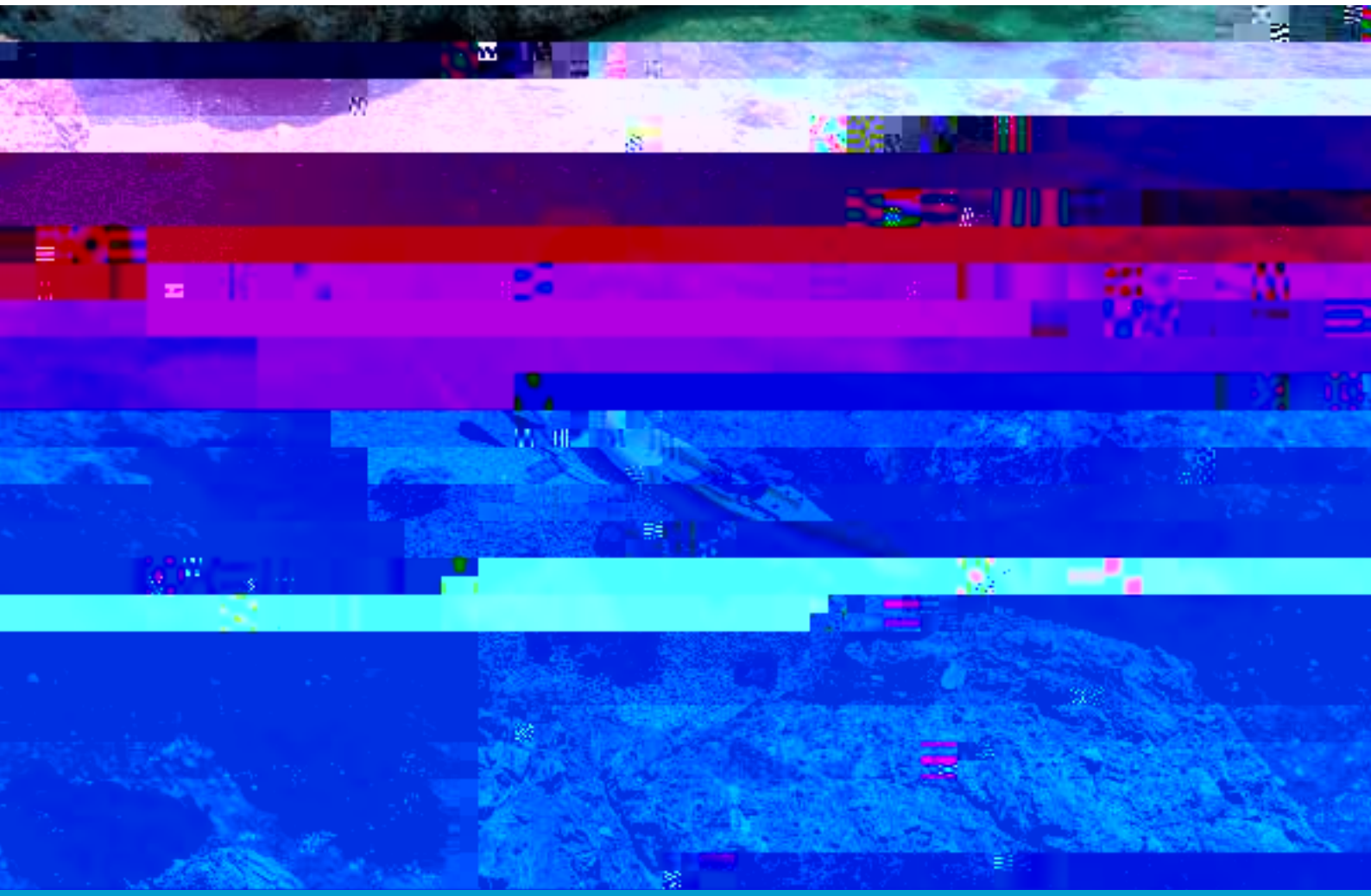

Mainstreaming biodiversity conservation in Lebanon

Guidelines for environmental impact assessment for projects affecting marine and coastal areas

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List of acronyms

ACCOBAMS	The Agreement on the Conservation of Cetaceans of the Black Sea Mediter - ranean Sea and contiguous Atlantic area
AEWA	Agreement on the Conservation of African-Eurasian Migratory
AGDS	Water Birds Acoustic Ground Discrimination Systems
BOP	Blowout Preventer
BTU	A British Thermal Unit
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNRS	Centre National de la Recherche Scienti que
CoM	Council of Ministers
CTD	Conductivity, Temperature and Depth
dB	Decibel
ECC	Environmental Compliance Certi cate
EIA	Environmental Impact Assessment
ELARD	Earth Link and Advanced Resources Development
ELCA	East Levantine Canyon Area
EMP	Environmental Management Plan
ERP	Emergency Response Plan
ES	Environmental Statement
EU	European Union
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
GFCM	General Fisheries Commission for the Mediterranean
GHG	Greenhouse Gases
GPS	Geographic Positioning System

The Hazard Identi cation

The Hazard Operability

High-Performance Water-Based Drilling Fluid

Habitat Suitability Index

Integrated Coastal Zone Management

Initial Environmental Examination

International Finance Corporation

International Finance Corporation Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living

Natural Resources International Maritime Dangerous Goods

International Maritime Organization

International Organization for Standardization

National Biodiversity Strategy and Action Plan

National Center for Marine Sciences

Net Environmental Bene t Analysis

Noise Emission Labels

National Emergency Response Committee

Net Gain

Non-Governmental Organization

Non-indigenous Species

Northeast Atlantic Marine Biological Analytical Quality Control

No Net Loss

National Oil Spill Contingency Plan

Net Positive Impact (net gain)

National Standards for Environmental Quality

SS	Suspended Solids
SSC	Suspended Sediment Concentrations
TCNR	Tyre Coast Nature Reserve
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scienti c and Cultural Organization Vertical
VSP	Vertical Seismic Pro le
WBDF	Water-Based Drilling Fluid

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01.

Introduction

1. Introduction

1.1 De ning biodiversity

Biodiversity is “the variability among living organisms, from all sources, including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species (genetic biodiversity), between species (species biodiversity) and of ecosystems (ecosystem biodiversity)” [Convention on Biological Diversity (CBD); United Nations, 1992]. More broadly, biodiversity refers to the variety of all species and habitats within an ecosystem, rather than simply the number of taxa present.
There is a clear relationship between the degree of biodiversity and the overall productivity and health of an ecosystem. Hence, protecting biodiversity has positive environmental and economic implications.

1.2 Main threats to marine biodiversity

This report focuses entirely on Lebanon’s marine and coastal areas, where biodiversity of aquatic species and habitats is considered rich, but highly vulnerable to anthropogenic activity (NCRS, 2016).

The main threats to Lebanon’s biodiversity are the following:

1. Habitat loss, fragmentation, and degradation

Changes to habitats are the main causes for ecosystem and species decline, given that habitats provide species with all the required elements of their ecological niches. Habitats can be:

- Completely destroyed/eliminated (Habitat loss);
- Restructured in a way that interferes with a species’ access to food, shelter, and reproduction (Habitat fragmentation); or
- Degraded to sub-optimal conditions (i.e. the selective removal or alteration of a critical habitat component, hydrological changes of the natural ow regimes, changes in water temperature, etc.).

Examples of development activities that impact habitats along coastal and marine zones include the construction of beach resorts, ports, marinas, industries, pipeline installations, and sea lling/land reclamation activities.

2. The exploitation of natural resources

Over shing, or the practice of extracting marine resources faster than their replenishment rate, is a major driver in the population decline of several marine species.
This not only affects speci c species by pushing them to their biological limits, but also disrupts their complex food chains within an ecosystem. Over shing can also lead to the loss of species not intended for commercial use (bycatch). Fishing methods can also contribute to species loss. While most of Lebanon’s sheries are small-scale and based on artisanal shing techniques, illegal and destructive practices (i.e. illegal mesh size, blast shing) still exist.

3. Pollution

Pollution of marine waters causes serious harm to both species and their habitats. Potential sources of contamination include:

- Illegal dumping of municipal and industrial solid waste
- Release of untreated municipal and industrial waste water
- Oil spills
- Discharge of ballast water from ships
- Agricultural runoff leading to eutrophication
- Air Pollution leading to acidi cation
- Noise pollution
- Light pollution
- Plastics and other marine debris
- Abandoned, discarded, or lost shing gear
- Ports and marinas

4. Non-indigenous species

Non-indigenous species (NIS) are non-native species, introduced either intentionally or accidentally (i.e. through the discharge of ballast waters) into local waters. They can threaten biodiversity by displacing native, endemic species, disrupting ecosystem structures and food webs (increased predation and competition for resources). NIS can quickly dominate the area where they have been introduced, making their removal dif cult.

