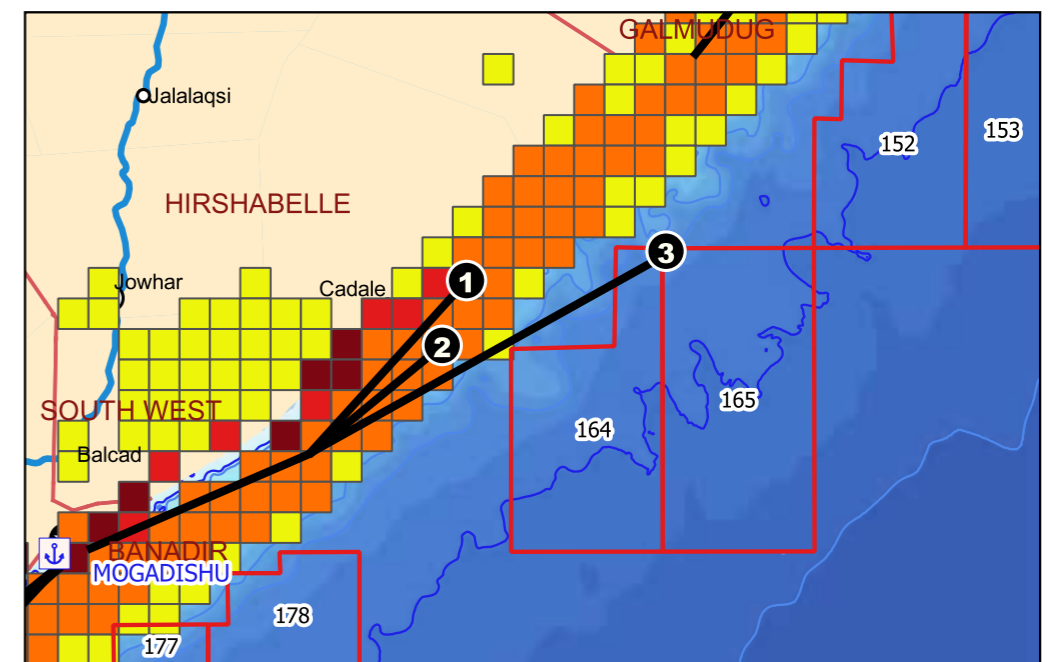
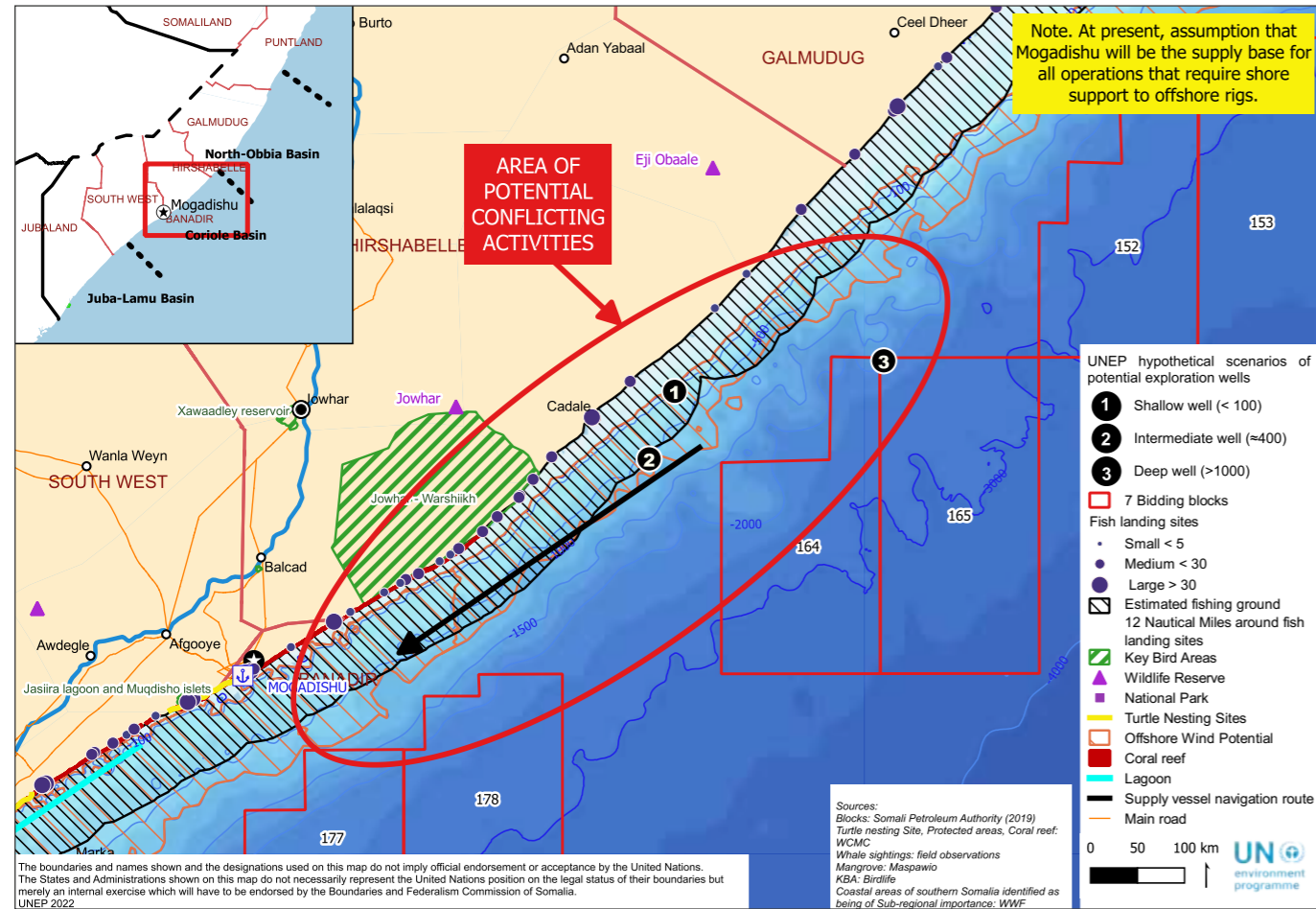


Figure 27: Geographical representation of a scenario showing three hypothetical explorations well locations in the Coriole Basin of interactions between socio-environmental receptors with potential oil and gas activities.



Juba-Lamu Basin GIS Analysis

The scenario from the Juba-Lamu Basin is particularly relevant to exploration block 204, as shown in Figure 28a. When these layers are combined for the Juba-Lamu Basin exploration well scenarios using the grid and sum functions in GIS, the outcome reveals an area within the map where numerous layers accumulate to reflect high probability of potential socio-environmental sensitivities (Figure 28c). In particular, the supply vessel route and the potential risk of spill from the route or the well locations indicate potential significant impact on coastal fishing communities and a unique 80 km coastal lagoon system (Figure 29). Local fishing communities are relatively sparse along the Jubaland portion of the coast, but there are larger landing sites along the South-west State coast. However, other receptors that are present in this area of potential socio-environmental sensitivities include an area of offshore wind potential which also overlaps with the

drilling scenarios, especially the shallow water and intermediate depth wells, plus turtle nesting sites along the shore and the presence of inshore coral reefs. The former is susceptible to noise and light disturbance while corals and nesting turtles are vulnerable to oil spills.

Alternatives that would reduce some of the areas of potential socio-environmental sensitivities include using the Kismayo Port as the supply base rather than Mogadishu, avoiding seasons when turtles are known to nest, adapting all vessel light systems and speeds to reduce unnecessary ambient light pollution and underwater noise, respectively, conducting the drilling during the season that is least favourable for fishing (between June and mid-September - the main summer months), and restricting supply vessel movement to greater distances from the shore to reduce interference with local fisheries.

Figure 28: Geographical representation of a scenario showing three hypothetical explorations well locations in the Juba-Lamu Basin with (a) a set of socio-environmental layers along the coastline, (b) identification of grids where at least one of the socio-environmental layers can be found, and (c) the number of socio-environmental layers that can be found in one grid with potential overlap of oil and gas activities.

- (a) socio-environmental layers along the coastline
- Exploration scenarios
 - 1-Shallow well (< 100)
 - 2-Intermediate well (≈400)
 - 3-Deep well (>1000)
 - 7 Bidding blocks
 - Fish landing sites (nb of boats)
 - Small < 5
 - Medium < 30
 - Large > 30
 - ▭ Estimated fishing ground 12 Nautical Miles around fish landing sites
 - ▨ Key Bird Areas
 - ▨ Turtle Nesting Sites
 - ▨ Wildlife Reserve
 - ▨ National Park
 - ▨ Areas identified as being of Sub-regional importance (WWF)
 - ▨ Coral reef
 - ▨ Mangroves
 - ▨ Lagoon
 - ▨ Offshore Wind Potential
 - ▨ Supply vessel navigation route
 - ▨ Main roads

(b) identification of grids where at least one of the socio-environmental layer can be found



(c) number of socio-environmental layers that can be found per grid in the vicinity of potential supply route.

- 1
- 2
- 3
- 4
- Supply vessel navigation routes

0 25 50 km

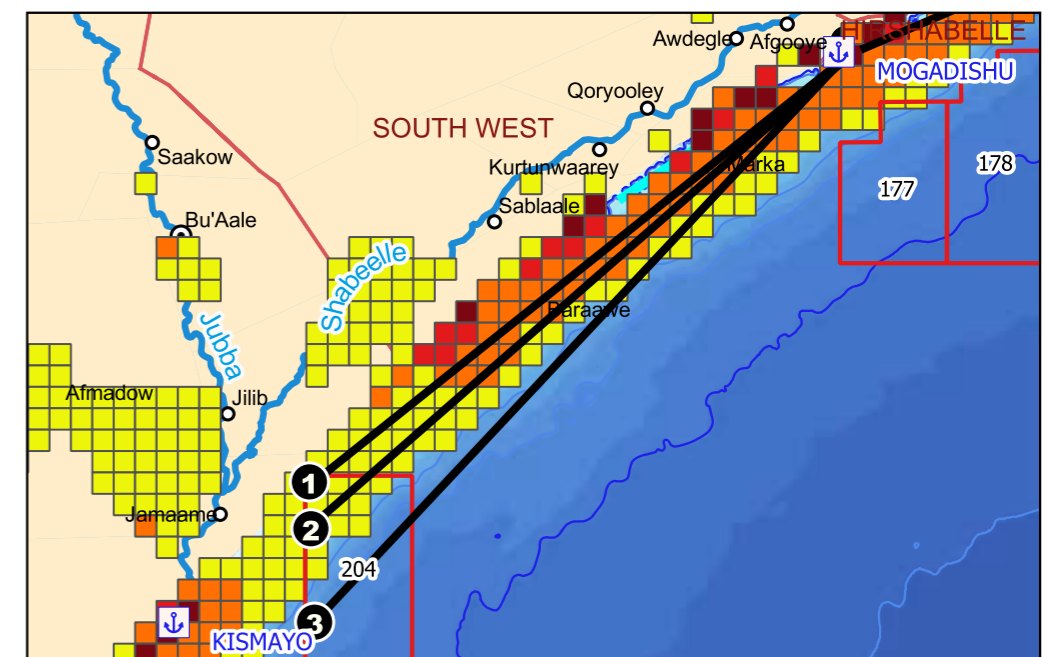
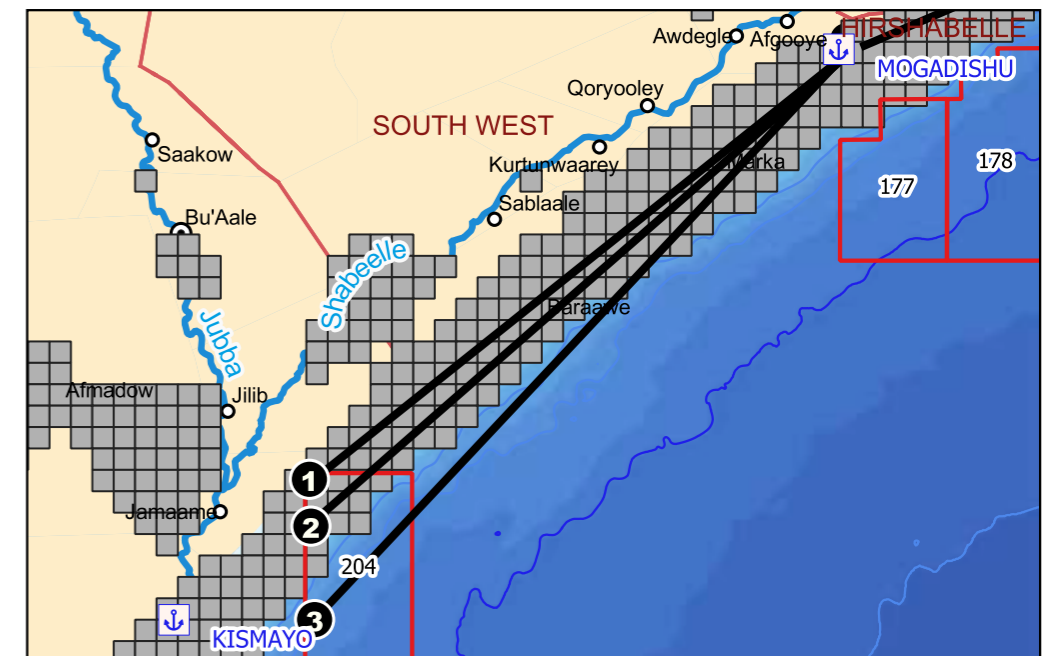
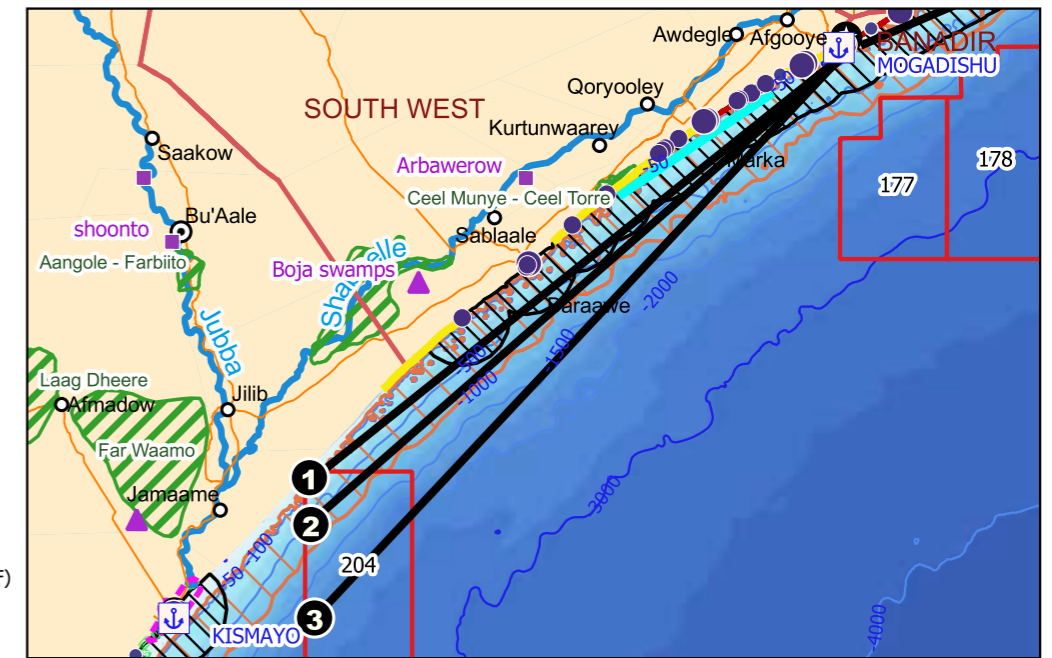
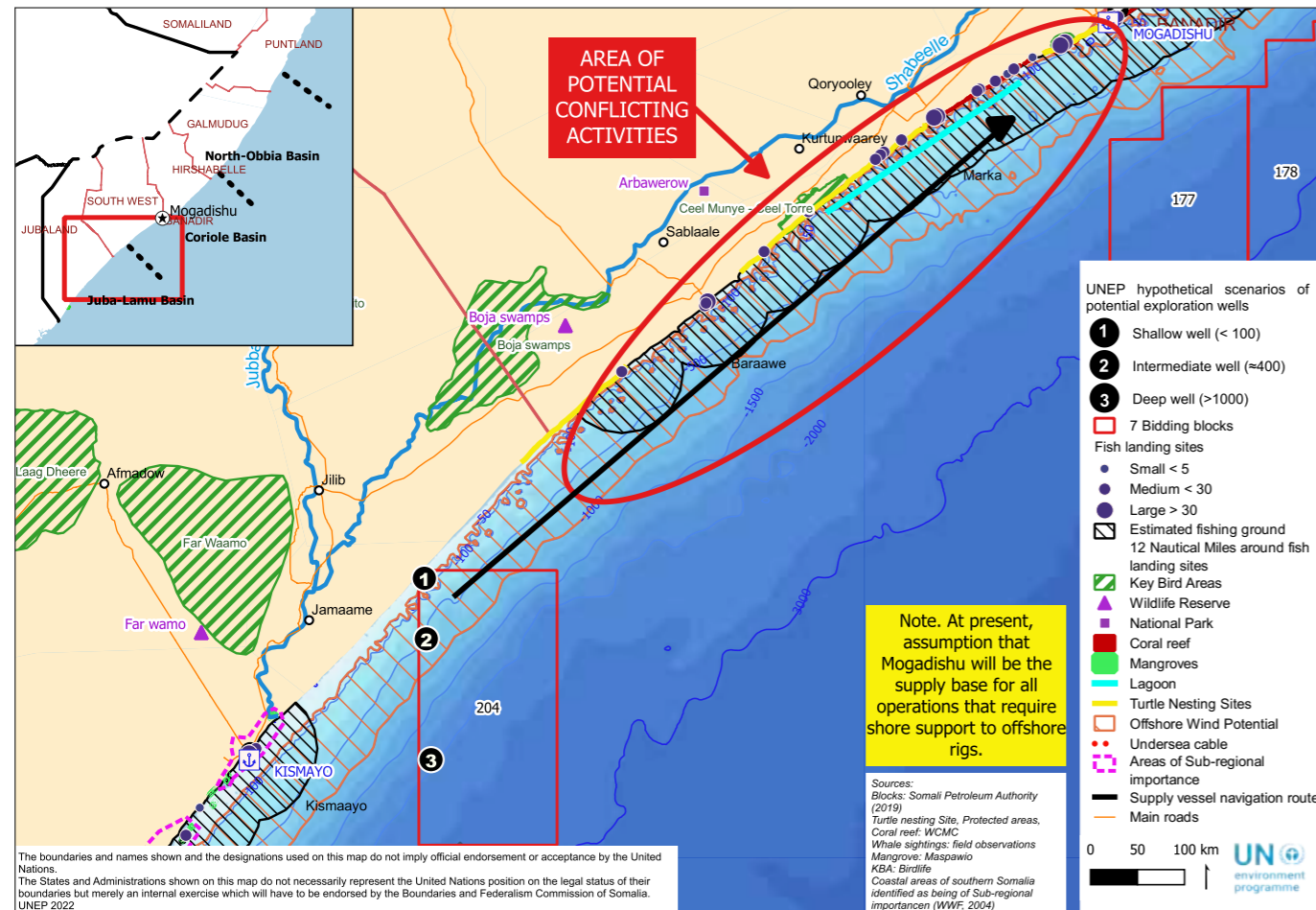


Figure 29: Geographical representation of a scenario showing three hypothetical explorations well locations in the Juba-Lamu Basin of interactions between socio-environmental receptors with potential oil and gas activities.