5. Climate change

There is clear evidence that the concentration of greenhouse gases (GHGs) in the atmosphere has been increasing exponentially, resulting in global climate change. In Lebanon, the industrial sector, electricity supply chains (i.e. generators), and high concentration of transportation vehicles have contributed to the

Table 1-1 Proposed MPAs as per the MPA strategy (MoE/IUCN, 2012)

#	Site	Quality and importance
1	Nakoura	The Nakoura site is unique for vermetid platforms of relatively small size; rocks and coralligeneous concretions at shallow depths; crevices and overhangs common; soft bottom areas of small sizes occasionally present in patches. The site provides nurseries, spawning and feeding grounds.
2	Sidon Rocks	Islets of rocks and vermetid reefs in the vicinity of Saida. A beach composed of gravel found nearby as well as the estuary of the Awali River. Hard bottom in shallow areas and surrounded by a sandy soft bottom. Saida (Sidon) includes an archaeological and historic features site that was nominated (1984) as a UNESCO World Heritage Site. Very low biodiversity, dominated by introduced species.
3	Raoucheh Cliffs and Caves	Beautiful limestone cliffs area with two large standing rock formations (Pigeons' Rocks). Shallow hard underwater bottoms extending over most of the area. Soft bottoms found at greater depths. Archaeological and historic site and a popular tourist destination (scale bar 250m).
4	Beirut Port Outer Platform	Arti cial site composed of a long jetty (>2km) that protects the port of Beirut. Concrete structures as well as rocks and boulders of var ious sizes create arti cial caves and crevices which act as an arti- cial reef.
5	Byblos	Large vermetid reefs with signi cant ponds. A beach composed of gravel is found north of the area and the Byblos historic port lies to the south. Hard bottom found in shallow areas and soft bottom with a seagrass meadow dominates deeper waters. Archaeological and historic features.
6	Medfoun Rocky Area	Rocky area with moderate cliffs. Hard underwater bottoms with occasional soft bottom patches. This area could be considered as partly protected since it lies within a military area.
7	Batroun Phoenician Wall	Rocky area with important vermetid reefs and hard underwater bottoms. Shallow hard underwater bottoms extend over most of the area. Soft bottoms found at greater depths. Archaeological and historic site and a popular tourist destination. A historic wall is believed to have been erected by the Phoenicians for protection from waves.
8	Ras El Chekaa Cliffs	Limestone cliffs area with hard underwater bottoms and caves. Landscape and seascape with cultural and religious importance.
9	Enfeh Peninsula	Limestone rocks and vermetid reefs forming a peninsula. Shallow hard underwater bottoms; soft bottom in deeper waters. Archaeological and historical site.
10	Litani Estuary	The Litani River is an important water resource in southern Lebanon. Exceeding 140 km in length, it is the longest river in Lebanon and provides an average annual ow estimated at 920 million cubic meters. The waters of the Litani both originate and ow entirely within the borders of Lebanon. The site is important for sheries, and in relation to the presence of marine turtles and seagrass meadows. The habitat, a combination of physical features and living organisms that provide food, nesting, resting and shelter for sh and wildlife, has recently experienced signi cant changes in benthic community structure, possibly as a result of anthropogenic activity. The potential of the site for restoration is therefore apparent. Being a distinct topographic entity, identi cation of the Litani estuary as a protected area with de ned boundaries is relatively straightforward.

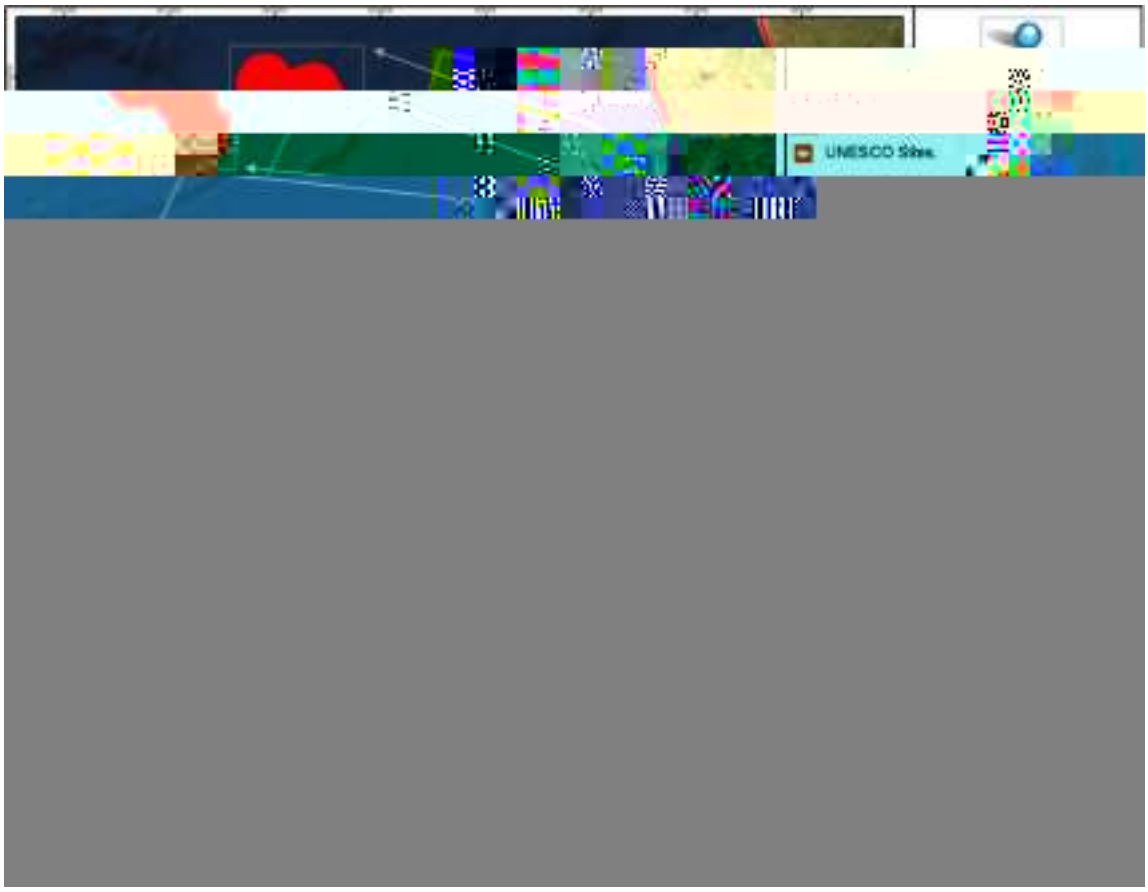

Figure 1-1 Existing and proposed Marine Protected Areas (MPAs)
Source: MoE/IUCN, 2012

As part of the Environmental Resources Monitoring Project in Lebanon (ERML) (MoE/UNEP/ UOB, 2013), the status of Coastal Sensitive Areas in Lebanon was assessed. The assessment aimed at preparing a database of natural and cultural heritage sites. Geographical, biological and cultural features, the existing and potential stresses, and current conservation status were all considered as parameters for the identi cation of the main coastal and marine sensitive sites. The most sensitive were then evaluated based on the criteria developed by the CBD and UNESCO-World Heritage Center (WHC). Consequently, priority ranking from the most to the least sensitive was given. Figure 1-2 presents the high priority sites [1,2].

Recommendations concerning the high priority sites emphasized the need for their immediate protection and management through a precautionary approach. In addition, high and medium priority sites were identi ed as hotspots for preservation and restoration whenever possible or feasible.

[1]Priority was designated based on the ranking and weighing of ecological criteria (representativeness, importance for threatened/ endangered species and/or habitats, high diversity, uniqueness, importance for life history stages of species or for migratory species, naturalness, connectivity, high biological productivity, vulnerability, international/national importance, scienti c and aesthetic importance,

Deep canyons characterize the continental slope of the Lebanese coast. Almost 518 large submarine canyons have been identi ed in the Mediterranean Sea and are considered as key structures for its ecosystem functioning. Submarine canyons are steep-walled, sinuous valleys, with V-shaped cross sections and relief comparable even to the largest of land canyons. Because they play a fundamental role in “Deep Oceans-Shelf Exchanges,” submarine canyons can be de ned as “super highways,” allowing the energy turnover to speed up by reducing the time and the distances covered by water masses, organic and inorganic sediments, benthonic and nektonic organisms during their active or passive movements from shallow to deeper waters and vice-versa.

The ELCA met the criteria as presented below.

The East Levantine Canyons is located all along the Lebanese and Syrian coastline. The East Levantine Canyons is a system composed of deep canyons, as well as hydrothermal vents and submarine freshwater springs, and is of particular biological importance. The coastal areas of the eastern Mediterranean host one of the largest areas of Opistho branch formations, and its waters experience the highest winter temperatures, allowing it to act as a refuge and spawning ground for many biologically important species of chondrichthyes, marine mammals, reptiles, and teleosts (many of which are listed as vulnerable/endangered on the IUCN Red List).							

According to the declaration by the GFCM (in agreement with all Mediterranean countries), a Fishery Restricted Area has been declared, banning trawling activities for all the Mediterranean in depths superior to 1,000 m. Inside Lebanon's territorial waters, this area represents about 1,240 km2, including four speci c features, as described by Oceana (2010) (further validating the importance of the ELCA), namely:

Beirut Escarpment
Saint Georges Canyon
Jounieh Canyon
Sayniq Canyon

Based on the Oceana study, and upon request by the MoE, a deep-sea expedition was undertaken in 2016 as part of the "The Deep-Sea Lebanon Project," funded by MAVA Foundation, a partnership between Oceana, IUCN and UNEP/MAP-SPA/RAC, on behalf of the MoE with the support of CNRS-L, GFCM and ACCOBAMS. Through this expedition the following ve canyons were surveyed: Beirut Escarpment (Ouzai), Saint Georges Canyon, Jounieh Canyon, Sayniq (Saida) Canyon, and Chekka- Batroun Canyon.

The expedition documented more than 200 species, including new records for the Mediterranean Sea. It con rmed the presence of "a superb belt of coralligenous gardens discovered at 80 meters depth, beautiful corals, and a huge variety of sponges." The long-nosed skate (Dipturus oxyrinchus) was seen for the rst time in the Levantine Sea, and observations of lantern shark (Etmopterus pusillus) marked the rst record of this species in the Mediterranean. These ndings should help in the declaration of the four identi ed deep-sea sites as MPAs.

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Figure 1-5 presents areas of conservation interest and their ranking based on the different surveys and studies conducted as part of by Deep-Sea Lebanon Project (2016).