4.3 Risk and Opportunities Analysis

Expanding on the scenarios, the risk and opportunities matrices further focused on the specific issues associated with the specific activities that are typical during seismic surveys and exploration well-drilling. An example on the outcome of UNEP SEA Core Team workshops includes a group analysis of the various exploration phase activities (e.g., physical presence, emissions, discharges, etc) for which areas of concern are noted, further assessed with respect to opportunities and risk, leading to a ranking of the most significant issues for each set of activities.

The results of such an analysis were presented to the stakeholders through a second round of online workshops as an avenue for them to add their additional concerns and issues. All results were integrated into an SEA Opportunities and Risks matrix, of which several iterations evolved over time as it was subjected to more inputs and reviews by the UNEP SEA Core Team and the TWG.

Table 5 presents a sample risks and opportunities matrix (for seismic surveys) focused on the following principal activities: physical presence, emissions and

discharges, accidental events, decommissioning and abandonment, and finally, institutional constraints. This and a similar matrix on well drilling, were shared with stakeholders in a format that allowed each risk and opportunity to be ranked (Appendix 3). The highest ranked were raised to the ‘issue’ status. As a means of testing the outcome of the risks and opportunities matrix and expanding on the preliminary list of issues and concerns, an online survey was organized using the Survey Monkey platform and a tailored questionnaire (Appendix 4).

4.4 Development of Key Issues

The UNEP SEA Core Team used the outputs of the previous steps to identify the Key Issues. The selection process builds on the following criteria:

- Key Issues should refer to oil and gas related activities within the next 5-15 years. Since a commercial discovery may be made at the earliest within 5-10 years (short term), this focuses attention on the exploration and the early development phases.
- Exploration for oil and gas should be treated the same way, as activities are generally very similar during the exploration phase.

- The description of the issues for discussion with stakeholders should focus on important aspects that assist in defining the significance of the issue.
- The Key Issues are the risks and opportunities which altogether get a high significance score taking all the above criteria into consideration.

From the scoring of the risk and opportunities matrices and the results of the online Survey Monkey

questionnaire emerged the final master list of issues. The outcome was a master list of 55 issues (Appendix 5) that were then compared and processed to avoid duplication and combine related issues that satisfy the above criteria and scored above a value of 3 (of the 0 to 5 score range) from the Survey Monkey questionnaire and risk and opportunities matrices. The outcome of this rationalization process is a list of 24 Key Issues (Appendix 6).

Table 5: Sample risks and opportunities matrix for seismic surveys.

Activity and aspects	Risks and Opportunities
SEISMIC SURVEYS Marine use: physical presence <ul style="list-style-type: none"> • Survey vessel(s) arrive in Somali EEZ • Area occupation offshore (within 12 nm) • Helipad and helicopter transport routes (for emergencies and occasional supplies) • Survey vessel and streamer exclusion zone 	Risks <ol style="list-style-type: none"> 1. Overlaps between existing economic activities (e.g., tourism/fisheries) and oil and gas industry 2. Decreased revenue of fishing industry 3. Disturbance of marine organisms 4. Disturbance of tourism industry 5. Disturbance to Shipping traffic 6. Shortage of fishing areas 7. Piracy/security risk for seismic vessel Opportunities <ol style="list-style-type: none"> 1. Employment and livelihood opportunities 2. Increased supplies and services
Emissions, discharges, and wastes <ul style="list-style-type: none"> • Vessel air emissions • Vessel discharges (sewage, grey water, food waste) • Hazardous waste handling and management • Non-hazardous waste handling and management • Ballast water • Deck drainage • Intense noise from airguns 	Risks <ol style="list-style-type: none"> 1. Health and safety problems 2. Environmental degradation/pollution 3. Climate change and variability from emissions 4. Noise impacts on marine life Opportunities <ol style="list-style-type: none"> 1. Employment opportunities and livelihoods 2. Increased supplies and services
Accidental or unplanned events <ul style="list-style-type: none"> • Spills: refuelling and bunkering • Spills: collision/tank/pipeline rupture • Introduction of invasive species • Collision with marine fauna 	Risks <ol style="list-style-type: none"> 1. Job creation (e.g., spill clean-up) 2. Skills and training (e.g., in spill clean-up) 3. Health and safety problems Opportunities <ol style="list-style-type: none"> 1. Employment opportunities (responding to incident) 2. Conducting studies and investigation of the area
Decommissioning <ul style="list-style-type: none"> • Survey vessel(s) depart Somali EEZ • Fuel and other supply contracts terminated 	Risks <ol style="list-style-type: none"> 1. Job loss, increase poverty and instability 2. High expectations of the local population Opportunities <ol style="list-style-type: none"> 1. Alternative energy
Institutional aspects <ul style="list-style-type: none"> • .. • .. • .. 	Risks <ol style="list-style-type: none"> 1. Unsuccessful survey completion and reputation damage 2. Increase accidental events such as Oil spill Opportunities <ol style="list-style-type: none"> 1. Successful survey completion reputation boost 2. Knowledge sharing and training

4.4.1 Key Issues and Strategic Areas grouping

To support the final analysis phase of the SEA, and facilitate a more structured assessment, the Key Issues are grouped into the following 12 Strategic Areas:

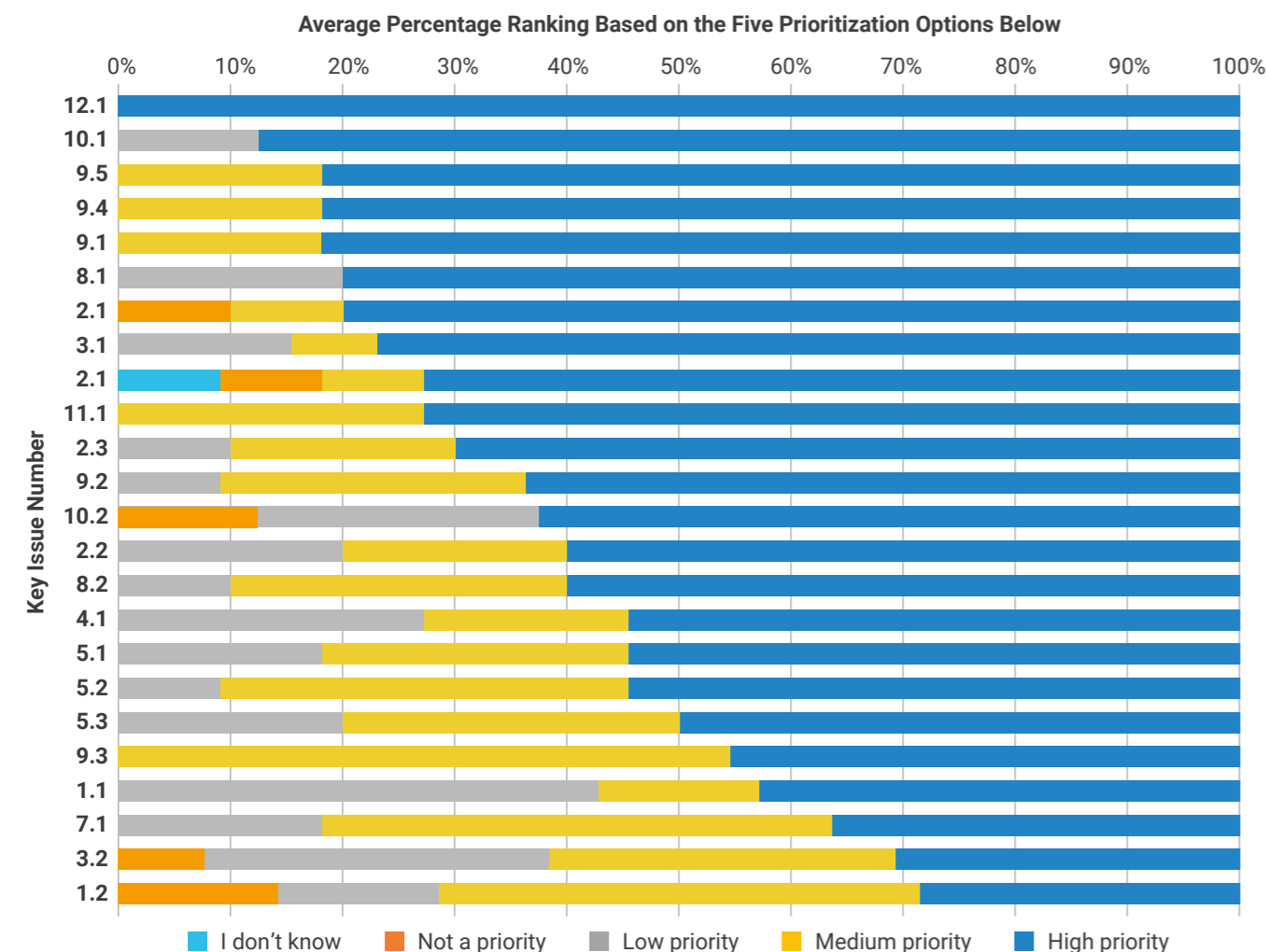
1. Activities in environmentally sensitive and protected areas
2. Discharges and emissions from the petroleum industry
3. Waste management
4. Emergency preparedness and response (for accidental events)
5. Co-existence with local communities
6. Co-existence with fisheries sector
7. Co-existence with tourism sector
8. Critical infrastructure
9. Institutional capacity building, structure, and functions
10. Transboundary issues
11. Land and marine area quality, use and spatial planning
12. Establishment of an environmental and socio-economic baseline dataset

4.4.2 Validation and Prioritization of Key Issues

An important validation and prioritization process by the TWGs and other stakeholders was held in January 2022. This required that all 24 numbered Key Issues as presented are re-considered as to whether each issue continues to rank as a Key Issue in the context of the nascent oil and gas history of Somalia. For each Key Issue stakeholders were offered five 'priority' options from which to select what they considered to be the most appropriate for each Key Issue. Figure 30 presents the summary of the results, with the Key Issue and poll question (Q) in validation and prioritization exercise presented in Appendix 7.

As can be seen from the results, all 24 Key Issues were considered high priority by some stakeholders, though for some Key Issues the priority ranking was much higher. It should be noted that stakeholders were from different parts of the country and thus their individual scores are likely to reflect their specific understanding and the geographical and natural resource characteristics of their part of the country. Also, there appeared to be limited awareness amongst the TWG represented of the international commitments the country is signatory to, which would then downplay the importance of any related issues.

Figure 30: Plot of the initial prioritization poll from January 2022 of the 24 Key Issues (numbered).



The previously identified Key Issue 10.2 was associated with disputed territorial waters and was subsequently regarded by some stakeholders as no longer relevant due to the International Court of Justice's recent ruling of 12 October 2021, by which the Court determined the maritime boundary between Somalia and Kenya. The remaining 23 Key Issues were subjected to fresh and better-informed analysis during the ToT Workshop in Nairobi in June 2022. Following further discussion with TWG there was a re-prioritization of the Key Issues undertaken by the 20 workshop participants, together with an improved understanding of their background and context. The 24 Key Issues were further prioritized down to 23 Key Issues. The revised prioritization is based on the mean of the priority scores (Appendix 8), and final priority ranking is presented in Table 6. **All 23 key issues remain important** though the ranking/prioritization is important but subject to these regional differences, institutional understandings etc.

The revised and final ranking reveals a few striking differences when compared to the process conducted in January 2022. For example, Key Issue No. 1.2, related to impacts on marine species of conservation importance was initially considered as a high priority by only 28% of respondents, being ranked overall as being of lowest priority. On the final day of the ToT Workshop, following several capacity building and awareness exercises the same Key Issue was raised to highest priority status. The original low ranking may be due to the distribution of such species, which are likely to be more common in the southern portion of the coast, within Jubaland, compared to off the coast of Galmudug. These potential regional differences need to be considered so that important issues are not downranked because of geographical heterogeneity of the species or habitat.

Table 6: Final Prioritization of Key Issues (June 2022).

Key Issue	Initial score*	Revised score†	Overall priority
12.1 Incomplete (and inaccessible) environmental data to support environmental management of offshore petroleum activities in Somalia	100	100	Highest
3.1 Impacts from hazardous waste	76	100	
9.1 Appropriate legal and policy requirements are in place	82	93	
1.2 Impact on marine species of conservation or national importance	28	93	High
1.1 Impact on environmentally sensitive marine areas and habitats	43	88	
10.1 Transboundary oil spill preparedness	88	87	
11.1 Spatial planning to aid management of Somalia EEZ	73	87	
8.1 Infrastructure is available to the petroleum sector	80	85	
9.4 Legal enforcement	82	80	
9.5 Technical capacity requirements are met	82	80	
2.1 Routine and accidental discharges	80	80	
6.1 Ensuring fisheries productivity	73	78	
7.1 Ensuring tourism potential	36	73	
9.2 Coordination between institutions to facilitate sustainable development of the sector	64	70	
8.2 Appropriate analytical laboratory is available to the petroleum sector	60	70	
5.1 Local content participation in the oil and gas sector	55	68	Medium
4.1 Emergency response preparedness (for accidental events)	55	68	
5.3 Health and safety among local communities and employees	50	65	
2.3 Impacts from sea level rise and storms	70	58	Medium-Low
9.3 Insurance requirements and liability are provided	45	55	
2.2 Greenhouse gas emissions	60	38	
5.2 Gender representation and impact assessment	55	30	Low
3.2 Impacts from non-hazardous waste	32	23	

* Score shown is the average percentage of 'high priority' ranking assigned to this Key Issue (see Fig. 30).

† Revised mean score based on outcome of the ToT Workshop group analysis and scoring of Key Issues.

4.5 Comparison with Previous Capacity Needs Assessment

The above ranking of Key Issues reflects the consensus reached by the stakeholder on the issues specifically related to the activities associated with the upstream exploration for oil and gas in the offshore and nearshore water off southern Somalia. An additional means of verification can be achieved by undertaking UNEP’s Capacity Needs Assessment (CNA) checklist based on the LPR and SEA findings. The current CNA is therefore based on the findings from the various consultation meetings from the LPR and SEA, online surveys, etc. The analysis examined eight sectors related to environmental management associated with the oil and gas sector. The results of the CNA are presented as spider plots (see Figure 31 and Figure 32).

As can be seen from examining the spider plots, the CNA Questionnaire demonstrates clearly that in general, Somalia’s the institutional and legislative infrastructure to manage environmental issues associated with the oil and gas sector remains at nascent stages. This is not surprising, given the recent history and virtually no experience in the petroleum industry, the limited national level academic training and technical expertise in the country and the limited awareness of the environment and its sensitivities. Despite that, some legally valid instruments are in place, at least on the MOPMR side (the Petroleum Law, Petroleum Environmental Regulations, and the model Production Sharing Agreement (or PSA)). Of note, is that five of the eight sectors have already established some credentials, where scores of 30% or more are achieved. This is seen for the capacities of national

institutions (mostly through the existence of some form of coordination mechanisms and favourable institutional set-up), for the level of national policies and legal frameworks that have been developed (notably policy frameworks/strategies and standards/guidelines), for the participation and/or representation of NGOs and civil society (through local communities) and to some extent in the sector represented by the media, and the responsibilities for emergency response and disaster management. The capacity with the private sector, the national technical capacities, and academia all scored very low.