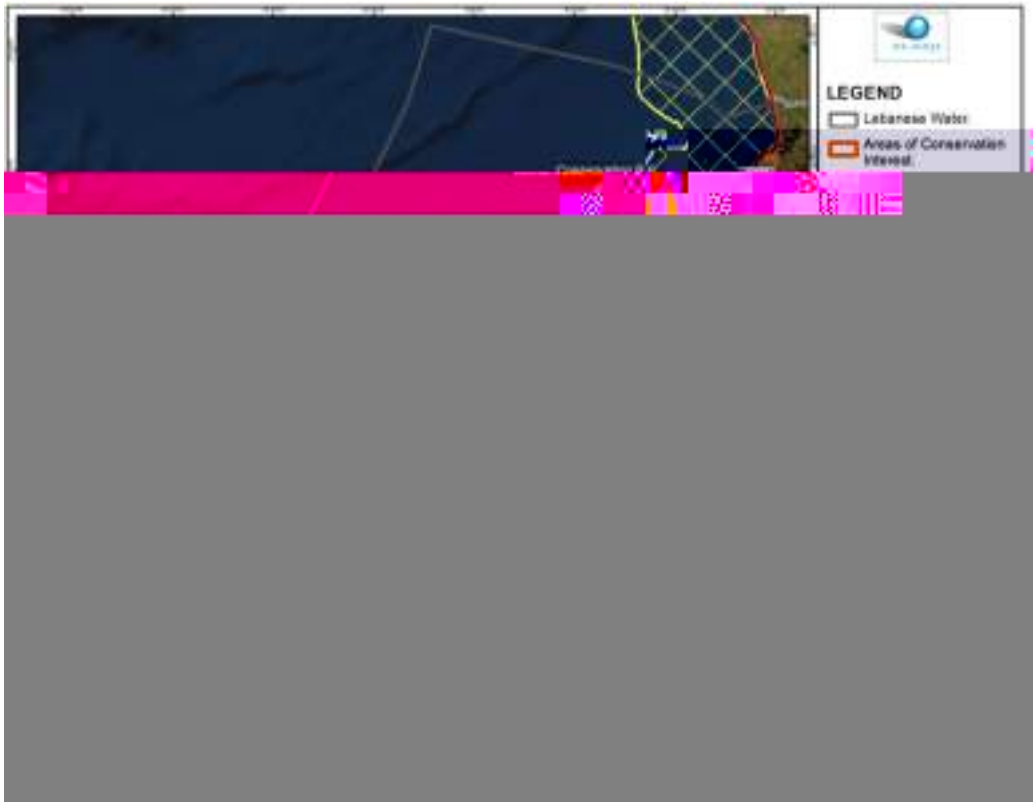


Figure 1-5 Areas of conservation interest
Source: Deep-Sea Lebanon Project (MoE, Oceana, CNRS, IUCN, SPA/RAC)

1.4 Project need and justi cation

The International Union for the Conservation of Nature, and in collaboration with the Ministry of Environment (MoE) is executing the project "Market policy and legislative development for mainstreaming sustainable management of marine and coastal ecosystems in Lebanon". The project, which is funded by the Global Environment Facility (GEF) and implemented by the United Nations Environment Program (UNEP), aims at creating an enabling integrated framework for sustainable management and conservation of coastal and marine biodiversity and at mainstreaming biodiversity priorities into national plans and coastal zone management plans.

The main activities of this project include: identi cation of threats to marine and coastal biodiversity in Lebanon, reviewing the existing policy and legislative tools, assessing the non-compliance causes, developing recommendations for legal reforms and law enforcement mechanisms, developing capacity building programs, as well as the identi cation of climate change impacts and adaptation measures. The Environmental Impact Assessment is one of the tools that aim at enhancing the biodiversity governance and provides an important entry point for biodiversity mainstreaming in development planning.

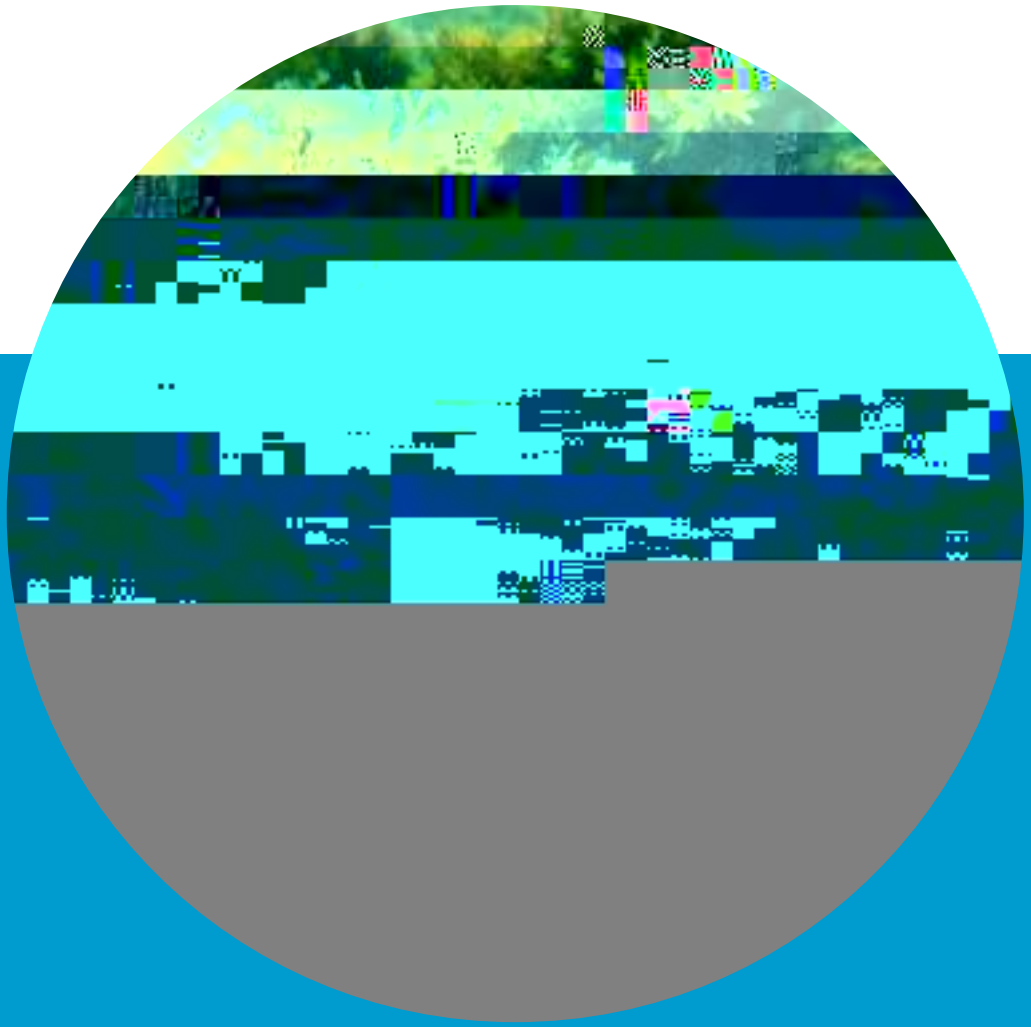
The project is working towards the development of these guidelines to enhance the capacity to mainstream biodiversity and sustainable management in EIA related to projects with potential impacts on coastal and marine biodiversity.

1.5 Purpose of the guidelines and checklist

All coastal development projects in Lebanon require an EIA. However, biodiversity has rarely been given speci c or appropriate consideration in the EIA process. The inclusion of biodiversity in EIA studies is a critical step forward in ensuring that necessary measures needed to protect biodiversity are applied in the process of development planning. The objective of this report is to create guidelines to speci cally address marine biodiversity inclusion, if/when applicable. This will strengthen the mechanisms for preventing biodiversity loss along the coastal zone through a more biodiversity-inclusive EIA process and an inspection checklist for monitoring implementation of the mitigation measures designed to prevent this loss.

This report will provide t-for-purpose guidelines to support EIA consultants in the development of robust biodiversity impact assessment and mitigation plans as part of coastal and marine developments, and MoE staff in reviewing the EIA studies and monitoring implementation of mitigation measures.

02.



2. Relevant legal framework

2.1 Introduction

This section presents an overview of main applicable legislation, standards and international treaties and agreements, national plans and strategies related to biodiversity. Further details can be found in Annex 1.

2.2 Relevant Lebanese regulations and standards

2.2.1 Synopsis of the legislative framework for Environmental Protection

An overview of the main environmental legislations in Lebanon applicable to development projects affecting coastal and marine ecosystems is presented below.

12. Decree No. 2275/2009, Organization and mandates of the MoE, its divisions and departments.

13. Decree No. 2366/2009, National Land Use Master Plan: It classi es lands and organizes the territory.

14. Decree No. 8633/2012, Environmental Impact Assessment: This decree sets forth the rules that shall be considered in the EIA of public and private projects to avoid potential adverse environmental impacts during the construction, operation and decommissioning of these projects.

15. Decree No. 8213/2012, Strategic Environmental Assessment in the public sector: This Decree aims at determining mandatory procedures to be followed for the assessment of potential environmental impacts of any policy, plan, programme, study, investment or organization proposal that tackles an entire Lebanese region or an activity sector, in order to ensure that these activities are compliant with conditions related to health, public safety, the protection of the environment and the sustainability of natural resources.

16. Decree No. 3989/2016, Environmental Police: Designation of an Environmental Police Department within the Ministry of Environment to regulate environmental crimes and enforce penalties; and speci cation of their organization and mandates.

17. MoE Decision 260/1 dated 2015, related to de ning the procedures for the review of IEE Reports.

18. MoE Decision 261/1dated 2015, related to de ning the procedures for the review of Scoping Reports (SRs) and EIA Reports.

19. MoE Decision 262/1/2015, related to de ning the procedures for ling and review of an objection on MoE Decisions related to EIAs.

20. MoE Decision No. 589/2015, related to de ning the procedures for the review of Strategic Environmental Assessment scoping reports (SEA scoping) and Strategic Environmental Assessment reports (SEA)

21. MoE Decision No. 189/2016, Review procedure for environmental audit studies.

2.2.2 Relevant national environmental standards

The main legislative texts that stipulate environmental standards in Lebanon are listed in Table 2-1.National emission and discharge standards were established by the MoE in Decision 52/1 dated 1996 and later updated and complemented in the Ministerial Decision 8/1 dated 2001.

Table 2-1 Relevant national environmental standards

Standard	Year	Relevent Provisions
MoE Decision No. 8/1	2001	National Standards for Environmental Quality (NSEQ) related to air contaminants and liquid waste emitted from classi ed establishments into receiving water bodies. Amends Decision 52-1/1996
Ministerial Decision No. 52/1, MoE	1996	National standards for environmental quality and environmental limit values for air, noise, water and soil, Amended by MoE Decision 8/1/2001.

These standards are currently being updated by MoE. Once this update is complete, these standards will replace Decisions 52/1 and 8/1 as the go-to reference.

2.3 International conventions, treaties and agreements

Lebanon has rati ed several conventions related to the protection of the environment and marine environmental resources. The conventions that are most relevant to development projects affecting coastal and marine ecosystems are listed below.

• The United Nations Convention on the Law of the Sea (UNCLOS)

• Barcelona convention and its following protocols:

1. 1976 Dumping Protocol
2. 1976 Emergency Protocol
3. 1980 Land-Based Sources Protocol
4. 1982 Specially Protected Areas Protocol (SPA) and 1994 SPA and Biodiversity Protocol
5. 2002 Emergency Protocol
6. 1995 Integrated Coastal Zone Management in the Mediterranean

• IMO MARPOL 73/78 and its annexes:

1. Annex I: Regulations for the prevention of pollution by oil
2. Annex II: Regulations for the control of pollution by noxious liquid substances in bulk
3. Annex III: Prevention of pollution by harmful substances carried by sea in packaged form
4. Annex IV: Prevention of pollution by sewage from ships
5. Annex V: Prevention of pollution by garbage from ships

• The Convention on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and Contiguous Atlantic-ACCOBAMS

• The Agreement on the conservation of African-Eurasian Migratory Water Birds (AEWA)

• The International Convention on the control of harmful anti-fouling systems on ships, 2001

• IMO Ballast Water Management Convention

• Basel convention on the control of trans-boundary movementseu/.1l1 <950784-ernational Convention on LtualText <FEFF000 Tw1.6a.41l1 <950784-ernational Convention on Ltu

• Rotterdam convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade

•Paris Agreement - Paris Climate Conference (COP21), part of the UNFCCC 2015

• United Nations Framework Convention on Climate Change (UNFCCC) treaty and the Kyoto Protocol

• Vienna convention for the protection of the ozone layer

• Montreal Protocol on substances that deplete the ozone layer and Copenhagen amendment

• UNESCO convention on the Protection of Cultural & Natural Heritage, 1972

• Convention on the Protection of the Underwater Cultural Heritage, 2001

• The Convention on Wetlands of International Importance (Ramsar)

• Convention on Biological Diversity (CBD)

• The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Bene ts Arising from their Utilization (ABS) to the Convention on Biological Diversity (CBD)

• Cartagena Protocol on biosafety

• Stockholm Convention on Persistent Organic Pollutants

• Sendai Framework of Action for Disaster Risk Reduction

• Minamata Convention on Mercury

• IMO International Convention on Civil Liability for oil pollution damage (CLC) (1969)

• IMO International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC)

• IMO International Convention on Civil Liability for Bunker Oil Pollution Damage (BUNKER)

• The International Convention relating to the Limitation of the Liability of Owners of Sea-Going Ships, and Protocol (Brussels, 1957); this convention was replaced by The IMO Convention on Limitation of Liability for Maritime Claims (LLMC),1976, but the LLMC has not been rati ed by Lebanon.

• Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

• Convention on Migratory Species (UNEP/CMS)

2.4 Plans, programmes and strategies

Main national plans, programmes or strategies that could have implications on development projects affecting coastal and marine ecosystems are presented in Table 2-2. It should be mentioned that this table is not exhaustive. It only includes the most relevant plans, programmes and strategies.

Table 2-2 Plans and strategies relevant to the development projects affecting coastal and marine ecosystems

#

03.

3. Guidelines on mainstreaming biodiversity conservation in the EIA process

3.1 EIA process

The guidelines in this report are speci c to marine and coastal development and follow the EIA structure as speci ed in Decree 8633/2012.The main steps of the EIA Implementation process in Lebanon are summarized in and discussed in following sub-sections.A summary of the biodiversity-inclusive EIA process described in these guidelines is provided in Figure 3-2.

Figure 3-1 Environmental Impact Assessment (EIA) process in Lebanon

Source: IUCN/CER, 2020

Biodiversity-inclusive screening phase

During the review of the screening form, MoE addresses a series of pertinent questions related to biodiversity:

If the answer to all of these questions is “No” → Biodiversity inclusion is not required

If the answer to at least one of these questions is “Yes” → Biodiversity inclusion is required

Biodiversity-inclusive scoping phase

If a biodiversity-inclusive EIA is required based on the screening phase decision above, the following sections shall be included in the scoping report:

- Biodiversity-inclusive project description
- Biodiversity baseline survey plan
  - Desk-based Assessment
  - Field reconnaissance
- Biodiversity-inclusive Impact Assessment Methodology
- Biodiversity-inclusive Stakeholder Engagement/Public Participation

Biodiversity-inclusive EIA phase

- Biodiversity baseline study

Field-based Assessment (habitat maps, surveys)
- Baseline Biological Environment
- Baseline Physical Environment

Stakeholder Engagement/Public Participation

Biodiversity-inclusive Impact Assessment

Analysis of Project Alternatives
- Avoidance
- Minimization
- Rehabilitation & restoration
- Biodiversity offsets
- No net loss

Environmental Management Plan

Monitoring

3.2 Screening phase

3.2.1 General requirements: current procedure

The first step of the EIA process is submitting the screening application by the project owner or a chosen consultancy firm from the CDR list directly to the MoE. In addition to the application, the owner has to write a cover letter addressing MoE, in case the consultancy firm is tasked with submitting the screening, the owner has to include in his cover letter the fact that he has assigned this consultancy firm to deal with the screening process, and the letter should be signed by an official notary.

The MoE verifies whether a project falls under Annex 1 or Annex 2 of the EIA Decree or is located in an area listed in Annex 3 and has a potential for causing significant impact on that area. The MoE tells the project owner/ consultancy firm of the classification decision typically within 15 days of the registration date of the screening application. However, deadlines for all the mentioned phases from screening to project approval could be put on hold and considered nonbinding in case of major events. Subsequently, project owners should wait for MoE's replies even past the official deadlines. For projects requiring an environmental study, classification is based on the following criteria:

- If the proposed project falls under Annex 1,it will be subject to an EIA;
- If the proposed project falls under Annex 2, it will be subject to an IEE;
- If the proposed project falls under Annex 2 and is located in an area listed in Annex 3 (Environmentally Sensitive Areas), or it may have a significant environmental impact on such areas, the project will be subject to an EIA study; or
- If the proposed project does not fall under Annex 1 or Annex 2, but is located in an area listed in Annex 3, or it may have a significant environmental impact on such areas, it will be subject to either an IEE or EIA.

Environmentally Sensitive Areas as per Annex 3 of Decree 8633/2012 include:

1. Areas classified, by virtue of laws or decrees,as specifically protected areas, or natural environment protected areas, or natural forests or wetlands or important areas of birds or public gardens or natural scenery sites or touristic and historic sites and/or archaeological locations or river banks or springs or holy places;
2. Areas that are home to endangered species (animal and plants);
3. Watersheds;
4. Sea beaches, river waterways, and springs;
5. Emiri land.

Additionally, the MoE, based on an informed review, may request an IEE or EIA study for the project, regardless of its classification.

According to the Lebanese EIA Decree (Decree No. 8633/2012), all coastal and marine projects require an EIA or IEE if located in Annex 3 Areas. The objective of these guidelines, especially during the screening phase, is to determine if the biodiversity-inclusion is also required.

3.2.2 Biodiversity-inclusive screening phase: recommendations

The screening mechanism seeks to identify the projects with potentially signi cant adverse effects on biodiversity components and ecosystem services. The outcome of the screening process is the development of a screening criteria and decision (whether or not the biodiversity inclusion is required in the EIA/IEE).

The screening criteria for biodiversity can be based on the following pertinent questions. If the answer to at least one of these questions is “yes,” then biodiversity inclusion is required:

If necessary, the Ministry of Environment can request that additional information regarding project activities be provided at this preliminary stage in order to address these questions and assess the need for a biodiversity-inclusive EIA.

3.3 Scoping phase

3.3.1 General requirements: current procedure

If the project requires an EIA study, then a scoping report must be prepared according to the requirements provided in Decree 8633/2012. The EIA scoping report shall be submitted to MoE.

For both, choice of evaluation parameters must consider space & time limits. Space mostly relates to the geographical location of the project and the surrounding habitats while time relates to the period of time the project will operate over.

It is highly recommended, if not required that monitoring of the project site starts at least one year before project construction to cover one full set of seasons and continue for three years after project completion. This will allow proper evaluation of project impacts and ecosystem response to the introduced stress (the project).