The overall conclusion from this short exercise is that the CNA confirm that many of the highest ranked Key Issues are those related to sectors that are in need of support. This can be seen from the high and medium priority ranking of Key Issues such as the need for appropriate legal and policy requirements to be in

place, the need for legal enforcement and for technical capacity requirements to be met, the need for coordination between institutions to facilitate sustainable development of the sector, and the mostly highly prioritized Key Issue, that the issue of incomplete (and inaccessible) environmental data to support environmental management of offshore petroleum activities in Somalia needs to be solved. The latter Key Issue can be seen as an over-arching concern that involves national institutions including academia, technical capacity and disaster preparedness.

The analysis nevertheless serves as an important basis from which to further investigate weaknesses and identify concerns or challenges in the national capacity to manage environmental issues related to the oil and gas sector in Somalia. It also serves as a tracking tool, which can be re-scored periodically as developments in these sectors take place.

Figure 31: Spider plot of the Somalia CNA questionnaire showing the summary results per sector.

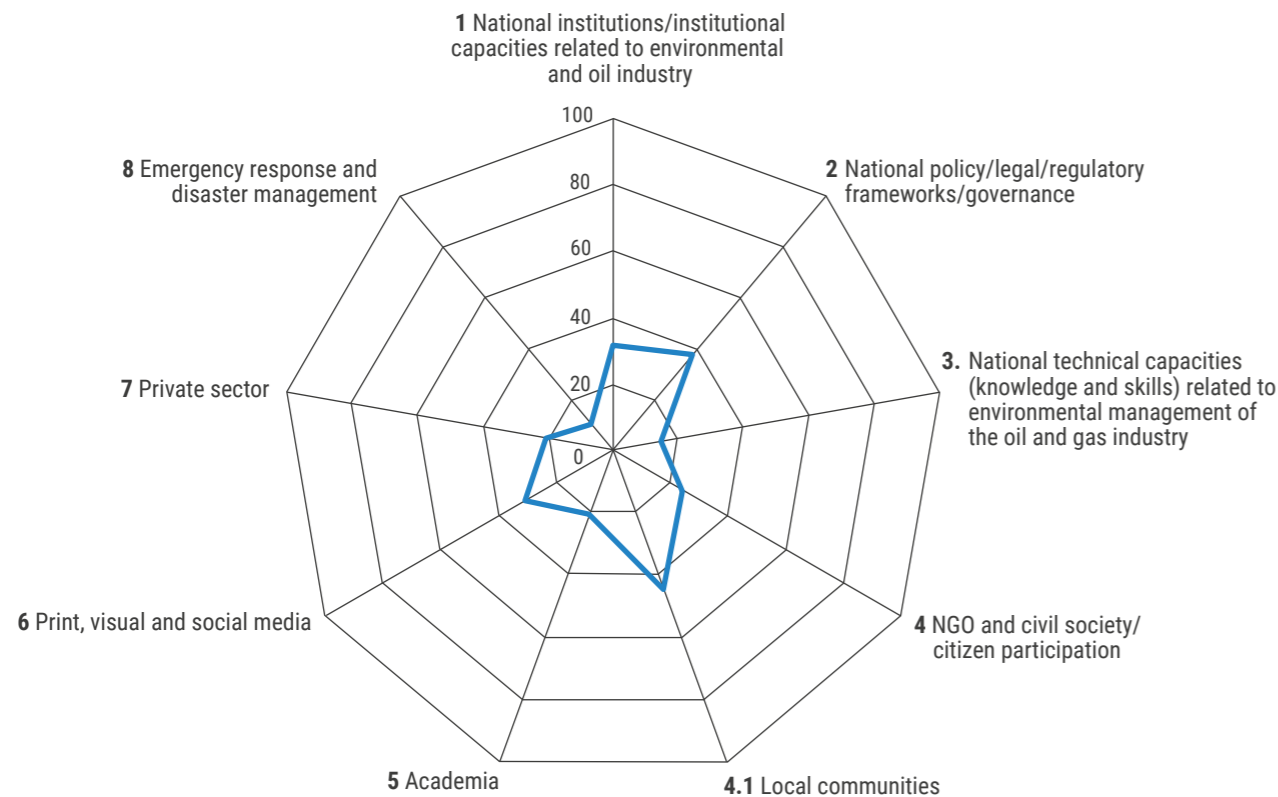
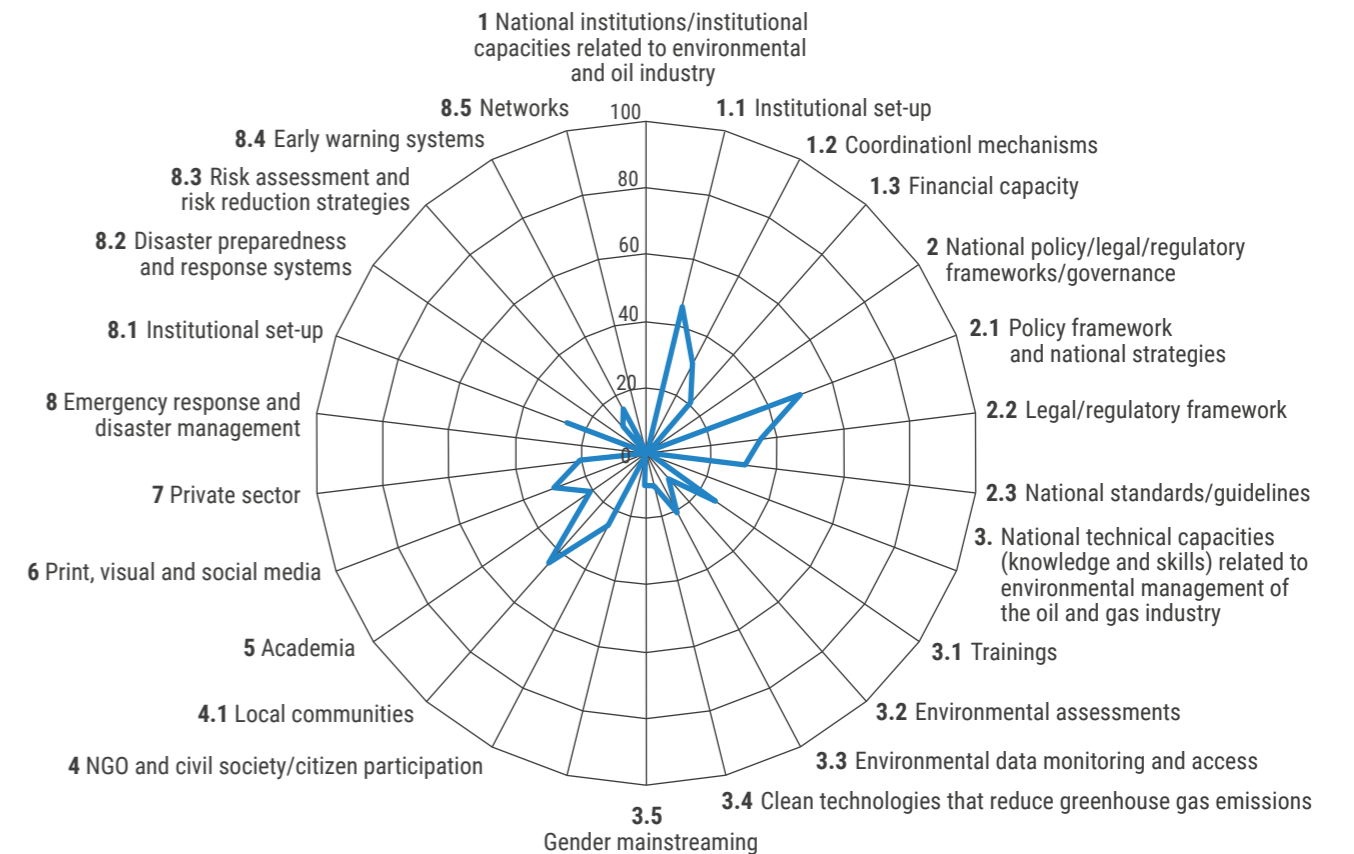


Figure 32: Spider plot of the Somalia CNA questionnaire showing the detailed results per sector.



5. PRIORITIZED KEY ISSUES AND RECOMMENDATIONS

The following sections present the final 23 Key Issues, grouped under the 12 Strategic Areas. For each Strategic Area, a short description is provided on the context as it relates to Somalia. The context information is derived either from the baseline sections of the SEA or from an understanding of the activities involved in upstream exploration. This is followed by a short section on best practice principles. Thereafter, each Key Issue is presented showing the poll results (taken from Table 5), and, where applicable and relevant, an extract from

UNEP's environmental LPR finalized in 2021. Following this, for each Key Issue, a list of proposed recommendations is included. These recommendations were the focus of the final stage of the stakeholder review.

The sequence of the Strategic Areas and associated Key Issues presented below follows the averaged priority ranking of the Key Issues, *starting with the Strategic Area with the highest average score.*

STRATEGIC AREA 12 ESTABLISHMENT OF ENVIRONMENTAL AND SOCIO-ECONOMIC BASELINE DATASET

Context

Offshore petroleum exploration activities rely on and are exposed to a diverse set of biological, fisheries, oceanographic, climatological, socio-economic, geologic, and other features that can be documented in various ways. It is extremely valuable to have a complete set of up-to-date data on the condition of the marine and coastal environment, including biodiversity and environmental parameters, hosted by a digital platform and accessible to all relevant entities.

In Somalia, there are a number of existing databases, hosted by diverse public and private institutions. However, there is no environmental database that can be accessed by all DECC-OPM* staff, and there seems to be lack of data integration. The DECC-OPM and the Bureau of Statistics is currently in discussions to establish a national data centre for environmental data. The final decision on which authority will manage this depository is, however, yet to be made.

Best Practice Principle

The four main features of environmental datasets are its availability, its accessibility to end users, the capacity of users to work with, operate and benefit from the information, and the means and mechanisms to update it as new data becomes available. Lately the oil industry has become more pro-active in making available datasets for the public good, by engaging local scientists to help fill data gaps and to contribute to capacity building in this area.

Key Issue 12.1: Incomplete (and inaccessible) environmental data to support environmental management of offshore petroleum activities in Somalia **Poll result:** Highest priority

Recommendations

- Undertake a data inventory of existing environmental and socio-economic data, determine gaps and barriers and restrictions to access.
- Create a database that is accessible online and hosted by an appropriate institution.
- Conduct targeted environmental surveys where necessary to fill gaps (including for offshore areas) and help establish environmental baselines.
- Encourage oil companies to participate in data gathering and sharing.
- Create a working group of inter-disciplinary experts, involving national universities, among others to guide the development of national datasets and ways to make these widely available. Examples existing from other countries e.g., Mozambique.

*As of September 2022, the DECC is being reconstituted into the new Ministry of Environment and Climate Change.

STRATEGIC AREA 10 TRANSBOUNDARY ISSUES

Context

Oil spills at sea may travel hundreds of kilometres and affect the EEZ and coastlines of neighbouring countries. There often exist differences in territorial (and maritime) claims that stem for diverse origins that may hamper collaboration. These differences need to be overcome for the collective benefit of neighbouring countries.

Regional agreements aim to foster cooperation to resolve transboundary issues such as those related to offshore fisheries, shipping, oil and gas exploration and emergency response (e.g., oil spills), among others. There have been previous/early efforts to coordinate transboundary issues e.g., in the context of oil spills through the Nairobi Convention (which has a protocol on this topic) and there were recent efforts to jump start regional cooperation on OSCP with IMO and the Nairobi Convention. This also includes strengthening cooperation through their Convention on the Red Sea which allows Somalia to request for assistance from other member states for pollution incidents.

Best Practice Principle

Collaboration between the FGS and neighbouring states/countries is needed to ensure coordinated responses to transboundary issues and events (e.g., offshore oil spills).

Key Issue 10.1: Transboundary oil spill preparedness

Poll result: High priority.

[see also Emergency Response Preparedness Key Issue No. 4.1]

Recommendations

- FGS and FMS governments to establish links and cooperation with neighbouring states to address oil spill response issues (see Context description above on Convention of the Red Sea).
- FGS to investigate the environmental sensitivities of the offshore southern Kismayo basin area and review incorporation into exploration blocks.

STRATEGIC AREA 9 INSTITUTIONAL CAPACITY, STRUCTURE AND FUNCTIONS

Context

Given the complexity of issues related to the development of the petroleum sector, a strong regulatory capacity within key institutions is a major requirement to enable the country to participate in, and benefit from oil and gas activities.

Institutional capacity building involves development of the necessary regulatory framework, infrastructure, and workforce i.e., introduction of new legislation and institutions, together with enhancement of existing ones. Currently, the institutional capacity and institutional structures are being developed at FGS and FMS levels.

Another equally crucial requirement is a strong and comprehensive legal framework and enforcement capacity. The Petroleum Regulations 2017 refer to several international standards and guidelines, such as the International Association of Oil and Gas Producers (IOGP) and International Organization for Standardization (ISO) which will apply to an authorised person, i.e., the operator, in the absence of national standards/guidelines.

Two key findings of the LPR report are the nascent framework laws governing the petroleum sector and the relative absence of subsidiary/secondary legislation and regulations for implementation.

Best Practice Principle

National institutional capacity, structures and functions are needed to support and manage the nascent petroleum sector in Somalia, whilst working with the petroleum operators in a transparent and productive manner to uphold international and industry best practice standards.

Critical for effective performance of the environmental management is the coordination of various institutions involved.

The key area of cooperation is monitoring and regulation of impacts but oil and gas being a new sector, the capacity of the institutions to perform this task in a coordinated manner is limited.

Key Issue 9.1: Legal and Policy Requirements**Poll result:** Highest priority

LPR Summary: The significant policies that have not yet been formulated include National Biodiversity Policy and the National Wetlands Policy. There is no National Environmental Action Plan (NEAP) as a foundational framework for environmental governance and institutional reforms. The EMA was drafted without a NEAP in place. The NEAP should provide a framework for streamlining environmental concerns into national planning and development through a participatory, multi-stakeholder and cross-sectoral process. In the absence of these, the legal regime on protected areas and environmentally sensitive areas remains weak. It should be noted a draft National Environmental and Strategic Action Plan (NESAP) was prepared by DECC-OPM in 2021 which laid out strategic objectives for environmental governance in the country.

Recommendations

- Provide appropriate training to FGS and FMS personnel in analysis and formulation of legal and policy documents, ensuring that gender balanced representation is also a priority in the selection of personnel who will be provided further trainings.
- Ensure availability of the necessary institutional and regulatory framework to address environment and biodiversity issues relevant to oil and gas activities. In particular, a NEAP should be developed to form the basis of policy, legal and institutional reforms. Developing action plans are highly recommended as it is an end product of high stakeholder participation, which encourages ownership of the Plan in all the relevant actors of the sector.
- Ensure the presence of the necessary capacity to monitor impacts on environment and biodiversity.
- Upgrade relevant environment and biodiversity legislation to address oil and gas activities.
- Develop subsidiary/secondary legislation and regulations for implementation of the framework laws governing oil and gas sector.
- FMS level institutions receive the same focus as FGS institutions.
- Strengthen strategies and plans for natural resources assessment, with particular focus on protecting sensitive coastal and marine ecosystems.

Key Issue 9.2: Coordination between institutions**Poll result:** High priority

LPR Summary: The primary observation from consultations held with the FGS and FMS institutions is that there is an asymmetry in interagency coordination at both the federal and member state level. Though individual ministries or agencies may have good coordination with select ministries, there is no formal legally mandated, inter-ministerial coordination committee that deals with environmental governance in the oil and gas sector. There is also limited communication and coordination between the various policies and legislation being drafted in-house by the various sectoral ministries in the FGS. This lack of a national framework for sectoral coordination was also raised by the stakeholders during the consultations. Its effects can be seen in the degree of coordination reported at the FMS level.

Recommendations

- Any new institutions to be established and existing ones require awareness, training, and infrastructure for handling their mandate in managing the petroleum industry, and for working with other institutions.
- In the formulation of such coordination mechanisms and institutional structures, gender representations should be given due consideration.
- Roles and responsibilities by the institutions need further clarification as capacity of the different institutions in monitoring may need strengthening.

Key Issue 9.3: Insurance requirements and liability**Poll result:** Medium priority**Recommendations**

- The principles of strict liability and joint and several liability have been embedded into the Somalia legislation (cf. Petroleum Law and model PSA).
- Ensure that ESIA for exploration activities make it clear that the costs of any clean-up operations and compensation are covered by the proponent, applying the "polluter pays" principle.

Key Issue 9.4: Legal enforcement**Poll result:** High priority

LPR Summary: Under the Petroleum Law and model PSA, the operator is obligated to provide for emergency clean-up operations and procedures, establish a fund for clean-up, a duty to restore the affected areas using Good Oil Field Practices, and a decommissioning fund. The draft EMA and ESIA Regulations also envision issuing environmental restoration orders against the responsible party if deemed necessary. In case of contamination, the responsible party may be ordered to pay compensation and the cost of clean-up (see Key Issue 9.3). However, there is currently no national oil spill contingency plan (NOSCP) in place. The Model PSA addresses operator obligations relevant to environmental governance and management, including the obligation of the operator to rehabilitate areas that suffer environmental damage, the duty to indemnify the government for clean-up and environmental repair and restoration and developing a Decommissioning Plan.

Recommendations

- Train government personnel in monitoring and enforcement of laws and regulations related to oil and gas exploration.
- Upgrade relevant environment and biodiversity legislation.
- Strengthen institutions with a mandate to manage the impacts of oil and gas activities on the environment and biodiversity.
- Capacity of FMSs to be built to gazette and implement the priority marine and coastal environmental conservation requirements, prior to approval of petroleum exploration activities.

Key Issue 9.5: Technical capacity requirements**Poll result:** High priority

LPR Summary: It was observed that FGS and the FMS institutions are either understaffed or inadequately staffed to address the technical needs of such institutions and possess little technical capacity to review instruments such as ESIA and resettlement actions plans. At the FMS level, in particular, there is reportedly a limited budget to address the technical needs of such institutions that currently possess little technical capacity to review instruments such as ESIA and resettlement actions plans.

Recommendations

- Ensure capacity and adequately staff and budget ministries that regulate the petroleum sector, such as MOPMR.
- Concentrate effort to train DECC-OPM (ESIA regulator) staff and other relevant supervisory agency staff to scrutinize and review ESIA related to the petroleum sector.
- Environmental management should be given high priority when preparing FMS/district budgets.
- More skilled personnel should also be recruited at the FMS level to fill vacant posts in the environment and natural resources fields.
- A specific Government training program, in collaboration with national universities and other academic institutions, should be developed and implemented for capacity building on environmental management related to the oil and gas sector in the coastal areas and offshore.
- Any new institutions to be established and existing ones, require awareness, training, and infrastructure for handling their mandate in the oil and gas industry. This can be achieved by strengthening cooperation between the petroleum industry, MOPMR and FMS governments.
- There is need for improved coordination between the FMS/districts and the relevant central FGS departments and the information flow channels should be clearly outlined and followed.
- Environmental and socio-economic data available at FGS departments and agencies should be available to the FMS. Extra data to be collected to fill any gaps (see Key Issue 12.1).
- It is recommended to moderate the speed of development of the petroleum sector to ensure balanced capacity building amongst relevant institutions, such as DECC-OPM, to manage the sector. Furthermore, this adjustment would benefit the FMS and local district governments and coastal population to adapt to the new sector.
- The LPR report highlighted that regional pilot projects for environmental management in the oil and gas sector can also be established, which can be used to help develop improved environmental assessment and management, and appropriate legislation for the FMS.
- The LPR report acknowledged there is a need to recruit staff for the implementing institutions to ensure sustained environmental governance and management. For this, adequate financial resources should be allocated to ensure effective management in their capacity to enforces the regulatory framework.

STRATEGIC AREA 2 DISCHARGES AND EMISSIONS FROM THE PETROLEUM INDUSTRY
Context

This relates to the management of emissions and discharges related to routine operations and accidental events of the petroleum sector. Upstream activities will generate a variety of emissions, with some impossible to completely eliminate, whilst others can be reduced. Offshore/nearshore activities can degrade the environment in different ways. Public as well as occupational health are potential concerns. Decommissioning accidents could happen in the future, though not likely in the next 5-15 years.

In terms of greenhouse gas (GHG) emissions, the small number of vessels that might be involved in the coming 5-15 years are considered to be insignificant at present, but in general it could still be significant. Such a scenario is possible, especially as fisheries and other offshore economic activities are likely to grow under their blue economy framework – thereby creating a situation of competition for space offshore (something that has happened in Ghana's offshore field). Related to climate change commitments of Somalia, there are large swathes of coastal waters that have the potential for offshore wind generation. Developing this energy opportunity also addresses climate goals. Extreme weather is not expected in this portion of the coast, though there is evidence of sea level rise.

Best Practice Principle

Oil and gas activities are undertaken in a manner that reduces as far as possible routine and accidental emissions. At the same time, Somalia also needs to ensure oil and gas development is considered hand in hand with their climate goals, thus consideration is needed for reducing GHG emissions from oil and gas activities, and for reducing energy transition risks for the country in the future.

Key Issue 2.1: Routine and accidental discharges**Poll result:** High priority.

LPR Summary: Under the Petroleum Law and model PSA, the operator is obligated to provide for emergency clean-up operations and procedures, establish a fund for clean-up, a duty to restore the affected areas using Good Oil Field Practices, and a decommissioning fund. The draft EMA and ESIA Regulations also envision issuing environmental restoration orders against the responsible party if deemed necessary. In case of contamination, the responsible party may be ordered to pay compensation and the cost of clean-up. However, there is currently no National Oil Spill Contingency Plan (NOSCP) in place. [see also Strategic Area 9: Institutional capacity, structure, and functions; Strategic Area 11: Land quality, use and spatial planning]

Recommendations

- Develop air, noise, vibration, and discharge regulations including special limits considered for protected and sensitive areas.
- Develop national benchmarks/ threshold limits of defined pollutants.
- Implement NESAP Strategic Objective 3: Undertake conservation initiatives (gender sensitive) to address urgent challenges in land degradation, biodiversity, aquatic and marine environment, and climate change.
- Prohibit activities in sensitive areas, including Bajuni Archipelago and other sensitive areas, including the upwelling fishing grounds offshore Hobylo or close to estuaries and mangrove or lagoon areas.
- Operators should demonstrate that they are doing as much as can be done and are prepared to combat accidental emissions.
- The development of the NOSCP shall be undertaken as a matter of urgency and include equipment and training at sites where oil spills are predicted to reach.
- Oil spill response planning shall be an integral part of ESIA's.

Key Issue 2.2: Greenhouse gas emissions**Poll result:** Low priority

LPR Summary: Petroleum Law and the Regulations do not adequately address the climate change aspects of the sector. Air emission standards and gas flaring restrictions are yet to be established. Similarly, the GHG emissions that may arise from the sector has not been considered in the National Climate Change Policy. However, the Petroleum Policy does refer to the significance of climate change, but this is not reflected in the law/regulations developed.

The Model PSA addresses operator obligations relevant to environmental governance and management, including the prohibition of flaring of natural gas.

Recommendations

- Requirement for full emission and discharge inventory for exploration ESIA's to be provided by licenced operators.
- Monitoring of exploration ESIA forecasts against real discharges and emissions and implementation of strict Environmental and Social Management Plans (ESMPs).
- Licenced operators to demonstrate highest standard of maintenance and quality of all combustion engines to minimize unnecessary GHG emissions.
- Develop air, noise, vibration, and discharge regulations.
- More focused studies on climate and energy policy for Somalia are needed, to also look into renewable energy potential especially wind and solar.

Key Issue 2.3: Impacts from sea level rise and storms**Poll result:** Medium priority**Recommendations**

- Coastal sand dunes should be preserved as they perform a very important function by supporting the recharge of the ground water table and act as a barrier against coastal disasters including tsunami.
- Mangrove forests should be awarded highest protection as they perform a very important function as a barrier against coastal disasters including tsunami.
- Erosion prone areas to be taken into consideration along with climate change induced sea level changes in development of petroleum related infrastructure with adequate precautionary/mitigation measures. This may require further modelling and guideline development by key agencies.

STRATEGIC AREA 8 CRITICAL INFRASTRUCTURE
Context

Somalia infrastructure was severely impacted during the civil war. Power supply is currently a major challenge in Somalia and is needed for any shore-based supply operations to support offshore exploration activities as well as emergency responses. Freshwater supply is also a major challenge in Somalia and is needed for any shore-based supply operations. Other than road access from a supply base and the airport, there is little need of road networks for offshore exploration – hence onshore transportation is not considered in this SEA. Airport facilities are critical for importation of equipment and materials and personnel exchanges. Accredited laboratories will be required for routine chemical testing of samples and monitoring water and sediment contamination and site rehabilitation

Best Practice Principle

Within the partnership between the operators and the government are needed agreement on the provision, or construction, and maintenance of critical infrastructure to support safe and efficient operations. Likewise, partnerships need to be developed with multiple stakeholders to prioritise and re-construct the main components necessary for the petroleum sector to develop while safeguarding the environment and maximizing local opportunities.

Key Issue 8.1: Infrastructure needs**Poll result:** High priority**Recommendations**

- Cooperation between the petroleum sector and the MOPMR, relevant FMS ministries, academia and local governments should be strengthened to ensure that the needs of the petroleum sector are integrated in the overall infrastructure planning and budgeting. This should include e.g., establishment of hazardous waste facilities, and support towards accredited laboratories, ideally private sector driven (see Key Issue 8.2).
- DECC-OPM should be involved in the planning to ensure concerns regarding protected areas and sensitive habitats are considered.
- Significant efforts are needed by the government and oil companies to enable national industry to participate in the sector.
- Support to ports to engage with oil and gas sector development and activities and supply services needed.

Key Issue 8.2: Analytical laboratory needs**Poll result:** High priority

[see also Strategic Area 5: Discharges and emissions from the petroleum industry; Key Issue 5.4]

Recommendations

- Relevant ministries to consider supporting an interim arrangement to facilitate an internationally accredited laboratory to establish a laboratory in Mogadishu to provide services to the petroleum sector (and other sectors). In some countries this is facilitated by oil companies themselves, in collaboration with the private sector.
- Establish accredited laboratory facilities to monitor and analyse emissions and discharge from the petroleum industry.

STRATEGIC AREA 11 LAND AND MARINE AREA QUALITY, USE AND SPATIAL PLANNING**Context**

Marine spatial planning (MSP) is currently the most advanced and accessible tool for integrating marine activities, habitats, fisheries, and other parameters into a mapping format to ease visualization and management decisions. Somalia has some but lacks much of the data and information to adequately populate the development of MSP but is in the process of constructing such a tool. Spatial planning development is on-going and training sessions have already been undertaken. A land use policy and framework has been under development with the Ministry of Agriculture as of early 2021, and the outcome is eagerly awaited. There are current efforts from Sweden and Nairobi Convention to support MSP in Somalia, and there is currently an established national mechanism for MSP in the country.

Best Practice Principle

A comprehensive MSP facility will greatly aid the integration of the diverse parameters that are associated with offshore petroleum exploration.

Key Issue 11.1: Use spatial planning to aid management of Somalia EEZ**Poll result:** High priority.**Recommendations**

- Develop and integrate physical master plans, environmental sensitivity maps and oil spill contingency plans (OSCPs) for the oil and gas exploration blocks and shipping corridors.
- Spatial plans to include designated waste management sites, fisheries areas, and other marine ecological and species data of relevance.

STRATEGIC AREA**6****CO-EXISTENCE WITH FISHERIES SECTOR****Context**

Between Hobyo and the southern Jubaland border there are at least 83 fish landing sites, defined by the presence of at least one fishing boat either on the beach or in the water, seen from available satellite images. These sites include 22 main trading sites/settlements that can be considered fishing centres, where there exists permanent housing and data are available on the numbers of fishers and main associated activities. Fisheries, at subsistence level as well as on an economic/industrial scale, is very important for Somalia and local livelihoods and should not be put at risk from oil and gas sector activities. Consequences of development of the oil and gas sector and co-existence with local fishing communities included issues of conflict resolution, expectation management and alternative income generating activities.

Of special concern is impacts from accidental events such as oil spills, but also from seismic surveys, especially in highly productive fisheries zones (e.g., upwelling off Hobyo and inshore reef and seagrass areas such as around Bajuni Islands). Note: seismic activities were conducted in deep sea areas in the past with no issues recorded.

Best Practice Principle

Establish a mutually beneficial relationship between all fisheries stakeholders and exploration activities by recognizing and promoting the different roles of the state, the oil companies, and other stakeholders.

Key Issue 6.1: Ensuring fisheries productivity**Poll result:** High priority.

LPR Summary: Any operation that affects fishing, navigation or other offshore activities must obtain separate authorisation from the responsible authority.

Recommendations

- Develop regulatory frameworks to operationalize the revised Fisheries Law 2020 (revision of a 1986 Law); and complete the draft Fisheries Policy.
- Strengthen the multi-institutional approach to fisheries administration and management, setting clear mandates and modes of interaction and coordination amongst the key institutional actors namely the MOFMR, equivalent FMS ministries and relevant departments and community representatives, for example beach management units or equivalents.
- The impacts of oil and gas projects must be viewed from a gender lens as well to ensure that comments are drawn from the different experiences of the stakeholders with their livelihoods, the use of natural resources, and local ecologies. Separate consultation rounds with women may be necessary.
- Develop marine fisheries plans and programs to map critical breeding, nursery and feeding grounds for major commercial fish species; model population dynamics of major commercial fish species for management purposes; and track and mitigate impacts of pollution from petroleum activities on the marine environment and fisheries.
- Improve knowledge basis in the fisheries sector.
- Create a coordination forum between the fisheries and the petroleum industry in order to effectively discuss and resolve coexistence issues on a mutual basis. Representatives from other authorities invited when necessary.

STRATEGIC AREA 4 EMERGENCY PREPAREDNESS AND RESPONSE (FOR ACCIDENTAL EVENTS)
Context

Exploration activities always include elements of risk. Accidents can happen and emergency preparedness and response greatly contribute to mitigating impacts to the environment and personnel. Accidental events leading to large oil spills as well as other types of spills e.g., chemical spills, and fires on offshore platforms are known to occur, as are ship collisions at sea and grounding.

The DECC-OPM is tasked under the draft EMA to lead the efforts for developing a NOSCP along with the relevant authorities. The MOPMT has been recipient of trainings from European Union Capacity Building Mission (EUCAP)-Somalia on maritime security, including concerns that arise in the event of oil spills. During consultations, the MOPMT also mentioned joint trainings with Kenyan Authorities on maritime spills. UNEP and Norway have also provided Somalia with trainings on oil spill preparedness and response and NOSCP based on IMO standards. The Petroleum Law envisages development of regulations on Protection and Restoration of Environment. The draft EMA empowers the DECC-OPM to issue environmental restoration orders.

Best Practice Principle

The government should make it clear that for all operations in Somalia, the Polluter-Pays-Principle shall apply. Nonetheless, the Government also needs to invest in developing, institutionalizing, and exercising its national oil spill/acute pollution contingency plan in a coordinated manner at FGS and FMS levels and alongside industry.

Key Issue 4.1: Emergency response preparedness
Poll result: Medium priority

LPR Summary: The LPR identifies the institutions tasked to undertake disaster management in the country. [see also Strategic Area 2: Discharges and emissions from the petroleum industry; Strategic Area 11: Land quality, use and spatial planning; and Strategic Area 10: Transboundary issues]

Recommendations

- Establish a clear institutional mandate related to management of the emergency response related to oil and gas activities and strengthen the relevant institutions.
- Mandate to be coordinated with public infrastructure development plans and should be the basis for provision of specific oil spill response equipment, training needs, etc.
- Require oil companies and their contractors/subcontractors to apply the highest standards of best practice e.g., if oil industry / company's policy have stricter standards than national standards, best practice is that they apply industry policy, or if international best practice applies a higher standard than national practice, then international best practice should apply in ensuring environmental protection.
- A functioning NOSCP has to be in place, including resources and equipment being available, personnel trained, and communication lines tested, and fully functioning prior to exploration activities.
- Oil companies and contractors should also have their own Oil Spill Contingency Plans (OSCPs), that should be aligned with the NOSCP.
- Map hydrodynamics of coastal and offshore areas of the Somalia EEZ and coastal sensitivities for input into oil spill contingency planning.
- There is a need to coordinate efforts between the NOSCP and establishing waste management procedures/facilities and the development of new public infrastructure.
- Relevant institutions need to put in place a disaster preparedness and response mechanisms for oil spills and other forms of acute pollution, with coordination between the NOSCP. Such a framework should involve the licenced operators and transboundary partners.
- Trainings on NOSCP should be extended to FMS who are the front liners in the event of spills and accidents.
- The NOSCP systems needs to be aligned between oil companies and Government with the overall national disaster management systems/framework/policies/strategies.

STRATEGIC AREA 3 WASTE MANAGEMENT
Context

Diverse forms and quantities of wastes are generated during exploration activities, with some potentially harmful for marine life and biodiversity, and personnel and third parties. During transportation of drilling materials and waste, contingency plans are needed to handle accidental events involving chemicals and waste. There is no accredited waste treatment facility in Somalia.

The lack of appropriate waste management regulation and appropriate facilities (especially for hazardous waste) is a concern. Decommissioning of petroleum infrastructure often generates large quantities of diverse waste materials, including hazardous waste.

Best Practice Principle

The oil and gas sector shall strive to reduce the generation of waste and manage all waste streams according to best international practice, including of the final disposal solutions. There are best practice procedures for handling all forms of waste and ensuring safe disposal.