For pollution, impact indicators on ora & fauna should be devised. Plants and shell sh are usually chosen as biological indicators for being sedentary and for their ability to bio-concentrate chemicals. De ning and index organism is very useful as it offers the observer measurable signs of change.

Accordingly a thorough assessment of the impacted ecosystem is essential for environmental management plans to be effective.

Baseline marine ecological surveys for all habitats should include:

1. Habitat mapping
2. Benthic sampling for biota
3. Marine oral and faunal communities and their classi cation as per IUCN categories
4. Physical oceanography parameters
   - A. Bathymetry
   - B. Currents, waves, turbulence and mixing
   - C. Seawater sampling and testing:
     - Temperature, salinity, total suspended solids, pH, DO, BOD,COD, chlorophyll, turbidity
     - Microplastics
     - Ammonia, nitrates, and phosphates
     - Intestinal enterococci: fecal indicator parameters
     - Metals: lead, cadmium, chromium, mercury
     - Total petroleum hydrocarbons (TPH)
     - Polycyclic Aromatic Hydrocarbons (PAHs)
     - Other parameters as required and necessary (site dependent)
5. Sediment sampling:
   - Granulometry
   - Organic carbon
   - Calcium carbonate
   - Nitrogen
   - Microplastics
   - Phosphate
   - Intestinal enterococci: fecal indicator parameters
   - Metals: lead, cadmium, chromium, mercury
   - Total petroleum hydrocarbons (TPH)
   - Polycyclic Aromatic Hydrocarbons (PAHs)

Categories of biodiversity components that may be included are:

1. Habitats

As stated, the above parameters should be assessed for all habitat types. Nevertheless, more focused attention in the baseline must be paid to:

- Highly threatened or unique habitats;
- Habitats of signi cant importance to endangered or critically endangered species;
- Habitats of signi cant importance to endemic or geographically restricted species;
- Habitats supporting globally signi cant pelagic or demersal species; and
- Areas associated with key evolutionary processes.

- Period of time provided to carry-out the survey; and
- Availability of funds and associated human resources

1. Desk-based assessment

Desk-based assessment of existing information is a cost-effective means of developing an understanding of the marine ecology components including biodiversity components that fall within the required scope of the baseline studies.

Desk-based assessment serves as a scoping exercise to de ne and plan eld-based assessments. It is important to note that desk-based assessment should not replace actual eld work that should be intensi ed particularly where sensitive species and/or habitats are expected to be present.

In order to conduct the desk-based assessment, the project proponent should compile and evaluate available marine ecological information, including information on the distribution and abundance of biodiversity components identi ed in the scoping phase described above.

Annex 2 provides a list of some available sources for marine and coastal baseline data in Lebanon, however, it shall be emphasized that the list is not exhaustive.

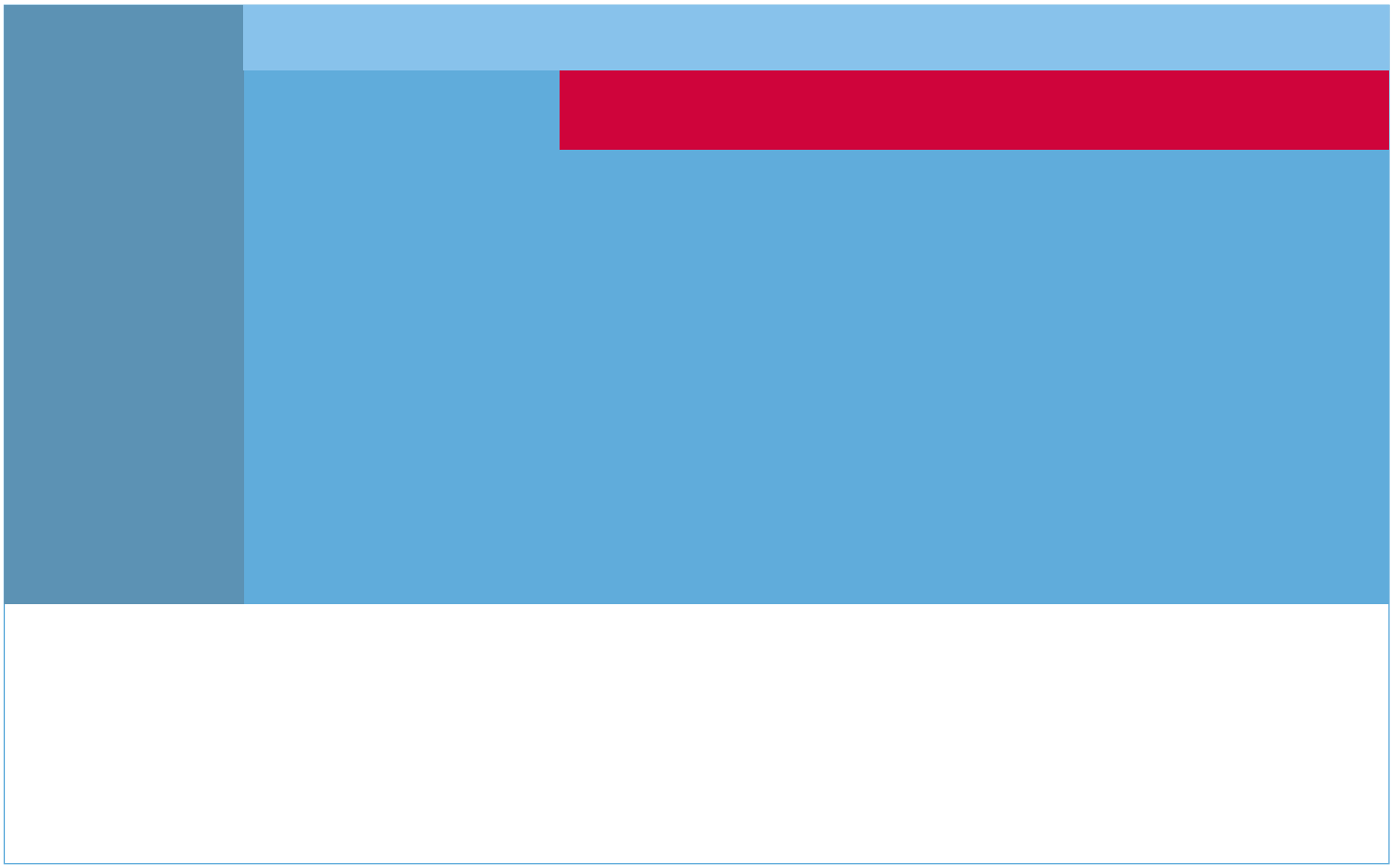
2. Field Reconnaissance

A reconnaissance visit to the study area shall be conducted during the scoping stage. Field reconnaissance is best suited for coastal (rather than marine) projects. The ways in which eld reconnaissance can support the baseline study include:

- Verifying the presence of biodiversity components that have been identi ed from possibly outdated desktop information;
- Re ning the baseline study area;
- Conducting preliminary meetings with local stakeholders to understand their priorities and concerns.

The earlier that potentially important biodiversity components can be identi ed and integrated into the baseline study, the better. Late detection of important biodiversity components can threaten the project schedule and reduce the effectiveness of mitigation planning.

It should be emphasized that the desk-based assessment and eld reconnaissance are tools to help develop the Baseline Survey Plan and do not replace the eld-based assessment. Table 3-1 provides a matrix for identi cation and preliminary assessment of project's impacts on biodiversity to help determine the level of baseline surveys required. It should be noted that the impact signi cance should consider the sensitivity of the biodiversity component expected to be affected.



Identifying the baseline study area

The Biodiversity Baseline Survey Plan should clearly establish the baseline study area. The baseline study area should encompass the project's area of in uence, or geographic area of anticipated project activities and impacts. It is good practice to expand the study area based on the distribution of biodiversity components across the landscape.

The rst step in identifying the project's area of in uence is to overlaying the project's footprint with spatial information of the landscape within which the project will be located. Sources of spatial information include Google Earth and other types of satellite imagery, aerial photos, and existing mapping products from government sources and elsewhere.

It should be noted that the baseline study area may change during the EIA process if additional information is needed to support impact assessment and mitigation planning, or to include control and benchmark sites to support long-term monitoring.

1. Project's area of in uence

It is good practice to take a comprehensive, precautionary approach (i.e. the maximum zone of in uence for the physical baseline environment should be anticipated) to de ning a project's area of in uence. The project area of in uence is generally larger than the physical footprint of the project, and includes the area within which a project may directly, indirectly, and cumulatively cause impacts to biodiversity.

The area of in uence may include the following, as appropriate:

2. Perceived project impacts

Stakeholder consultation may reveal perceived impacts from a project that are different than those indicated by science, or by similar experience elsewhere. It is good practice to document perceived impacts, even if they appear technically unfounded. Maintaining a discipline of respectfully acknowledging and analyzing these concerns will contribute towards building trust with stakeholders and ensuring a complete analysis. It may be appropriate that the baseline study area includes areas of stakeholder concern in order to con rm predictions of no impacts.

3. Spatial scales relevant to biodiversity

In some circumstances increasing the baseline study area will help to better understand the biodiversity context of the project. Following are cases where this may be useful:

- Distribution of biodiversity components: when the project may affect a biodiversity component that has a very limited distribution, it may be appropriate to include the entire occurrence of the component in the baseline assessment,particularly if the occurrence is very small, and/or if cumulative impacts are a concern.
- Proximity to areas of interest: when a project is near a nature reserve, spawning and nursery grounds, or threatened habitats (i.e. terraces hosting dendropoma species), these areas should be included in the baseline study area.
- Ecological function: it may be appropriate to expand the boundaries of the analysis to encompass a functionally de ned landscape.
- Migratory routes: for migratory species, it may be appropriate for the baseline study to consider other sites utilized by the species along its migratory route. In particular, understanding whether there are functionally equivalent sites outsideof the project area of in uence (for example, alternative stopover or staging sites for a migratory bird species) can help in impact assessment.
- In regions with poor existing knowledge: where little is known about biodiversity, wider landscape-scale surveys may be needed to help assess the signi cance of project impacts.