Key Issue 3.1: Impacts from hazardous waste
Poll result: Highest priority

[see also Strategic Area 9: Institutional building, structure, and functions]

Recommendations

- Develop waste management regulations for future hazardous waste, both liquid and solid, based on international categorization of waste, including licensing, auditing, revoking, chain of custody documentation, site management and shipping, occupational health standards, etc.
- Facilitate development of central waste treatment and disposal facilities in accordance with international standards. All options (biological, thermal, chemical, and physical methods) should be assessed. Central facilities will reduce land take and establish clear ownership of waste and liability. Offshore disposal should not be considered except for MARPOL defined ship waste and, depending on drilling muds used and cuttings, some offshore disposal can be considered e.g., water/based muds/cuttings with low toxicity/biodegradable drilling fluids, but must be subject to strict regulations.
- Onshore waste facilities should include capacity for contaminated soil and sediment as part of potential future oil spill clean-up activities.
- Require in exploration ESIA's for full inventory of hazardous liquid and solid waste volumes by waste types.
- Ensure the presence of necessary capacity and facilities to monitor the management of hazardous wastes of petroleum activities.
- Regulators to plan ahead on how to manage waste streams from decommissioning, beginning with wells and pipelines.
- Agreements need to be reached on the requirements for oil companies and any other operators to make the necessary efforts to return all sites on which oil and gas activities are undertaken to their original condition as an environmental obligation.

Key Issue 3.2: Impacts from non-hazardous waste
Poll result: Low priority

LPR Summary: The significant policies that have not yet been formulated include the National Waste Management Policy. In its absence, the legal regime on protected areas and environmentally sensitive areas remains weak.

Recommendations

- Require oil companies and contractors/subcontractors to apply the highest standards of best practice e.g., if oil industry/company's policy have stricter standards than national standards, best practice is that they apply industry policy, or if international best practice applies a higher standard than national practice, then international best practice should apply in ensuring environmental protection.
- Non-hazardous waste management should be part of the ESIA's and permitting i.e., need to provide inventory and estimate of non/hazardous waste.
- Strengthen the institutions with a mandate to manage non-hazardous wastes from petroleum activities.

STRATEGIC AREA 5 CO-EXISTENCE WITH LOCAL COMMUNITIES
Context

Between northern Hobyo and the southern Jubaland there are 22 main coastal trading sites/settlements that can be considered centres for fishing, trading, and business. These include the main coastal cities of Hobyo, Adale, Mogadishu, Marka, Braawe and Kismayo. In the initial years of exploration, Mogadishu would most likely be the main port supporting offshore operations, though in time, other ports may become involved.

The livelihoods of local communities in the main cities and along the coastal settlements are already fragile and infrastructure is predominantly poor. National content in the petroleum sector is nil at present due to the absence of activities but likely to remain low and restricted to unskilled labour.

Expectations from the oil and gas sector are low at present, partly due to ongoing uncertainty with the development of the sector discussed for decades with no tangible benefits to date. Consequences of development of the oil and gas sector and co-existence with local communities include issues of STDs, community infrastructural planning (social and economic infrastructure), conflict resolution, expectation management and alternative income generating activities. The petroleum sector has the potential to create high economic benefit to small numbers of individuals in local communities.

It is very important to include all sections of society, especially women who play an important role in the economy of Somalia and are often poorly represented in oil and gas institutions and decision-making processes. Women as providers for families would potentially face the greater brunt of impacts from unplanned accidental and pollution events in the petroleum sector.

Health and safety issues in this Key Issue Group are related to local communities (resulting from accidental and pollution events), employed local personnel and foreign personnel brought to Somalia for specific duties during operations, and from personnel associated with clean-up and emergency response operations.

Best Practice Principle

Oil and gas sector co-existence issues with local communities and social tension are avoided and local contents benefits from the process. The development of the sector should support mutually beneficial relationships between all stakeholders by recognizing and promoting the different roles of the state, the oil companies, and other stakeholders, with an overall positive impact in the national economy and local content.

Key Issue 5.1 Local content participation in the oil and gas sector**Poll result:** Medium priority**Recommendations**

- Education and awareness on management of social issues and expectations (the NESAP communication and Outreach Strategy is "To enhance public awareness, participation and behaviour change on environmental protection, conservation and climate change").
- Targeted, early, and continuous training programs needed on issues e.g., health, safety, and environment (HSE), procurement, quality assurance, etc. The implementation of appropriate curricula with adequate quality is also essential.
- Petroleum industry to offer capacity building programs for existing and potential new local businesses (subcontractors) with the aim of preparing them for delivery of goods and services to the sector in good time prior to activities commencing.
- Petroleum industry to endeavour to make potential local subcontractors competitive.
- FGS and FMSs to establish the necessary regulatory framework for national content, and to identify opportunities for national content and plan for its implementation.

Key Issue 5.2: Gender representation and impact assessment**Poll result:** Medium-low priority**Recommendations**

- Ensure gender representation in all public consultations related to oil and gas sector development and activities.
- Ensure data and findings from public consultations are gender differentiated.
- In the absence of gender and participatory skills among the ESIA consultants, gender specialists and gender-sensitive NGO representatives should be on hand to steward the process together with the women to enable them to feel secure and welcome when they voice their concerns and opinions.

Key Issue 5.3: Health and safety of local communities and employees**Poll result:** Medium priority**Recommendations**

- Develop occupational health exposure limits related to all relevant parameters (e.g., exposure to gases, light and radiation, working hours) and monitor their implementation.
- Develop occupational health personal protective equipment (PPE) requirements for relevant activities and monitor implementation.
- Develop occupational health personal protective

STRATEGIC AREA 7 CO-EXISTENCE WITH TOURISM SECTOR
Context

There is a strong linkage between tourism and environmentally sensitive and protected areas. Along the southeast coast of Somalia there is only one protected area (Lac Badana, see Section 3.6.2) which includes a small coastal portion. In addition, there are many more sensitive coastal areas such as mangrove fringed shores, sandy beaches, lagoons, and small bays, and these are the focus areas for tourism (local, regional, and international). Exploration work will potentially affect tourism related livelihoods because some of areas with a potential for hydrocarbon production will inevitably coincide with areas that are important to the tourism sector, for which a transparent rationalization process is needed.

Best Practice Principle

At present, tourism is a minor, nascent but important economic sector that should not be put at risk due to oil and gas operations.

Key Issue 7.1: Ensuring tourism potential**Poll result:** High priority**Recommendations**

- There should be regulations on the maximum acceptable disturbance levels of oil and gas activities taking the tourism sector views into consideration.
- Oil and gas operators must ensure minimum disturbance to the tourism sites, access routes and activities, and alternatives developed to replace any excluded due to exploration activities.

ACTIVITIES IN ENVIRONMENTALLY SENSITIVE AND PROTECTED AREAS

Context

Between north Hobyo and the southern Jubaland, the coastline of 1,115 km includes large expanses of sand shores (notably in the northern section), with sand beaches along much of the coast (some supporting turtle nesting), rocky shores and coastal lagoons (more prevalent in the southern section), at least seven main river estuaries (some supporting mangrove forests, in Jubaland), large expanses of shallow water seagrass beds, and inshore and exposed coral reefs, particularly around the Bajuni Islands (Jubaland).

The coastal areas around Kismayo and Bajuni Islands were identified under the WWF Eastern Africa Marine Ecoregion study as being of sub-regional importance due to their marine biodiversity. These habitats in turn support diverse seabird and fish communities, some of subsistence and commercial importance, as well as marine mammals: dugong, dolphin, and various whale species, including Blue whales (offshore). Some areas with a potential for hydrocarbon production will inevitably coincide with coastal and offshore areas that have important biodiversity and conservation value.

There are no gazetted marine protected areas, but seven terrestrial areas of high conservation importance extend to the coastline. Biodiversity data for Somalia is scarce.

Best Practice Principle

It is the responsibility of the licensed oil companies to protect the environment where they work or any areas in the country impacted by their operations while the government shall legislate, regulate, and monitor compliance. Due consideration will therefore be necessary to ensure harmony between developing the petroleum resources and conservation.

Key Issue 1.1: Impact on environmentally sensitive marine areas and habitats Poll result: High priority

LPR Summary: The Model PSA addresses operator obligations relevant to environmental governance and management, including the obligation of the operator to rehabilitate areas that suffer environmental damage, the duty to indemnify the government for clean-up and environmental repair and restoration and developing a Decommissioning Plan.

The significant policies that have not yet been formulated include National Biodiversity Policy and the National Wetlands Policy. In the absence of these, the legal regime on protected areas and environmentally sensitive areas remains weak.

Somalia is signatory to a number of Conventions that aim to protect endangered and threatened marine and bird species, and coastal and marine habitats. To meet those obligations, the FGS and the FMS will need to work together to strengthen their response to those commitments and obligations.

Recommendations

- All environmental sensitive areas should be identified, mapped and locations shared with the petroleum sector.
- Boundaries of high priority environmentally sensitive areas should be demarcated (ideally gazetted) prior to commencement of exploration activities.
- Hydrocarbon exploration techniques should be carefully evaluated, and action taken to avoid or mitigate any adverse impacts on the marine and coastal environment and/or livelihoods.
- Extensive awareness and capacity building on ecosystems, environmentally sensitive areas, ecosystem services and their management is recommended for all agencies (FGS and FMS levels), NGOs, communities, and schools.
- Reservations or buffer zones should be decided and maintained to protect coastal lagoons, known critical habitats (coral reefs, seagrass beds and mangrove forests) or coastal features e.g., islands.
- Prohibit activities in the Bajuni Archipelago and other sensitive areas, including the upwelling fishing grounds offshore Hobyo or close to estuaries and mangroves or lagoon areas.
- The necessary institutional and regulatory framework to address marine and coastal environment and biodiversity issues needs to be in place with relevant environment and biodiversity legislation to address oil and gas activities.

- Oil companies/operators to make the necessary efforts to return all sites on which oil and gas activities are undertaken to their original condition as an environmental obligation.
- Strengthen the institutions with mandates to manage the impacts of oil and gas activities on environment and biodiversity and ensure presence of necessary capacity and facilities to monitor the impact of petroleum activities on environment and biodiversity.
- Implement Strategic Objective 2 of National Environment Strategy and Action Plan (NESAP): To undertake a comprehensive assessment to establish status and trends of the natural resources

and environment of the country; item 2.3 Undertake assessment of status and trends in coastal and marine resources, including through marine environmental diagnostic.

- Petroleum exploration activities already licensed to take place in environmentally sensitive areas should continue to be based on approved ESIA's and relevant national policies and guidelines (where these exist) and the model PSA.
- Ensure commitments under the Nairobi Convention and other regional and international agreements are met.

Key Issue 1.2: Impact on marine species of conservation or national importance

Poll result: Highest priority

[see also Key Issue 1.1, above]

Recommendations

- Numerous guidelines exist that recommend safe distances from marine mammals, marine mammal observers (MMOs) aboard during seismic operations, avoidance of sensitive seasons etc. e.g., Joint Nature Conservation Committee (JNCC).
- Geographical areas hosting (annual or season) species marine species of conservation or national importance that are sensitive to noise disturbance should be mapped and shared with petroleum sector for avoidance planning.
- Comprehensive biodiversity assessment should be carried out for Jubaland to identify valuable and unique habitats/species and appropriate action taken to conserve such areas/species urgently.
- Prohibit activities in the Bajuni Archipelago and other sensitive areas, including the upwelling fishing grounds offshore Hobyo or close to estuaries and mangroves or lagoon areas.
- Marine mammal and sea turtle migration corridors within the Somalia EEZ should be strictly maintained as no exploration zones in order to minimize threats to endangered species.

6. NEXT STEPS

A typical, a full SEA would include two further phases: assessment of the recommendations, and implementation. Some of the main elements in these final phases include delivery of the recommendations on overriding issues and integration of relevant environmental, socio-cultural, and economic issues related to the oil and gas development into policy, plans, program, laws, and regulations, followed by an implementation plan to develop the recommendations.

To integrate the *Preliminary SEA* a few steps are now required so that it becomes the useful guidance documents it was intended to be. These broadly fall into two categories: those steps that are required in the short term to formally conclude this SEA process, and those that need to be monitored and incorporated in the coming months. UNEP recommends that the lead Federal Government institutions take the lead working with SEA TWG members in advancing the identification of institutions to support implementation of the recommendations. In order to inform this future process, UNEP included discussions on this matter at the Somalia ToT Workshop on SEA and GIS components held in June 2022 in Nairobi, Kenya.

Finally, evaluating renewable energy options for Somalia is a task that the FGS and the FMS might wish to consider, irrespective of the outcome of the renewed oil and gas focus. An introduction to this topic is also included below.

6.1 Finalization of the *Preliminary SEA* process

Assigning Institutions to implement the recommendations

A critical first step in the implementation of recommendations of the *Preliminary SEA* that also necessitates stakeholder participation is to agree on the institutions deemed to have the mandate for implementing the finalized recommendations. Relevant institutions will certainly be from the FGS as well as the FMS, the latter especially as some of the Key Issues are not equally applicable geographically, being more important in some areas than other.

During the ToT Workshop participants examined each of the 23 Key Issues and proposed a provisional assignment of 'owner' institutions to implement recommendations associated with the Key Issues (Appendix 9). For each Key Issue, the suggestions are

broad and include many relevant line ministries as the mandated entities, and equivalent institutions in FMS levels. Only for a few Key Issues are one or two ministries proposed. This analysis nevertheless serves as a starting point from which FGS and FMS representatives will need to agree on the specific lead institution(s) for each Key Issue in each FMS location where it is most applicable.

6.2 Focus of Efforts beyond the *Preliminary SEA*

The following steps are proposed for the FGS and those of the FMS and associated partners to consider in the future.

Incorporation of current and future sectoral development plans

Applicable to the short term and long term is inclusion of any major sectoral development plans in this marine space e.g., current, and future projection in terms of fisheries sector, or development of a new port, that may impact on the risk and opportunity factors for oil and gas activities. Such plans need to be incorporated into the SEA to avoid overlapping or unclear mandates that may result in a weakened overall management of the sector.

Incorporation of regional climate scenarios

Applicable to the medium to long term is an improved understanding of the regional climate scenarios that will govern extreme events and sea level rise, and how this will interact with oil and gas activities in the area.

Monitoring of disaster and security risks

For development of the petroleum sector, risk from disasters (e.g., oil spills) and security must be kept low. Development of risk scenarios and risk assessments that will also interact with petroleum activities in the area are needed.

Incorporating developments in environmental policy and legal framework

The recently completed LPR document outlines a broad set of recommendations aimed at filling the current gaps in the environmental policy and legal frameworks in Somalia that are needed to strengthen the management of the petroleum sector. As these legal instruments become law, the SEA would need to be updated.

6.3 Evaluating Renewable Energy Options for Somalia

In the renewable energy sector, Somalia has some of the largest potential in Africa, but often stakeholders have been working in isolation from each other and from global markets. Currently, only an estimated 16% of the population has access to electricity.

In the context of future energy needs and the need for countries like Somalia to consider a strategy for eventually moving away from fossil fuel dependency, with support from development partners, there are a number of reasons to evaluate the renewable energy options for the country. These include:

1. The present heavy reliance on biomass for fuel, leading to continued deforestation, land, and watershed degradation;
2. The global future of the oil and gas sector is uncertain as momentum for global energy transition and net zero commitments begin to be implemented; and
3. Emerging/potential oil and gas producers like Somalia will potentially likely face greater financial risks in developing oil and gas.

Therefore, oil and gas development in Somalia should be considered within the context of a broader sustainable energy development strategy for the benefit of the people of Somalia, and to support a just energy transition for Somalia.

According to a recent study by the African Development Bank, Somalia has the highest resource potential of any African nation for onshore wind power and could generate between 30,000 to 45,000 MW

(ADB 2015). Solar power could potentially generate an excess of 2,000 kWh/m². Wind concentrations differ by region, with Somaliland on the low end for wind, nevertheless, mean wind speeds in excess of 9 m/s at 80 m elevation are common along much of the coastal areas (Poplack and Coolidge 2016). Note that the height of a typical 1.5 MW turbine is 100 m). Indeed, the coastal region receives the bulk of wind energy, with potentials between 30 and 45 GWh/km² throughout most of coastal South-Central Somalia and into the interior by some estimates (Poplack and Coolidge 2016). This represents as much wind energy in four square kilometres as the entire country currently produces with diesel and hybrid generation².

Solar energy is similarly abundant in the Somali region and is an increasingly popular option for rural communities, individual businesses, and facilities as the capital and technical skills required to exploit this resource are much lower than for wind. Unlike wind, which is stronger along the central coast, the most solar irradiation accrues to the north in Puntland and Somaliland. Horizontal solar energy is at least 200 W/m² over most of the country. With on average 2,900 to 3,100 hours of sunlight per year, Somalia has one of the highest daily averages of total solar radiation in the world, which with an average yearly temperature of 27°C, permits a satisfactory operation life of solar PV systems (Poplack and Coolidge 2016).

Not only are wind and solar both plentiful in the Somali region but they are becoming increasingly financially attractive as well, both in competition with other sources like diesel and also in their own right due to technological advances (Poplack and Coolidge 2016).

2. Based on data from the European Commission's African Renewable Energy Technology Platform (AFRETEP), <http://capacity4dev.ec.europa.eu/afretep/minisite/maps-and-data-sources>. Calculations based on an average six-hour day of electrification in a 365-day year.

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8. APPENDICES

Appendix 1. Meetings and Workshop Log

The following were the principal meetings/workshops held with stakeholders associated with the development of the Preliminary SEA:

- Initial introductory meeting (12.11.20) with UNEP - Regional Africa Office, Crisis Management Branch, Nairobi Convention Secretariat, UNEP-WCMC, UNESCO, Swedish Agency for Marine and Water Management and Norwegian Environment Agency.
- General Kick-off (KO) meeting (21.01.21). Introducing the OfD programme and the Preliminary SEA, to a core team of stakeholders from the DECC and MoPMR.
- S1 SEA Kick-off (23.02.21). Follow up meeting with the same core team of stakeholders but more strategic focused to develop SEA implementation and coordination requirements, sharing experiences from other countries in the region, defining roles and responsibilities between lead Government agencies, identifying potential coordination mechanisms for the SEA, which can also feed into ongoing strategic planning processes plan for the future engagement with a wider stakeholder group and appointment of the two focal points (FPs).
- FP Focal point meeting (+ GIS) (23.03.21). Short meeting with only the two newly appointed FPs to align on strategy and future meetings.
- TWG Working Groups (29.04.21). A large meeting, involving representatives from diverse institutions from all relevant member states (Galmudug, Hirshabelle, Benaadir, South-West State and Jubaland), focused on presentations of the oil and gas sector, impacts and challenges as a capacity building exercise, to review and mapping of available environmental baseline data in Somalia, to discuss potential development scenarios of the SEA, to discuss and

agree on the main roles/functions of the SEA Technical Working Group and a primer for the future involvement.

- T1 TWG Preparatory Basin Meetings (31.05.21). A short meeting with FPs and few others to plan for the 'Basin Workshops' involving representatives from diverse institutions from each of the three hydrocarbon basins.
- T2 TWG Obbia Basin (14.06.21). The first of three 'Basin Workshop' involving representatives from institutions in Galmudug and Hirshabelle.
- T3 TWG Coriole Basin (15.06.21). The second 'Basin Workshop' involving representatives from institutions in South-West State and Benaadir.
- T4 TWG Juba-Lamu Basin (16.06.21). The third and last 'Basin Workshop' involving representatives from institutions in Jubaland.
- T5 TWG Key Issues (29.07.21). A workshop with breakout rooms (20 minutes each) for participants, split in three groups, to review the results from the online survey and risk and opportunity matrices exercise, and to consider and discuss environmental aspects, socio-economic and gender aspects, and hazards and conflicts.
- T6 TWG Key Issue Validation (10.01.22). A large workshop to review the full list of Key Issues and undertake a prioritization poll.
- T7 Presentation of prioritised Key Issues and proposed recommendations of the Preliminary SEA, to the TWG and wider audience, which provided the basis of drafting the final report. Royal Palace Hotel, Mogadishu (10.03.22).
- T8 Training of Trainers Workshop, Nairobi, Kenya (20-23.06.22).

Appendix 2. Participating Individuals, Institutions and Meetings Attended.

Participant	Gender	Position and Institution	Meetings/Workshops*														
			KO	S1	FP	WG	T1	T2	T3	T4	T5	T6	T7	T8			
Ahmed Yusuf Ahmed	M	DG, DECC															
Kenadid Mumin Cali	M	Deputy DG, DECC, OPM															
Dr. Ali D. Mohamed	M	Chief Policy Advisor, OPM															
Najib Ahmed Abdullahi	M	Tech. Advisor, Emt Governance, DECC															
Abdifatah M'hmd Hared	M	Director, Planning, Res. & Dev., DECC															
M'hmd Mohamud S. Ahmed	FP	Director, Legal Dept., DECC															
Abdisamad H. Ahmed	M	Director, Climate Change Dept., DECC															
Fadumo Ahmed Abdullahi	F	Head, CC Adaptation MOHADM															
Muntaziyah M. Jimale	F	Head, Maritime Police Directorate, OP															
Abdinasir Warsame M'hmd	M	Director, Economic Policy & Planning, Min. Finance															
Miski Ibrahim Osman	F	Adviser, Somali NDP Min. Planning															
Mona A. Mohamed	F	Planning Officer, Statistics Dept., Min. Planning															
Mohamed Hashi Arabey Abdi	M	DG, MOPMR															
Mohamed Adan	M	Legal Advisor to DG, MOPMR															
Mahmud Hassan M'hmd	FP	Director, MOPMR															
Fartun Mohamed Abshir	F	MOPMR															
Ilhan Hussein Abdi	F	MOPMR															
Yasin Hassan Dahir	M	Geologist/GIS, MOPMR															
Abdikadir Ahmed Haji	M	Geologist/GIS, MOPMR															
Libaan Mahi Moalim	M	Director, Environment Dept., MOPMR															
Abdihafid Ali Dirir	M	Somali Petroleum Authority, MOPMR															
Abdirahim Yahye Abdirahman	M	MOPMR															
Yonis Aden	M	Senior Advisor, SMA, MOPMT															
Abdifatah Mohamed Mohamud	M	Director, Marine Environment, MOPMT															
Addullahi Addow	M	Director, Planning, MOPMR															
Abdulkadir Abdinor Yusuf	M	Director, Dept Marine Environment Protection MoFMR															
Abdimajid Abdi Mo'alim	M	MOEW															
Ahmed Mohamed Hassan	M	Director, Hydrometeorology MOEW															
Hassan Mohamud Mohamed	M	Benaadir RA (Petroleum & Minerals Rep.)															
Zakaria Ibrahim Nageye	M	Benaadir RA (Petroleum & Minerals Rep.)															
Abdulkadir Noor Abow	M	Technical Advisor, MOE SW State															
Abdullahi Sh. Hussein M'hmd	M	MoPE, SW State															
Yusuf Hassan Isaak	M	General Director, MOPE, SW State															
Fardowsa M'hamed Lukman	F	Director, Minerals Dept., MOPE, SW State															
Iqra Abdi Rashid Adan	F	MOPMT equivalent, SW State															
Ahmed Mohamed Abdi	M	MOPM Galmudug															

Participant	Gender	Position and Institution	Meetings/Workshops*															
			KO	S1	FP	WG	T1	T2	T3	T4	T5	T6	T7	T8				
Kadra Mohamud Kalif	F	Admin & Finance, MOPM Galmudug																
Umulkhair Mahmoud Dirie	F	Consultant, MOE Galmudug																
Abdirashid Mohamed Abdi	M	Min. Ports & Fisheries, Galmudug																
Ahmed Abdullahi Ahmed	M	Min. Ports & Transport, Galmudug																
Mohamed Adow Hassan	M	Min. Petroleum, Jubaland																
Abdulhamid Ali Salat	M	DG, Min. Petroleum, Jubaland																
Mohamed Aden	M	Min. Fisheries Jubaland																
Jibril Abdi	M	Principal Advisor for Policy Min. Petroleum, Jubaland																
Mohamed Bashir Dolal	M	NRM Officer, MOE Jubaland																
Khalid Mukhtar Abdiwali	M	Min. Ports & Transport equivalent, Jubaland																
Abdirahman Hassan Ali	M	Min. Ports & Transport equivalent, Hirshabelle																
Abdinasir Ibrahim Xaai	M	MoE Hirshabelle																
Yasin Ahmed Mohamoud	M	MoE, Hirshabelle																
Salma Mohamed Ibraahim	F	Planning Dir., MOPMR, Hirshabelle																
Mohamud Hussein Moghe	M	Min. Fisheries equivalent, Hirshabelle																
Mohamed Ahmed Nor	M	MOPMR, Hirshabelle																
Sidali Abukar Mohamed	M	Director, Information Centre, Hirshabelle																
Abdinor Adan Afyare	M	DG, Ministry of Environment, Hirshabelle																
Mohamed Elmi Ali	M	GIS expert, Min. Petroleum, Puntland																
Abdulrahman Mohamud Dirie	M	Head, Marine Biotic Resources, SMRRC																
Mustafe Hassan	M	SMRRC																
Hassan Osman Hassan	M	Deputy Director, Marine Environment SMRRC																
Abdilatif H. Omar	M	Dept. Marine Science, Somali National Uni.																
Abdulqadir Omar Ziyad	M	Somalia National Uni.																
Omar Faruk Osman	M	Gen. Sec, Fed. Somalia Trade Unions																
Abdirahman Shaacir	M	Fed. Somalia Trade Unions																
Warsame	M	Som. Institute of Management Studies NGO																
Baxsan Osman Ali	F	Somalia National Women Organisation																
Falxado Fulan Xaji	F	Somalia National Women Organisation																
Abubakar Mohamud Abubakar	M	Exec. Dir, SONRECC																
M'hmd Dayib Sh Abubakar	M	Director, Capacity Development, SONRECC																
Abdirashid Artan	M	National Biodiversity Expert																
Mulki Abshow Ibrahim	F	Director of Planning, MOPMR Hirshabelle																
Ibrahim Moalin Ali	M	Environment Department, MOPMR																
Total no. of participants from Somalia = 70; No. meeting/workshop attendees:			10	9	2	22	4	10	12	13	23	18	47	20				

* Details of meetings are presented in Appendix 1.

Appendix 3. Risk and Opportunities Matrices for Upstream Activities.

Scenario: Offshore OBBIA Basin 1: Shallow water (100-200 m depth) inside 12 nm

Activity and Aspects	Risks and Opportunities	Significance					
		0	1	2	3	4	5
SEISMIC SURVEYS	Risks						
Marine use: physical presence	1. Overlaps between existing economic activities (e.g. tourism/fisheries) and oil and gas industry						
• Survey vessel(s) arrive in Somali EEZ	2. Decreased revenue of fishing industry						
• Area occupation offshore (within 12 nm)	3. Disturbance of marine organisms						
• Helipad and helicopter transport routes (for emergencies and occasional supplies)	4. Disturbance of tourism industry						
• Survey vessel and streamer exclusion zone	5. Disturbance to Shipping traffic						
	6. Shortage of fishing areas						
	7. Piracy/security risk for seismic vessel						
	Opportunities						
	1. Employment and livelihood opportunities						
	2. Increased supplies and services						
Emissions, discharges and wastes	Risks						
• Vessel air emissions	1. Health and safety problems						
• Vessel discharges (sewage, grey water, food waste)	2. Environmental degradation/pollution						
• Hazardous waste handling & management	3. Climate change and variability from emissions						
• Non-hazardous waste handling & management	4. Noise impacts on marine life						
• Ballast water	Opportunities						
• Deck drainage	1. Employment opportunities and livelihoods						
• Intense noise from air-guns	2. Increased supplies and services						
	3. ..						
Accidental or unplanned events	Risks						
• Spills: refuelling and bunkering	1. Job creation (e.g. spill clean-up)						
• Spills: collision/tank/pipeline rupture	2. Skills and training (e.g. in spill clean-up)						
• Introduction of invasive species	3. Health and safety problems						
• Collision with marine fauna	Opportunities						
	1. Employment opportunities (responding to incident)						
	2. Conducting studies and investigation of the area						
Decommissioning	Risks						
• Survey vessel(s) depart Somali EEZ	1. Job loss, increase poverty and instability						
• Fuel and other supply contracts terminated	2. High expectations of the local population						
	Opportunities						
	1. Alternative energy						
Institutional aspects	Risks						
	1. Unsuccessful survey completion and reputation damage						
	2. Increase accidental events such as Oil spill						
	Opportunities						
	1. Successful survey completion reputation boost						
	2. Knowledge sharing and training						
Additional comments:							

Scenario: Offshore OBBIA Basin 1: Shallow water (100-200 m depth) inside 12 nm

Activity and Aspects	Risks and Opportunities	Significance					
		0	1	2	3	4	5
WELL-DRILLING							
Physical presence							
<ul style="list-style-type: none"> Drillship and supply vessel(s) arrive in Somali EEZ Area occupation offshore (within 12 nm) Several exploration and production wells to be drilled (each well 50 days) Supply base establish at suitable port Storage and handling of hazardous and dangerous materials Road traffic to waste and other project sites onshore from supply base (port) Helipad and helicopter transport routes Supply vessel transport routes to drillship Job creation Local deliveries of goods and services Waste handling and management Exclusion zone around drillship 	Risks						
	1. Social disruption due to migration influx						
	2. Spread of STDs from shore-based crew changes						
	3. Overlaps between existing economic activities (e.g. tourism and fisheries) and oil and gas sector						
	4. Impact on ecological habitat coastal and marine						
	5. Impact on natural visualization of the ocean due to the presence of rigs etc.						
	6. Impact on cultural heritage and disturbance of historical and cultural sites						
	7. Environmental degradation/pollution						
	8. Decreased revenue of inshore fishing industry						
	9. Disturbance of marine organisms						
	10. Disturbance of tourism industry						
	11. Piracy/security risk for drillship/supply vessel						
	12. Shortage of fishing areas						
	13. Security risk for helicopter(s)						
	14. High expectations of the local population						
15. Capacity of local critical infrastructure (electric, water supply, internet)							
Opportunities							
1. Employment opportunities and livelihoods							
2. Knowledge and skills transfer							
3. Enhancement of local content							
4. Improved infrastructure at supply base (port)							
5. Support to entrepreneurship							
6. Increased supplies and services							
7. Delivery of local goods							
8. Increase port income/revenues							
Emissions, discharges and wastes							
<ul style="list-style-type: none"> Air pollution (GHG, NOX etc.) Vessel discharges (sewage, grey water, food waste) Hazardous waste handling and management Non-hazardous waste handling and management Ballast water Noise and light from drillship Venting and flaring Drill cuttings/fluid discharges Deck drainage Seabed smothering 	Risks						
	1. Contribution to climate change and variability due to emissions						
	2. Environmental degradation/pollution						
	3. Health and safety problems						
	4. Loss of biodiversity						
	5. Terminate the project						
	6. Political issues						
	Opportunities						
	1. Technology transfer						
	2. Increase the consideration of the environment and climate change						
	3. Development alternatives						

Scenario: Offshore OBBIA Basin 1: Shallow water (100-200 m depth) inside 12 nm

Activity and Aspects	Risks and Opportunities	Significance				
		0	1	2	3	4
Accidental or unplanned events						
<ul style="list-style-type: none"> Spills: refuelling and bunkering Spills: collision/tank/pipeline rupture Major oil spill potential Introduction of invasive species Traffic accidents around supply base Emergency response (national and/regional) 	Risks					
	1. Impact on fisheries					
	2. Environmental degradation/pollution					
	3. Health and safety problems					
	4. Loss of biodiversity					
	5. Absence of insurance and liability policies					
6. Capacity to coordinate and execute emergency response						
Opportunities						
1. Job creation (e.g. spill clean-up)						
2. Skills and training (e.g. in spill clean-up)						
3. Knowledge transfer						
Decommissioning and Abandonment						
<ul style="list-style-type: none"> Existing well footprint Removal of equipment and facilities at shore base 	Risks					
	1. Loss of jobs					
	2. Poor enforcement of laws and regulations					
	3. Knowledge gaps					
	4. Failure in abandonment leading to leaks					
5. Accidents during decommissioning						
Opportunities						
1. Raw materials availability to local community						
2. Temporary job opportunity						
3. Environmental safety, Developing alternatives option						
Institutional aspects						
<ul style="list-style-type: none"> Laws and regulations Guidelines and standards Capacity building/training Facilities Equipment Personnel Procedures/routines Cooperation Budgets 	Risks					
	1. Inadequate laws/regulations, standards and guidelines for oil and gas, lack of legal instruments					
	2. Poor enforcement of laws and regulations					
	3. Knowledge gaps on oil and gas industry					
	4. Unsuccessful drilling campaign reputation damage					
	5. Inadequately skilled personnel					
	6. Inadequate coordination of institutions with responsibility for the sector					
	7. Shortage of equipment (testing laboratory, personal protection, vehicles, etc.)					
	8. Lack of budget for the development of the sector					
	9. Lack of monitoring and evaluation framework					
10. Inadequate facilities and equipment and personnel to support/control the sector						
Opportunities						
1. Increased revenues						
2. Knowledge and skills transfer						
3. Successful drilling campaign reputation boost						
4. Job creation						
Additional comments:						

Appendix 4. Survey Monkey Questionnaire Outline

Understanding of the Coastal Zone

Please indicate which parts of the coast are best known to you (score 3 for high, 2 for moderate, 1 for little and 0 not known)

Coastal zones	Benaadir RA	Jubaland	SW State	Hirshabelle	Galmudug
Coastal zones best known to you					

SECTION 1: Environmental Features

This section focuses on the understanding of the coastal environment for the oil and gas sector.

- Does your institution collect environmental data related to the sea, or the coast or the climate which may be directly or indirectly relevant to environmental management/governance in the oil and gas?

Yes No

- If yes, data on what kind of parameter(s)?

- Please indicate your impression of evidence for the following events or processes along the shores of the five states/administration (score 3 for significant amount of evidence, 2 moderate evidence and 1 minor evidence, and 0 if not sure):

No Coastal zones	Benaadir RA	Jubaland	SW State	Hirshabelle	Galmudug
1. Evidence of sea level rise					
2. Evidence of storm damage					
3. Evidence of Tsunami damage					
4. Evidence of oil spill damage					
5. Evidence of chemical or industrial pollution					

- Please elaborate on the most significant of the above-identified environmental aspects (s)?