3.3.2.3 Impact Assessment Methodology

[Source: Total E&P Liban Sal, Block 4 (Lebanon) offshore exploration drilling EIA Report]

Based on the sensitivity of the environmental receptors and the intensity of the impact, the signi cance of the impacts can be assessed.

De nitions for scoring intensity and sensitivity are provided below.

- Impact Magnitude or Intensity

For each source of impact, the intensity of the effect shall be de ned according to the following criteria:

- The nature of the change (what is affected and how)
- Its size and scale
- Its geographical extent and distribution
- Its duration, frequency and reversibility
- Possible cumulative effects from other activities
- Outputs from modelling exercises

Although the scales and their description are prede ned, the assigned rating for each impact will be based on the judgment of a group of experts in the eld.

The intensity is then scored from 1 (very low) to 4 (high) based on de nitions of negative effects. A rating of 0 is also provided for bene cial
(positive) effects.

An example of a low magnitude impact to species biodiversity would be the disturbance of a local population or individuals of a species resulting in a decline in abundance or distribution over one or more generations, but that does not change the overall longevity or viability of the population of the species or populations of other dependent species.

Alternatively, a high magnitude impact would disturb a suf cient portion of the biogeographic population of a species and may cause a decline in abundance, distribution or size of the genetic pool such that natural recruitment could not return the population of the species, and other species dependent on it, to former levels.

Table 3-2 De nitions to assist with scoring the intensity of the impact

Score	Geographical extent	Duration	Environmental (physical and biological)
			• Bene cial impacts on habitats and species
			• Disturbance to the environment limited to the immediate area, with rapid recovery without intervention • Planned activity or accident causes disturbance to individuals of a species that is similar in effect to the random changes in population due to normal environmental variation • No discernible effect due to disruption of behaviour or species interactions of nationally/internationally important species of conservation concern • No protected areas affected Emissions and ef uent discharges do not breach licence limits, or national/international standards and have negligible impact due to rapid dilution and dispersion • Noise from project site is audible at receptor locations but would not contribute to an exceedance of project criteria • Spill or accidental event (onshore or marine) that causes immediate area damage only and can be restored to an equivalent capability in a period of days up to one month
			• Impacts on a unique habitat, or national scale, resulting in long-term damage and a restoration time of more than ve years and requiring substantial intervention • Activity or event disturbing a suf cient portion of the biogeographic population of a species to cause a change in abundance, distribution or size of genetic pool such that natural recruitment would not return the population of the species, and several species dependent on it, to former levels within several generations • Potential for large-scale pathological damage of nationally/internationally important species of conservation concern • Numerous non-compliances with emission and ef uent discharge licence limits, or national/ international standards • Environmental incident with potential for extensive ecological damage typically requiring mobilisation of in- country or international response resources • Noise levels from the proposed project site at receptors may contribute to an exceedance of project criteria dependent on cumulative noise levels, but does not exceed project criteria alone • Spill or accidental event (onshore or marine) leading to immediate area or localised damage to water resources or soil that may take up to

- Impacts on a unique habitat, or regional scale, resulting in medium term damage and a restoration time of several years that may require intervention
- Disturbance of a population of species resulting in a change of abundance over one or more generations, but that does not change the integrity of the population of the species, or populations of dependent species
- Potential for small-scale pathological damage of nationally/internationally important species of conservation concern
- Occasional non-compliances with emission and ef uent discharge licence limits or national/ international standards.
- Predicted noise levels from site plant at receptor

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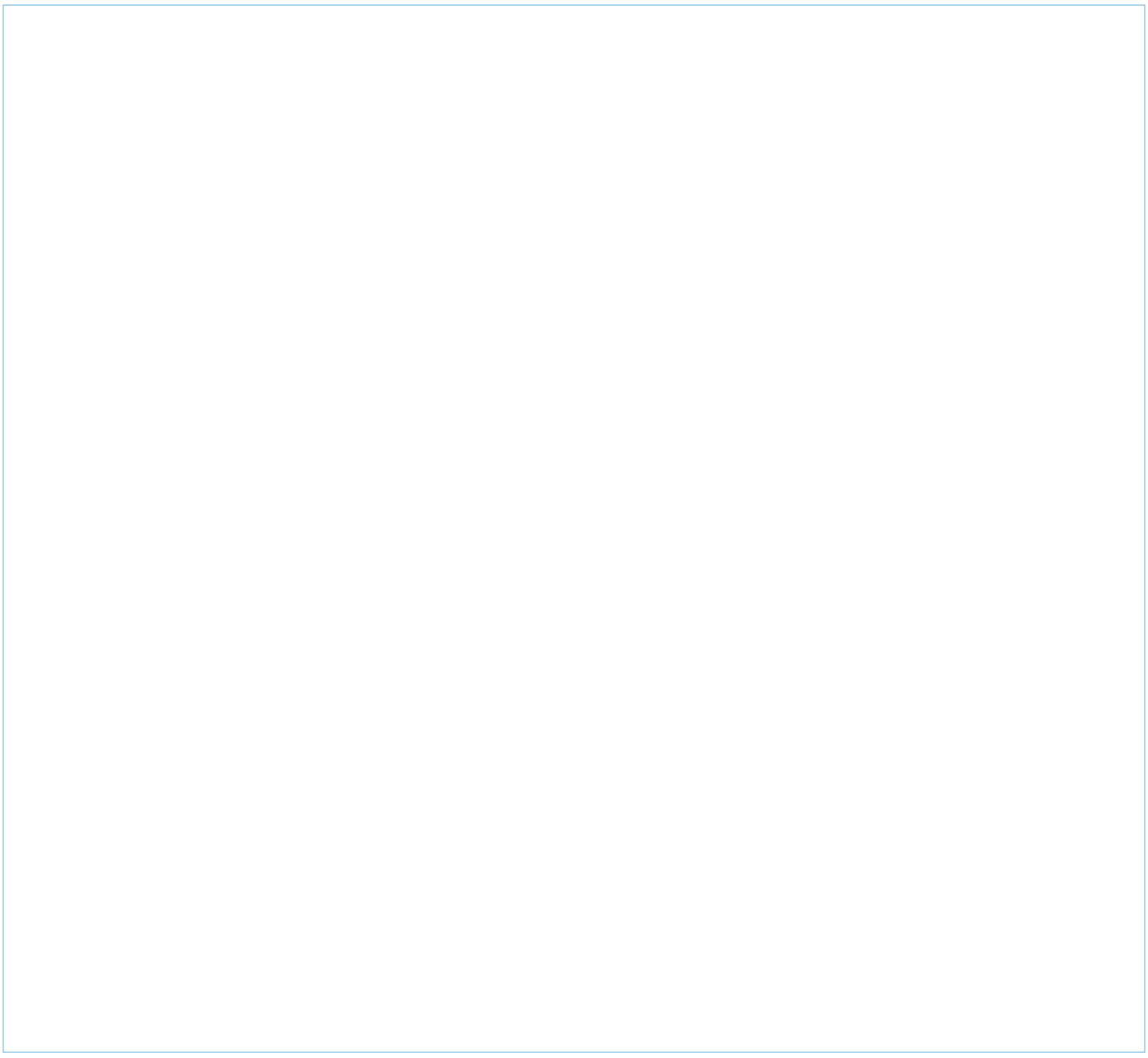

3.3.2.4 Stakeholder consultation and engagement

Involving relevant authorities and stakeholders at an early stage of the EIA will make it possible to capture the most important issues and establish a consistent approach to assessing impact and looking for solutions.

Engaging stakeholders allows a project to better characterize biodiversity components including ecosystem services in the baseline study area. Similarly, experts familiar with the study area can be of tremendous help in identifying biodiversity components that should be included in the scope of the biodiversity baseline study, ruling out others that are not likely to be present.

Making use of the knowledge and opinions of environmental authorities and stakeholders can also help to:

- Highlight potential areas of contention and areas of improvement in a timely andeffective way;
- Provide information on relevant forthcoming projects, policies and legislative or regulatoryreforms, other types of assessment that should be considered when analyzing evolving baseline trends;
- Collect suggestions for building biodiversity enhancement schemes into the proposed project from the very beginning.
- Draw a clearer picture of all the prospective projects in the area of in uence that could have a cumulative impact on the biodiversity

The project can reduce the risk of non-compliance by regularly consulting with key stakeholders. Best practice risk management involves ensuring that there is consensus among project stakeholders on biodiversity priorities and proposed survey methods.

With respect to biodiversity, relevant stakeholders (public institutions, research centers, academic institutions, private sector, NGOs, etc.) in the process are:

- Bene ciaries of the project – target groups making use of or putting a value to known ecosystem services which are purposely enhanced by the project;
- Affected people – those people who experience, as a result of the project, intended or unintended changes in ecosystem services that they value;

- Draw a clearer picture of all the prospective projects in the area of in uence that could have a cumulative impact on the biodiversity

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With respect to biodiversity, relevant stakeholders (public institutions, research centers, academic institutions, private sector, NGOs, etc.) in the process are:

- Bene ciaries of the project – target groups making use of or putting a value to known ecosystem services which are purposely enhanced by the project;
- Affected people – those people who experience, as a result of the project, intendedor unintended changes in ecosystem services that they value;
- General stakeholders – formal or informal institutions and groups representing either affected people or biodiversity itself.

3.3.2.5 Quali cations of biodiversity experts

The scoping report should include the pro les and CVs of the biodiversity experts who will be conducting the eld surveys and impact assessment. The team's quali cations should cover all biodiversity components scoped in the assessment.