- From your understanding, how important are the following environmental receptors (natural features that may be sensitive to change) for each state/administration? (score 3 = Highly important, 2 = Moderately important; 1 = Minor importance; 0 = Not sure)

No Environmental receptors	Benaadir RA	Jubaland	SW State	Hirshabelle	Galmudug
1. Environmentally sensitive and protected areas					
2. Whales					
3. Dugong					
4. Dolphins					
5. Turtles					
6. Tuna stocks					
7. Sardine stocks					
8. Lobsters					
9. Coral reefs					
10. Seagrass areas					

No Environmental receptors	Benaadir RA	Jubaland	SW State	Hirshabelle	Galmudug
11. Mangrove forests					
12. Salt marsh areas					
13. Seabirds					
14. Ground/surface water bodies					
15. Other					

SECTION 2: Socio-economic Features

This section focuses on the understanding of the social and economic for the oil and gas sector.

- Does your institution collect social or economic data related to the coastal zone which may be directly or indirectly relevant to environmental management / governance in the oil and gas?

Yes No

- If yes, on what kind of activities?

- From your understanding, how significant are the following socio-economic receptors (human or economic activities that may be sensitive to change) within the coastal zone (10 km) of each of the states/administration? (score 3 = Highly significant, 2 = Moderately significant; 1 = Minor significance; 0 = not sure)

No Receptors	Benaadir RA	Jubaland	SW State	Hirshabelle	Galmudug
1. Coastal infrastructure (ports, fish landing sites, waste treatment plants)					
2. Local fishing communities					
3. Coastal tourism					
4. Coastal archaeology and cultural heritage sites					
5. Solar evaporation salt pans					
6. Seaweed farming					
7. Mangrove harvest					
8. Shipping and trade					
9. Farming and grazing					
10. Urban centres/villages					
11. Other					

SECTION 3: KEY ISSUES

This section focuses on the key issues that may be the most relevant to the development of the petroleum sector in Somalia

1. What is your assessment of the importance of the following Key Issues associated with the start of oil and gas exploration in Somalia? (please indicate the level of importance)

No	Key Issue	Highly important	Fairly important	Not important	Not sure
1.	Activities in environmentally sensitive and protected areas				
2.	Sea area quality, use and spatial planning				
3.	Critical infrastructure e.g. ports, airports, waste facilities				
4.	Discharges and emissions from the petroleum industry				
5.	GHG emissions (e.g. from shipping, flaring etc)				
6.	Emergency preparedness and response				
7.	Non-hazardous waste management				
8.	Hazardous waste management				
9.	Co-existence with local communities				
10.	Gender representation within local communities				
11.	Co-existence with fisheries and aquaculture sector				
12.	Co-existence with coastal tourism				
13.	Co-existence with archaeology and cultural heritage				
14.	Institutional capacity building				
15.	Environmental legal and policy frameworks in place				
16.	Transboundary and international aspects				
17.	Water related mgmt. issues				
18.	Decommissioning of appraisal and exploration wells?				

2. Please score the following challenges faced when trying to involve local communities in environmental management and governance of oil and gas:

Challenge	Score			
	3 High	2 Moderate	1 Minor	0 Not sure
Level of trust in the Federal institutions				
Level of trust in the Member State institutions				
Level of understanding of oil and gas issues				
Level of interest in oil and gas issues				
Difficulty in convening meetings				
Security concerns				
Other				

3. What recommendations do you propose for strengthening involvement of local communities in management in the oil and gas sector?

SECTION 4: PETROLEUM SECTOR GOVERNANCE AND CAPACITY

This section focuses on the effectiveness of the policy, legislative and institutional framework for the petroleum sector.

1. What is your perception of the level of understanding of the following topics related to the oil and gas sector among **government institutions** (excluding the petroleum ministries and related departments)? (please tick the level of understanding)

Topic	Government Institution Level of Understanding (excluding petroleum ministries)			
	High	Moderate	Weak	Not sure
Offshore oil and gas activities in general				
Detailed aspects on impact mitigation				
Detailed aspects on monitoring of exploration activities				
Purpose of the SEA for the Petroleum Sector				
Steps involved in the SEA for the Petroleum Sector				
Environmental and Social Impact Assessments (ESIAs) for Petroleum Sector activities				
Other				

2. What is your assessment of the level of understanding of the following topics related to the oil and gas sector among the **local communities**? (please tick the level of sufficiency)

Topic	Local Communities Level of Understanding			
	High	Moderate	Weak	Not sure
Offshore oil and gas activities in general				
Detailed aspects on emissions and wastes				
Detailed aspects on impact mitigation				
Responding to oil spills				
Detailed aspects on monitoring of exploration activities				
Purpose of the SEA for the Petroleum Sector				
Steps involved in the SEA for the Petroleum Sector				
Environmental and ESIAs for Petroleum Sector activities				

3. In your view, should communications material on the oil and gas sector be provide to government institutions in English or Somali language?

English Somali

4. In your view, should communications material on the oil and gas sector be provide to local communities in English or Somali language?

English Somali

5. Please indicate the quality of Internet connections that you regularly have access to (please tick the level of sufficiency)

	High	Moderate	Weak	Not sure
Internet quality accessible to you				

Appendix 5. Master List of Issues and Scores of Risk and Opportunities Matrix and Survey Monkey

No	Project activity	Key Issue	R&O Matrix scores							Survey Monkey		
			3	4.7	2	4.5	2	4.5	4.6	Sum	No.	Score
1	Seismic Institutional	1. Unsuccessful survey completion/reputation damage	3	4.7	2	4.5	2	4.5	4.6			
2	Drilling Institutional	1. Inadequate laws/regulations, standards and guidelines for oil and gas, lack of legal instruments	3	4.7	2	4.5	2	4.5	4.6			
3	Drilling Institutional	2. Poor enforcement of laws and regulations, leading to environmental (and socio-economic) impacts	3	4.7	2	4.5	2	4.5	4.6	47	10	4.7
4	Drilling Institutional	7. Shortage of equipment (testing laboratory, personal protection, vehicles, etc.)	3	4.7	2	4.5	2	4.5	4.6			
5	Drilling Institutional	8. Lack of budget for the development of the sector	3	4.7	2	4.5	2	4.5	4.6			
6	Drilling Accidental events	1. Impact on fisheries, including shortage of fishing areas and reduced revenues	2	4.5	2	4.5	2	4.5	4.5	39	10	3.9
7	Drilling Physical presence	7. Environmental degradation/pollution	3	4.3	2	4.5	2	4.5	4.4			
8	Drilling Institutional	3. Knowledge gaps on oil & gas industry	3	4.3	2	4.5	2	4.5	4.4	23	6	3.8
9	Drilling Institutional	4. Unsuccessful drilling campaign reputation damage	3	4.3	2	4.5	2	4.5	4.4	12	3	4.0
10	Drilling Institutional	6. Inadequate coordination of institutions with responsibility for the sector	3	4.3	2	4.5	2	4.5	4.4			
11	Drilling Decommissioning	4. Failure in abandonment leading to leaks	3	4.3	2	4.5	2	4.5	4.4			
12	Drilling Accidental events	3. Health & safety problems	3	4.3	2	4.5	2	4.5	4.4	9	2	4.5
13	Drilling Accidental events	4. Loss of biodiversity	3	4.3	2	4.5	2	4.5	4.4	40	10	4
14	Drilling Accidental events	6. Capacity to coordinate and execute emergency response	3	4.3	2	4.5	2	4.5	4.4			
15	Drilling Institutional	5. Inadequately skilled personnel	3	4.0	2	4.5	2	4.5	4.3	15	3	5
16	Drilling Institutional	9. Lack of monitoring and evaluation framework	3	4.0	2	4.5	2	4.5	4.3			
17	Drilling Institutional	10. Inadequate facilities and equipment and personnel to support/control the sector	3	4.0	2	4.5	2	4.5	4.3			
18	Drilling Emissions	2. Environmental degradation/pollution	3	4.0	2	4.5	2	4.5	4.3	43	10	4.3
19	Drilling Accidental events	2. Environmental degradation/pollution	3	4.0	2	4.5	2	4.5	4.3			
20	Drilling Physical presence	14. High expectations of the local population	3	3.7	2	4.5	2	4.5	4.2	34	8	4.25
21	Drilling Decommissioning	3. Knowledge gaps	3	3.7	2	4.5	2	4.5	4.2			
22	Seismic Accidental events	3. Health & safety problems	3	4.0	2	4.5	1	4.0	4.2			
23	Drilling Physical presence	15. Capacity of local critical infrastructure (electric, water supply, internet)	3	3.3	2	4.5	2	4.5	4.1			
24	Drilling Decommissioning	2. Poor enforcement of laws and regulations	3	3.3	2	4.5	2	4.5	4.1			
25	Drilling Decommissioning	5. Accidents during decommissioning	3	3.3	2	4.5	2	4.5	4.1	6	2	3
26	Seismic Institutional	2. Survey data loss	1	4.0	1	4.0	1	4.0	4.0			
27	Seismic Decommissioning	1. Health & safety problems	1	4.0	1	4.0	1	4.0	4.0			
28	Seismic Emissions	1. Health & safety problems	3	3.7	2	4.0	2	4.0	3.9			
29	Drilling Physical presence	4. Impact on ecological habitat coastal & marine	3	3.7	2	4.0	2	4.0	3.9	45	10	4.5

No	Project activity	Key Issue	R&O Matrix scores							Survey Monkey		
			3	3.7	2	4.0	2	4.0	3.9	Sum	No.	Score
30	Drilling Emissions	4. Loss of biodiversity	3	3.7	2	4.0	2	4.0	3.9			
31	Drilling Emissions	3. Health & safety problems	3	3.3	2	4.0	2	4.0	3.8			
32	Seismic Physical presence	1. Overlaps between existing economic activities (e.g. tourism/fisheries) and O&G industry	3	3.0	2	4.0	2	4.0	3.7	29	10	2.9
33	Seismic Accidental events	2. Skills and training (e.g. in spill clean-up)	3	3.0	2	3.5	2	4.0	3.5			
34	Drilling Physical presence	3. Overlaps btw existing economic activities (e.g. tourism/fisheries) and O&G sector	3	3.0	2	4.0	2	3.5	3.5	16	4	4
35	Seismic Accidental events	1. Job creation (e.g. spill clean-up)	3	3.3	2	3.5	2	3.5	3.4			
36	Drilling Accidental events	5. Absence of insurance and liability policies	3	3.3	2	3.5	2	3.5	3.4	10	3	3.3
37	Seismic Emissions	2. Environmental degradation/pollution	3	3.3	2	3.0	2	3.0	3.1			
38	Drilling Decommissioning	1. Loss of jobs	3	2.3	2	3.5	2	3.5	3.1			
39	Seismic Physical presence	6. Shortage of fishing areas	3	2.7	2	3.0	2	3.5	3.1			
40	Drilling emissions	Greenhouse gas (GHG) emissions from ships and resulting oil/gas production								35	10	3.5
40	Drilling emissions	Greenhouse gas (GHG) emissions from ships and resulting oil/gas production								35	10	3.5
41	Seismic/Drilling Physical presence	Impact on mangroves, seagrass beds and coral reefs								37	10	3.7
42	Seismic/Drilling Physical presence	Disturbance of marine organisms from seismic & drilling vessels								37	10	3.7
43	Seismic/Drilling Physical presence	Impact on marine turtles								37	10	3.7
44	Seismic/Drilling Physical presence	Activities in marine protected or environmentally sensitive areas								40	10	4
45	Seismic/Drilling Institutional	Environmental policy and legal frameworks not in place								40	10	4
46	Seismic/Drilling Physical presence	Vulnerability and impact on marine mammals (dolphins, whales, and dugong)								41	10	4.1
47	Seismic/Drilling Physical presence	Low gender representation within local communities in O&G institutions in decision making								32	8	4
48	Seismic/Drilling Physical presence	Potential gender-differentiated impact of oil spill risks/other acute pollution on livelihoods								22	6	3.7
49	Seismic/Drilling Physical presence	Sea level rise risks								14	4	3.5
50	Seismic/Drilling Physical presence	Tsunami exposure								9	4	2.3
51	Seismic/Drilling Accidental events	Piracy/security risk for drillship/supply vessel								4	4	1
52	Seismic/Drilling Physical presence	Security risk for helicopter(s)								7	3	2.3
53	Drilling missions	Non-hazardous waste management								9	2	4.5
54	Drilling emissions	Hazardous waste management								15	3	5.0
55	Seismic/Drilling Physical presence	Storm damage								17	5	3.4

Appendix 6. Key Issues and Associated Issues from Master List

Key Issues	Issues from the master list of issues and concerns
1.1 Impact on environmentally sensitive marine areas and habitats	Impact on ecological habitat coastal & marine environment (3.9; 3.7); Environmental degradation/ pollution (from drilling and accidental events) (4.4-4.3; NA) Impact on mangroves, seagrass beds and coral reefs; impact of ecological habitat coastal and marine and loss of biodiversity (from accidental events) (NA-3.9, 4.4; 4.0-4.5, 4.0, 3.7)
1.2 Impact on marine species of conservation or national importance	Impact on marine turtles & vulnerability and impact on marine mammals (dolphins, whales, and dugong) (NA; 3.7 & 4.1); Disturbance of marine organisms from seismic & drilling vessels (NA; 3.7) Displacement or mortality may occur due to noise from operations.
2.1 Routine and accidental discharges	Environmental degradation/pollution from drilling (4.3; 4.3); from seismic surveys (3.1; NA); loss of biodiversity (3.9; NA) including from failure in abandonment leading to leaks (NA; 4.4); and accidents during decommissioning (4.1; 3.0)
2.2 Greenhouse gas emissions	Previously identified as the same issue.
2.3 Impacts from sea level rise and storms	Sea level rise risks (NA; 3.5) & Storm damage (Na; 3.4)
3.1 Impacts from hazardous waste	Hazardous waste management (NA; 5.0); includes waste management associated with decommissioning
3.2 Impacts from non-hazardous waste	Non-hazardous waste management (NA; 4.
4.1 Emergency response preparedness (for accidental events)	Capacity to coordinate and execute emergency response (4.4; NA)
5.1 Local content participation in the oil and gas sector	High expectations of the local population from drilling program (4.2; 4.3); Skills and training (e.g. spill clean-up) + Technology transfer, capacity building (4.8; 4.7); Delivery of local goods + services and supplies + Employment & livelihood opportunities, enhanced local content, entrepreneurship boost (4.3, 4.1; 4.5, 4.3)
5.2 Gender representation and impact assessment	Gender representation within oil and gas institutions in decision making spaces can be improved (NA; 4.0); Potential gender-differentiated impact of oil spill risks/other acute pollution on livelihoods (NA; 3.7)
5.3 Health and safety among local communities and employees	Health & safety problems during drilling (4.4; 4.5), seismic (4.2), including related to emissions; and decommissioning (4.0; NA); Health & safety problems related to emissions from seismic and drilling (3.9, 3.8; NA)
6.1 Ensuring fisheries productivity	Impact on and overlaps with fisheries, including shortage of fishing areas and reduced revenues (3.1, 4.5; 3.9) and from seismic surveys (3.7; 2.9) also leading to reduced fishing areas (3.1; NA)
7.1 Ensuring tourism potential	Overlaps between existing tourism sector and oil and gas sector (3.5; 4.0)
8.1 Infrastructure is available to the petroleum sector	Capacity of local critical infrastructure (electric, water supply, internet) (4.1; NA) Improved infrastructure at supply base (port) (3.0; 4.0) Increase port income/ revenues (3.2; NA); Inadequate facilities and equipment to support / control the petroleum sector (4.3; NA)
8.2 Appropriate analytical laboratory is available to the petroleum sector	Shortage of equipment (testing laboratory, personal protection, vehicles, etc.) (4.6; NA)

Key Issues	Issues from the master list of issues and concerns
9.1 Appropriate legal and policy requirements are in place	Laws/regulations, standards and guidelines for oil and gas, lack of legal instruments (4.6; NA) and lack of monitoring and evaluation framework (4.3; NA); environmental policy and legal frameworks not in place (NA; 4.0)
9.2 Coordination between institutions to facilitate sustainable development of the sector	Inadequate coordination [or ability] of institutions with responsibility for the sector (4.4; NA)
9.3 Insurance requirements and liability are provided	Absence of insurance and liability policies (3.4; 3.3)
9.4 Legal enforcement	Poor enforcement of laws and regulations, leading to environmental (and socio-economic) impacts from drilling (4.6; 4.7), and also for decommissioning (NA; 4.1)
9.5 Technical capacity requirements are met	Capacity building at all levels to address knowledge gaps on oil & gas industry (for drilling) (4.4; 3.8); Inadequately skilled personnel (4.3; 5.0); knowledge gaps (on decommissioning) (4.1; NA)
10.1 Transboundary oil spill preparedness	Previously identified as the same issue.
10.2 Disputed territorial waters	Previously identified as the same issue.
11.1 Spatial planning to aid management of Somalia EEZ	Previously identified as the same issue.
12.1 Incomplete (and inaccessible) environmental data to support environmental management of offshore petroleum activities in Somalia	Previously identified as the same issue.

Appendix 7. Key Issue and Poll Question (Q) in Validation and Prioritization Exercise

Strategic Areas (SA), Key Issue and Short Explanation/Context

SA 1	Activities in environmentally sensitive and protected areas
1.1	Impact on environmentally sensitive marine areas and habitats Relates to potential impacts from pollution, noise, and accidental events from drilling and seismic, impacting coastal and marine habitats and causing loss of biodiversity.
Q.	How important is it for Somalia to avoid impact on environmentally sensitive marine areas and habitats?
1.2	Impact on marine species of conservation or national importance Relates to impact on marine turtles and marine mammals (dolphins, whales, and dugong) from seismic and drilling vessels [see also Key Issue 1.1, above].
Q.	How important is it for Somalia to avoid impact on marine species of conservation or national importance?
SA 2	Discharges and emissions from the petroleum industry
2.1	Routine and accidental discharges Relates to environmental degradation/pollution from drilling and from seismic surveys, and failure in abandonment leading to leaks and accidents during decommissioning, resulting in loss of marine and coastal biodiversity [see also Key Issue 1.1, above].
Q.	How important is it for Somalia to avoid routine and accidental discharges (from drilling, seismic survey, decommissioning)?
2.2	Greenhouse gas emissions Focuses on greenhouse gas (GHG) emissions from ships associated with upstream activities.
Q.	How important is it for Somalia to minimize greenhouse gas emissions from ships associated with upstream activities?
2.3	Impacts from sea level rise and storms Relates to sea level rise risks and storm damage and how these may impact the upstream sector.
Q.	How important is it for Somalia to prepare to reduce impacts from sea level rise and storms on the upstream sector?
SA 3	Waste management
3.1	Impacts from hazardous waste Relates to inadequate or poorly implemented hazardous waste management (including waste associated with decommissioning) thus increasing risks to environmentally sensitive areas, socio-economic activities, and public health [see also Key Issues 9.1 and 9.4].
Q.	How important is it for Somalia to avoid impacts on public health and the environment from hazardous waste?
3.2	Impacts from non-hazardous waste Focuses on inadequate or poorly implemented non-hazardous waste management increasing risks to environmentally sensitive areas, socio-economic activities, and public health.
Q.	How important is it for Somalia to avoid impacts on public health and the environment from non-hazardous waste?
SA 4	Emergency preparedness and response (for accidental events)
4.1	Emergency response preparedness (for accidental events) Relates to the present low capacity to coordinate and execute emergency response leading to risks to environmentally sensitive areas, socio-economic activities, and public health [see also Key Issue 2.1].
Q.	How important is it for Somalia to have an emergency response preparedness for accidental events associated with the oil and gas sector?

Strategic Areas (SA), Key Issue and Short Explanation/Context

SA 5	Co-existence with local communities
5.1	Local content participation in the oil and gas sector Relates to risk of failure to meet expectations of local population regarding the petroleum sector; and the need for skills and training (e.g. spill clean-up), technology transfer and capacity building; as well as the opportunities to increase delivery of local goods, services, and supplies, and enhance employment and local content, and boost entrepreneurship.
Q.	For Somalia how important is local content participation in the oil and gas sector?
5.2	Gender representation and impact assessment Focuses on the need to improve gender representation within petroleum institutions in decision making, and in distinguishing gender-differentiated impacts of accident risks/pollution on livelihoods.
Q.	How important is it for Somalia to improve gender representation and differentiate impacts based on gender?
5.3	Health and safety among local communities and employees Relates to health and safety problems during seismic/drilling related to emissions and decommissioning.
Q.	How important is it for Somalia to take care of health and safety issue among local communities and employees?
SA 6	Co-existence with fisheries sector
6.1	Ensuring fisheries productivity Relates to potential impact on and overlaps with fisheries, including shortage of fishing areas and reduced revenues, and from seismic surveys also leading to reduced fishing areas and productivity.
Q.	How important is it for Somalia to ensure fisheries productivity despite development of oil and gas activities?
SA 7	Co-existence with tourism sector
7.1	Ensuring tourism potential Relates to potential impacts and overlaps between existing tourism sector and the petroleum sector.
Q.	How important is it for Somalia to ensure co-existence of the tourism sector with the oil and gas sector?
SA 8	Critical infrastructure
8.1	Infrastructure is available to the petroleum sector Relates to the risk of failure to increase port income/revenues and opportunities to boost local ports and improve port infrastructure; as well as capacity of local critical infrastructure (electric, water supply, internet, port) to meet the sector needs; and facilities/equipment to support/control the sector.
Q.	How important is it for Somalia to ensure appropriate infrastructure is available to the petroleum sector?
8.2	Appropriate analytical laboratory is available to the petroleum sector Relates to risk and impacts of shortage of equipment (testing laboratory, personal protection, vehicles, etc.) [see also Key Issue 5.4].
Q.	How important is it for Somalia to ensure analytical laboratory is available to the petroleum sector?
SA 9	Institutional capacity, structures, and functions
9.1	Appropriate legal and policy requirements are in place Relates to the need for laws/regulations, standards and guidelines for oil and gas; noting the lack of legal instruments on environmentally sensitive areas and weak monitoring and evaluation framework.
Q.	How important is it for Somalia to ensure appropriate legal and policy requirements are met?
9.2	Coordination between institutions to facilitate sustainable development of the sector Relates to concern over coordination between institutions with responsibility for the sector.
Q.	How important is it for Somalia to ensure coordination between institutions involved?
9.3	Insurance requirements and liability are provided Focuses on the absence of robust insurance and liability policies.

Strategic Areas (SA), Key Issue and Short Explanation/Context

Q.	How important is it for Somalia to ensure insurance and liability are provided?
9.4 Legal enforcement	Focuses on obligations of operators to provide emergency clean-up operations and procedures, establish a clean-up (and decommissioning) funds, and restore any affected areas using Good Oil Field Practices, as well as concern over the ability to enforce laws and regulations, leading to impacts.
Q.	How important is it for Somalia to enforce obligations, law and regulations toward oil and gas operators?
9.5 Technical capacity requirements are met	Focuses on the need for institutional capacity building at all levels to address knowledge gaps related to the petroleum sector and for skilled personnel; further recognizing that at the FMS level there is a limited budget to address the technical needs of institutions with little technical capacity to review instruments such as ESIA's.
Q.	How important is it for Somalia to ensure technical capacity requirements of all related institutional personnel are met?
SA 10 Transboundary issues	
10.1 Transboundary oil spill preparedness	Focuses on the ability to coordinate responses to an oil spill transported into neighbouring waters or originating in neighbouring waters [see also Key Issue 4.1].
Q.	How important is it for Somalia to coordinate oil spill preparedness with neighbouring countries?
10.2 Disputed territorial waters	Focuses on need to ensure environmental sensitives of these offshore areas are reviewed and incorporation into exploration blocks and oil spill management plans.
Q.	How important is it for Somalia to solve dispute in territorial waters and EEZ?
SA 11 Land and marine area quality, use and spatial planning	
11.1 Spatial planning to aid management of Somalia EEZ	Relates to the absence of spatial plans to include designated waste management sites, fisheries areas, and other marine ecological and species data of relevance, and for environmental sensitivity mapping aligned with oil spill contingency plans (OSCPs) for exploration blocks and shipping corridors.
Q.	How important is marine spatial planning for Somalia EEZ management?
SA 12 Establishment of an Environmental and Socio-economic Baseline Dataset	
12.1 Incomplete (and inaccessible) environmental data to support environmental management of offshore petroleum activities in Somalia	Relates to the need to develop a data inventory of existing environmental and socio-economic data, to determine gaps and barriers and restrictions to access to establish appropriate baseline conditions.
Q.	How important is it for Somalia to establish an Environmental and Socio-economic Baseline Dataset (and Geospatial datasets)?

Appendix 8. Final Key Issue Validation and Prioritization Exercise January 2022.

Initial ranking		ToT Workshop group results				Total score	Revised Mean score
		4	3	2	1		
12.1	Incomplete (and inaccessible) environmental data to support environmental management of offshore petroleum activities in Somalia	10	10	10	10	40	10.00
3.1	Impacts from hazardous waste	10	10	x	10	30	10.00
9.1	Appropriate legal and policy requirements are in place	10	10	x	8	28	9.33
1.2	Impact on marine species of conservation or national importance	8	10	x	10	28	9.33
1.1	Impact on environmentally sensitive marine areas and habitats	10	10	5	10	35	8.75
10.1	Transboundary oil spill preparedness	8	8	x	10	26	8.67
11.1	Spatial planning to aid management of Somalia EEZ	8	10	x	8	26	8.67
8.1	Infrastructure is available to the petroleum sector	8	10	8	8	34	8.50
9.4	Legal enforcement	8	8	x	8	24	8.00
9.5	Technical capacity requirements are met	8	8	x	8	24	8.00
2.1	Routine and accidental discharges	8	8	x	8	24	8.00
6.1	Ensuring fisheries productivity	8	8	5	10	31	7.75
7.1	Ensuring tourism potential	8	6	x	8	22	7.33
9.2	Coordination between institutions to facilitate sustainable development of the sector	8	8	x	5	21	7.00
8.2	Appropriate analytical laboratory is available to the petroleum sector	8	8	x	5	21	7.00
5.1	Local content participation in the oil and gas sector	8	8	1	10	27	6.75
4.1	Emergency response preparedness (for accidental events)	8	10	1	8	27	6.75
5.3	Health and safety among local communities and employees	8	10	5	3	26	6.50
2.3	Impacts from sea level rise and storms	5	5	5	8	23	5.75
9.3	Insurance requirements and liability are provided	8	10	1	3	22	5.50
2.2	Greenhouse gas emissions	1	5	1	8	15	3.75
5.2	Gender representation and impact assessment	1	5	1	5	12	3.00
3.2	Impacts from non-hazardous waste	5	1	x	1	7	2.33

Appendix 9. Proposed Key Issues “Owner” Institution from the ToT Workshop June 2022.

Key issue number and title	Mandated Institutions (or Key Issue Owners), where applicable – FGS	Mandated Institutions (or Key Issue Owners), where applicable – FMS	Mandated Institutions (or Key Issue Owners), where applicable – FGS	Mandated Institutions (or Key Issue Owners), where applicable – FMS
12.1 Incomplete (and inaccessible) environmental data to support environmental management of offshore petroleum activities in Somalia	<ul style="list-style-type: none"> DECC MoPMR SPA MoFMR MoPMT 	<ul style="list-style-type: none"> SNBS DECC_OPM MoF MOPT Statistics Department (MOP) 	<ul style="list-style-type: none"> FMS corresponding institutions (planning, petroleum, environment, fisheries and marine resources, ports, and marine transport) 	<ul style="list-style-type: none"> MOPMR MOPWRH MOPMT FMS corresponding institutions MOFinance MPWRH MOLSA
3.1 Impacts from hazardous waste	<ul style="list-style-type: none"> DECC MOPMR MOHADM MOH 	<ul style="list-style-type: none"> FMS local authorities Local Government Mo Water and Energy 	<ul style="list-style-type: none"> MOE Municipalities MOPMR MOH FMS local authorities, local governments Mo Water and Energy 	<ul style="list-style-type: none"> Judicial Courts AJ Police FMS corresponding institutions (petroleum, environment, fisheries and marine resources, ports, and marine transport) Ministries of Security Mo Justice Police coast guard & Navy Other legal institutions
9.1 Appropriate legal and policy requirements are in place	<ul style="list-style-type: none"> DECC MOPMR SPA MOFMR MOPMT MOJ 	<ul style="list-style-type: none"> AJ MOF MOTP MOPlanning MOJustice Other legal institutions 	<ul style="list-style-type: none"> FMS corresponding institutions (justice, planning, petroleum, environment, fisheries and marine resources, ports, and marine transport) Other legal institutions 	<ul style="list-style-type: none"> FMS corresponding institutions (petroleum, environment) MOPlanning Int'l Cooperation MOEducation
1.2 Impact on marine species of conservation or national importance	<ul style="list-style-type: none"> MOFMR DECC MOPMR Navy and Coast Guard, SMA AG 	<ul style="list-style-type: none"> DECC-OPM, FMS local Authorities, Port Authority Ministry of Information and Tourism, MOPMT Local Government 	<ul style="list-style-type: none"> MOFMR MOE FMS corresponding institutions Ministries of Information and Tourism, Local Governments 	<ul style="list-style-type: none"> MOFMR FMS corresponding institutions (petroleum, environment, ports and marine transport, environment) Local gov't
1.1 Impact on environmentally sensitive marine areas and habitats	<ul style="list-style-type: none"> DECC MOFMR MOPMR Navy and Coast Guard 	<ul style="list-style-type: none"> SMA AG FMS local Authorities Port Authority 	<ul style="list-style-type: none"> MOE MOFMR FMS corresponding institutions 	<ul style="list-style-type: none"> MoFMR FMS corresponding institutions (fishery and marine institutions)
10.1 Transboundary oil spill preparedness	<ul style="list-style-type: none"> DECC MOPMR SPA MOFMR MOPMT 	<ul style="list-style-type: none"> MOPT MOHADM MOFA Navy and Coast Guard 	<ul style="list-style-type: none"> FMS corresponding institutions (petroleum, environment, fisheries and marine resources, ports, and marine transport) 	<ul style="list-style-type: none"> Ministry of Environment FMS corresponding Federal institutions Ministries of Information and Tourism Corresponding FMS institutions
11.1 Spatial planning to aid management of Somalia EEZ	<ul style="list-style-type: none"> MOPMR MOFMR MOPIED DECC-OPM 	<ul style="list-style-type: none"> SMA MHADM MO Planning 	<ul style="list-style-type: none"> MOFMR MOPMR MOPIED FMS corresponding Federal institutions MOHADM Corresponding FMS institutions 	<ul style="list-style-type: none"> FMS corresponding institutions All line Ministries Mo Planning at state level
8.1 Infrastructure is available to the petroleum sector	<ul style="list-style-type: none"> MOPMR SPA MOPWRH MOPMT MOPWH 	<ul style="list-style-type: none"> MOPT MOF MOFinance MPWRH MOLSA 	<ul style="list-style-type: none"> MOPMR MOPWRH MOPMT FMS corresponding institutions MOFinance MPWRH MOLSA 	<ul style="list-style-type: none"> MOPMR MOPWRH MOPMT FMS corresponding institutions MOFinance MPWRH MOLSA
9.4 Legal enforcement	<ul style="list-style-type: none"> DECC MOPMR MOFMR MOPMT Judicial Courts Police Navy and Coast Guard 	<ul style="list-style-type: none"> SMA AG Ministry of Security MOJustice Police coast guard & Navy Other legal institutions 	<ul style="list-style-type: none"> Judicial Courts AJ Police FMS corresponding institutions (petroleum, environment, fisheries and marine resources, ports, and marine transport) Ministries of Security Mo Justice Police coast guard & Navy Other legal institutions 	<ul style="list-style-type: none"> Judicial Courts AJ Police FMS corresponding institutions (petroleum, environment, fisheries and marine resources, ports, and marine transport) Ministries of Security Mo Justice Police coast guard & Navy Other legal institutions
9.5 Technical capacity requirements are met	<ul style="list-style-type: none"> Line Ministries MOPMR DECC MOForeign Affairs & Int'l Cooperation 	<ul style="list-style-type: none"> MOPlanning MOEducation 	<ul style="list-style-type: none"> FMS corresponding institutions (petroleum, environment) MOPlanning Int'l Cooperation MOEducation 	<ul style="list-style-type: none"> FMS corresponding institutions (petroleum, environment) MOPlanning Int'l Cooperation MOEducation
2.1 Routine and accidental discharges	<ul style="list-style-type: none"> DECC MOPMR SPA MOFMR MOPMT 	<ul style="list-style-type: none"> Navy and Coast Guard SMA AG Local gov't 	<ul style="list-style-type: none"> MOFMR FMS corresponding institutions (petroleum, environment, ports and marine transport, environment) Local gov't 	<ul style="list-style-type: none"> MOFMR FMS corresponding institutions (petroleum, environment, ports and marine transport, environment) Local gov't
6.1 Ensuring fisheries productivity	<ul style="list-style-type: none"> MOFMR Fisheries Union 	<ul style="list-style-type: none"> SMA SMRC 	<ul style="list-style-type: none"> MoFMR FMS corresponding institutions (fishery and marine institutions) 	<ul style="list-style-type: none"> MoFMR FMS corresponding institutions (fishery and marine institutions)
7.1 Ensuring tourism potential	<ul style="list-style-type: none"> MOICT DECC Navy and Coast Guard SMA AG 	<ul style="list-style-type: none"> FMS local Authorities Port Authority Ministry of Information and Tourism MOFMR 	<ul style="list-style-type: none"> Ministry of Environment FMS corresponding Federal institutions Ministries of Information and Tourism Corresponding FMS institutions 	<ul style="list-style-type: none"> Ministry of Environment FMS corresponding Federal institutions Ministries of Information and Tourism Corresponding FMS institutions
9.2 Coordination between institutions to facilitate sustainable development of the sector	<ul style="list-style-type: none"> MOPMR All line Ministries 	<ul style="list-style-type: none"> Office of the Prime Minister Mo Planning 	<ul style="list-style-type: none"> FMS corresponding institutions All line Ministries Mo Planning at state level 	<ul style="list-style-type: none"> FMS corresponding institutions All line Ministries Mo Planning at state level
8.2 Appropriate analytical laboratory is available to the petroleum sector	<ul style="list-style-type: none"> MOPMR SPA 	<ul style="list-style-type: none"> Somalia Bureau of Standards MFMR 	<ul style="list-style-type: none"> MOPMR FMS corresponding institutions 	<ul style="list-style-type: none"> MOPMR FMS corresponding institutions