3.4 Enviromental impact assessment phase

3.4.1 General Requirements: Current Procedure

- EIA report

The EIA Report shall comply with the Scoping Report approved by the MoE and shall consider any other impact not mentioned in the Scoping Report but noted during the EIA stage.

The EIA Report shall be submitted to the MoE. The MoE shall review the EIA Report and check its conformity with the approved Scoping Report within two months from the date of registration at MoE. Comments submitted from the MoE on the EIA Report must be addressed and the revised report must be submitted to the MoE for approval.

If the Ministry does not respond within the time limit prescribed above (two months), the project proponent may consider the EIA Report approved. Unless there are major events that might cause delays with the MoE replies, as mentioned before, then the client should wait for the MoE's replies past the of cial deadlines.

The position of the MoE on the EIA Report could be an approval, a conditional approval or a rejection with explanation. The Ministry's position shall be communicated to the project proponent and will be made available to the public and the concerned stakeholders.

The public and the concerned stakeholders have the right to access the summaries and the EMP- mitigation chapters in the approved EIA Report in addition to MoE related reports, except for any information pertaining to patent or con dential information for the project proponent.

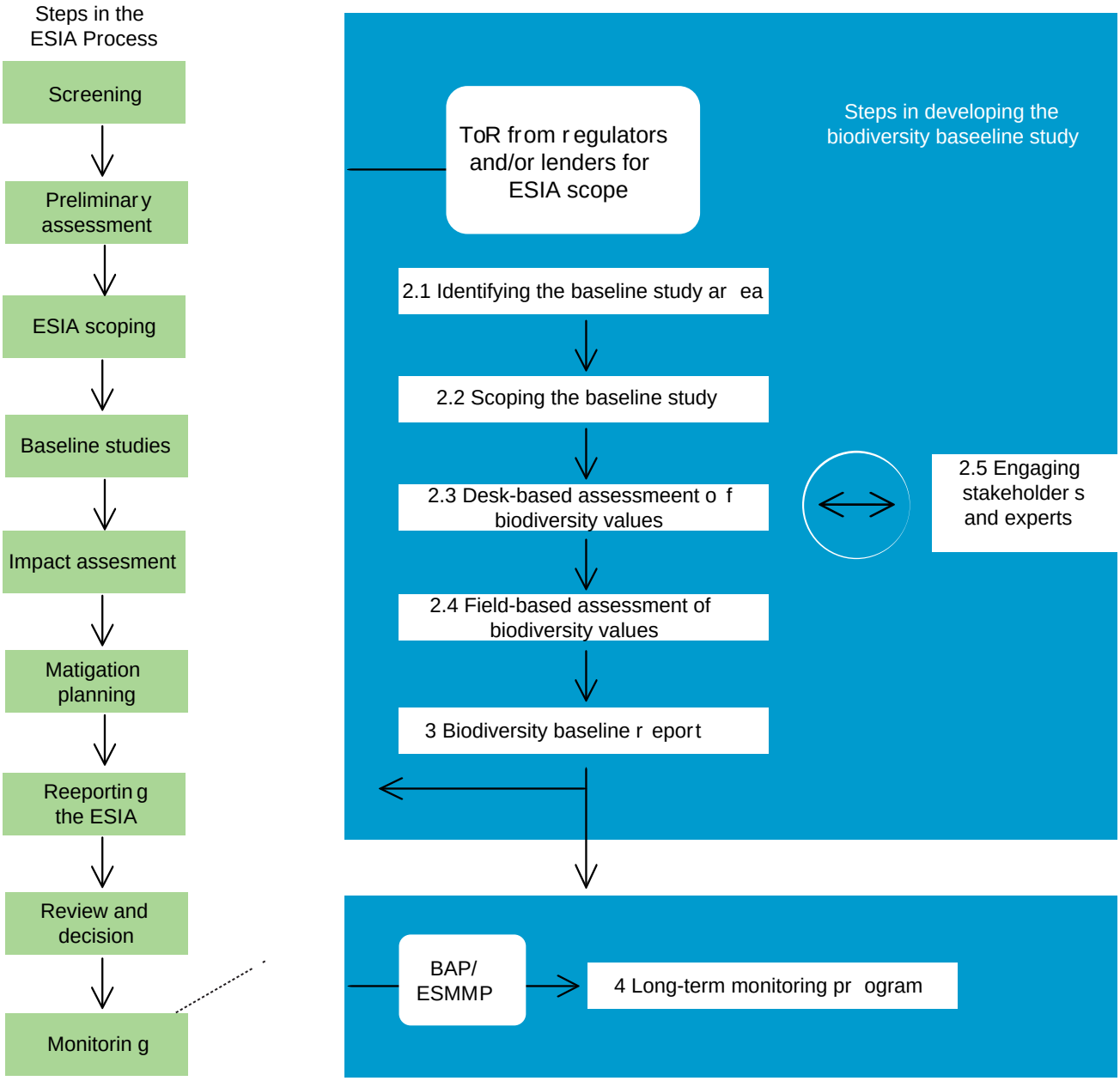
3.4.2 Biodiversity-inclusive impact assessment phase: Recommendations

If a biodiversity-inclusive EIA is required based on the screening phase, the following shall be included in its relevant subsection of the EIA Report.

3.4.2.1 Biodiversity baseline study

Following the approval of the Biodiversity Baseline Survey Plan developed during the scoping phase, the implementation of the Biodiversity Baseline Study is completed during the EIA phase.

Figure 3-3 describes the steps involved in a biodiversity baseline study. Whether a project must follow all these steps will depend on the biodiversity components present at the project site, the sensitivity of these components to potential project impacts, as well as regulatory requirements.

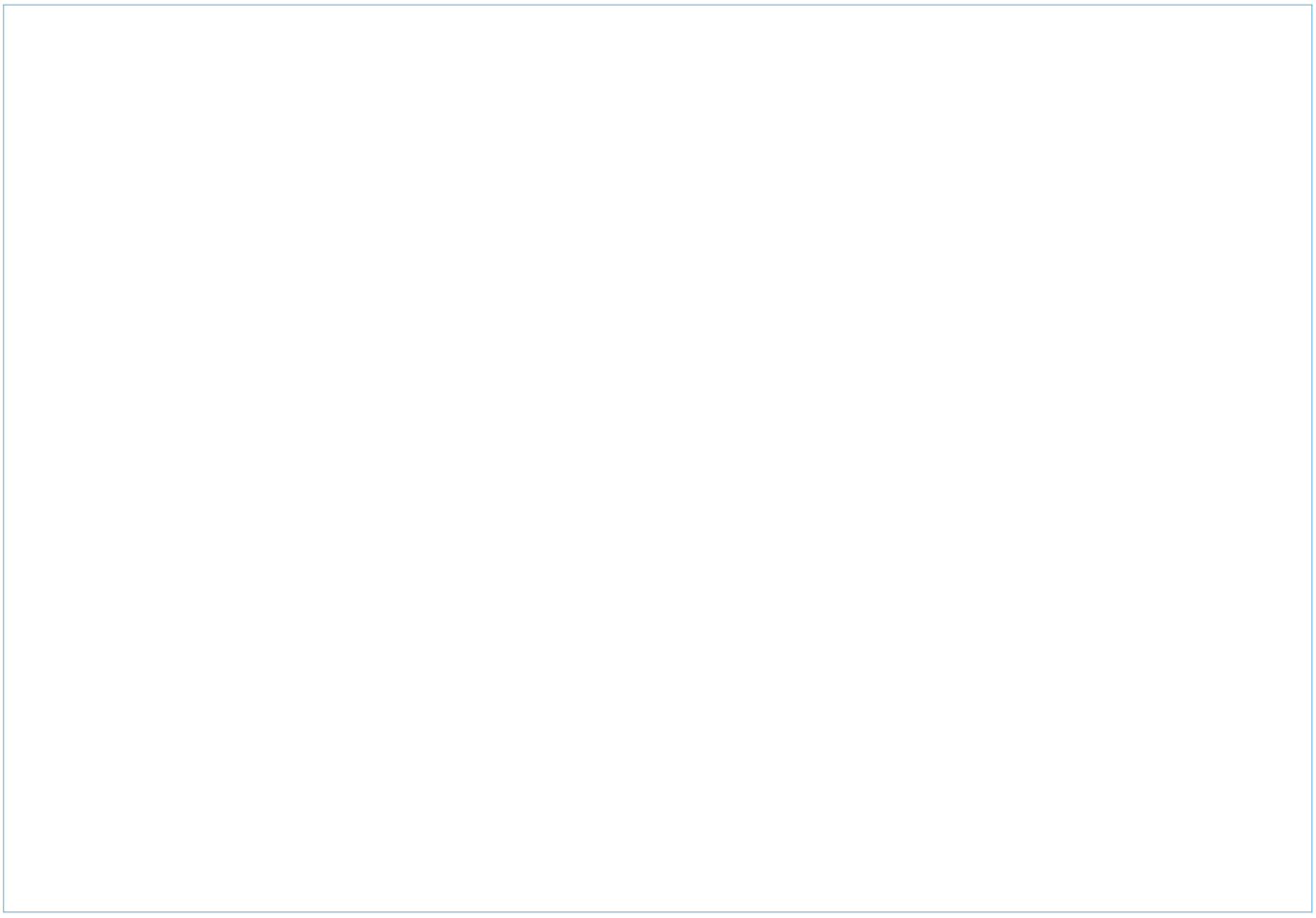

Steps in the ESIA Process
Screening
Preliminary assessment
ESIA scoping
Baseline studies
Impact assesment
Matigation planning
Reeporting the ESIA
Review and decision
Monitoring
ToR from regulators and/or lenders for ESIA scope
Steps in developing the biodiversity baseeline study
2.1 Identifying the baseline study area
2.2 Scoping the baseline study
2.3 Desk-based assessmeent of biodiversity values
2.4 Field-based assessment of biodiversity values
2.5 Engaging stakeholders and experts
3 Biodiversity baseline report
BAP/ ESMMP
4 Long-term monitoring program

3.4.2.1.1 Field-based assessment

The following is an overview of some key issues associated with the design of eld-based assessments and choices of methodologies. It is worth emphasizing the importance of engaging appropriate experts throughout the eld-based assessment, either through

Table 3-6 Parameters in the baseline study of different species and related investigation methods

Species		Parameters	Optional investigation methods
Pelagic communities	Phytoplankton	- Species composition - Species distribution - Species abundance - Biomass	• Manual sampling with plankton nets and samplers from ship/boat • Ship-of-opportunity sampling (unattended recording and sampling on ferries and other commercial ships with regular schedules) • Remote sensing
	Zooplankton, pelagic shes, cephalopods, marine mammals		
Benthic communities	Infauna	- Species' number and composition - Species' abundancee - Biomass	• Grab sampling • Quantitative and qualitative sampling by scuba divers • Statistical analyses (community analysis, spatial analysis)
	Epifauna		• Video survey • Sampling by scuba divers • Statistical analyses (communityanalysis, spatial analysis) • Modelling
	Phytobenthos	- Species' number and composition - Coverage - Biomass	• Video survey • Quantitative and qualitative sampling by scuba divers • Community analysis, spatial analysis,modelling
	Benthic habitats	- Distribution and main characteristics of habitats	• Video survey • Sampling by scuba divers • Spatial modelling
Fish	Demersal sh	- Observed species and abundance - Biomass - Dominance ratios	• Bottom-set gill net shing • Otter trawl shing • Stomach analyses of predatory sh (to identify small sh species that cannot be caught with gill nets)
	Pelagic sh		• Hydro acoustics • Pelagic (mid-water) trawling • Vertical gillnets • Fish counts through remote operated vehicles or autonomous underwater vehicles, video and/or divers.
	Recruitment processes	Spawning migration routes - Spawning grounds and related biological processes - Nursery areas and related biological processes	• Video tracking • Telemetry • For sh eggs: diving surveys, surveys using arti cial spawning substrates
		- Fish larvae	• Manual sampling with planktonnets and samplers from ship/boat
Birds	Sea birds	- Distribution and abundance in the project area and vicinity - Numbers of all ying and swimming individuals - Age and sex distribution	• Ship transect surveys • Aerial transect surveys • Aerial photography
	Migratory birds	- Flight direction and intensities at various altitude gradients (100 m steps) up to 1,000 m	• Radar surveys • Visual observations
Marine mammals	Seals, whales, dolphins	- Habitat use	• Remote sensing: tagging and tracking seals with telemetry devices that enable to obtain information on dive pro les and foraging trips of marine mammals as well as oceanographic data
		- Abundance and distribution	• Aerial surveys during breeding and moulting season • Aerial photography



3.4.2.3 Biodiversity-inclusive impacts assessment

The EIA should assess impacts of project activities during construction, operations, and decommission phases. This should be inclusive of the infrastructure and the incremental transportation and energy infrastructure required to support the project. The main marine biodiversity impacts (either directly caused by the project or indirectly caused by activities linked to the project) could include:

Impact type	Impact
Habitat loss/degradation	- Benthic habitat degradation - Benthic habitat loss - Pelagic habitat degradation - Pelagic habitat loss - Seabed erosion - Coastal erosion - Reduction in productivity, anaerobic/azoic conditions - Intertidal habitat destruction/degradation - Dune system habitat destruction/degradation
Habitat disturbance	- Habitat disturbance/turbulence - Disturbance of current, sediment and temperature regimes - Disturbance in wave patterns and distribution of wave energy - Electromagnetic disturbance - Increased vessel activity
Habitat avoidance	- Habitat displacement - Migration interference - Spawning, nursery and feeding grounds
Species mortality	- Displacement of shing effort and con ict with shing - Bycatch/entanglement - Submergence - Extinction rare/endemic species - Climate Change - Pollution
Non-indigenous species	- Introduction of alien species from ballast and biofouling - pests, pathogens, competitors, predators - Genetic dilution
Contaminants	- Contamination from seabed sediment disturbance - Water pollution and bioaccumulation - oil, chemical, rubbish, waste, heavy metals, antibiotics - Air pollution - Eutrophication
Noise	- Noise - above water - Noise - below water
Light	- Light pollution - arti cial lights - Water turbidity
Collisions	- Collisions (sea birds) - Collisions (marine mammals)
Positive impacts	- Habitat creation - Shelter - Knowledge of poorly studied ecosystems - Increasing productivity of nutrient poor area

A list of potential environmental impacts/aspects to marine biodiversity from different types of marine and coastal projects is provided in Table 3-12. Potential impacts are those that could occur in the absence of management within the project's area of in uence. It should be noted that other impacts may arise depending on the project's activities and location.

Activities/ Sources of Impact	Potential effects
Shipping noise	Low-intensity sounds can cause masking and behavioural disruptions May cause hearing loss and reduce animals' ability to rely on hearing for locating and capturing prey, and for detecting and avoiding predators
Anchoring	Damaging the benthic environment by uprooting plants, leading to reduced shoot density and bed cover Anchoring on rocky bottoms poses a threat to assemblages of infralittoral algae and sensitive species that are associated with such habitat types
Ships navigating in shallow water areas	Stir up sediments from soft bottoms Alteration in the physical and chemical characteristics of the water column and, ultimately, to potential adverse impacts
Antifouling biocides	Affecting non-target biota, especially in harbours and marinas with high vessel density and restricted water circulation
Collisions	
Accidental oil spills	
Construction works	Increasing turbidity, total suspended solids and other water quality values Burying of habitats Changes in current and wave regimes Disturbance of nutrient ow Erosion of beaches
Operation of the land ll	Decreasing in the population of planktons, benthic ora and fauna Less oxygen for the macro-benthic fauna
Construction works and pipeline installations	Habitat loss or destruction
Clearance activities and vehicular transport during construction	Habitat loss or destruction and vegetation loss
Destruction of terrestrial vegetation	Mortality of individuals Loss of individuals through emigration
Habitat removal and/or introduction of barriers	
Oil spills and solid waste generation	Altered abiotic/site fac and otherr7
Wastewater leakages	
Reduction of uncontrolled wastewater discharges	Positive impact
Physical removal of sea bed material	Removal of benthic animals living in/on sediments leading to their entrainment. Reversibility of impact depends on type of marine species and communities The recovery of disturbed habitats following dredging depends upon the nature of the new sediment at the dredge site, sources and types of re-colonizing animals, and the extent of the disturbance Conversion of shallow subtidal to deeper subtidal habitats as a cumulative effect resulting from maintenance dredging
Disposal of dredged materials, Sediment suspension and increased turbidity level	Disposal of non-contaminated ne material leads to sediment suspension and increase in turbidity level. This would impact lter feeding organisms, such as shell sh, through clogging of gills and damaging feeding and breathing equipment, leading to sh fatalities. The severity increases with release of organic nutrients attracting larger sh, which ultimately would suffer the same fate Increases in turbidity also lead to decreases in rates of photosynthesis (absence of light penetrating the water column)

Activities/ Sources of Impact	Potential effects
Release of organic matter, nutrients and contaminated sediments	Release of organic rich sediments during dredging or disposal/re- suspension would result in localized oxygen (O2) removal from the surrounding water leading
Release of dredged material during disposal	
Discharges from ships	
Spills of oils, lubricants, fuels and other oily liquids	
Cargo handling and storage	
Discharge from waterfront industries	
Deposition/ accumulation of organic matter	
Inorganic deposition	
Altered water column nutrient and suspended solid concentrations	
Farm structures and the use of heavy machinery and boats	
Introduction of non-endemic species and exotic pathogens	

Activities/ Sources of Impact	Potential effects
Translocation of exotic pathogens	Potential reduction in species abundance and diversity resulting from intolerance of endemic species to exotic pathogens
Chemicals	Potential bio-accumulation of contaminants, particularly for lter feeding organisms
Marine Debris	Local smothering and loss of benthic habitat Mortality or impacts on health through ingestion of, or entanglement in, debris
Organic deposition (i.e. faeces and excess sh food)	Smothering and light reduction Altered sediment chemistry, including oxygen depletion and production of toxic gases
Nutrient discharge	Potential contamination with micro-algal biotoxins during bloom events caused by increased nutrient levels Loss or reduced coverage due to growth of epiphytic algae and phytoplankton blooms Smothering through growth of nuisance algae, resulting in reduced diversity and loss of some native species Altered species composition and abundance of microalgae due to blooms Avoidance and attraction responses, a result of modi ed food sources, leading to altered population distribution
Antibiotics	Antibiotic resistance in sediment bacteria and non-target organisms
Disease	Spread of disease, potential loss of diversity and abundance
Chemicals	Bio-accumulation and possible mortality through toxic effects Lethal and sub-lethal effects resulting in alterations to species diversity and composition Bio-accumulation, avoidance responses and changes in distribution patterns Bio-accumulation in tissues
Introduction of exotic species	Reductions in native stocks Genetic contamination of wild stocks
Marine Debris	Impact of debris through ingestion or entanglement
Predator control	Entanglement, resulting in injury and potentially death
Disposal of dead sh to land ll	Oiling of feathers of sea birds and ingestion of oil, leading to poor health or death
Farm infrastructure and machinery	Altered communities through habitat modi cation and disturbance - Physical disturbance of sediment and shading effects of structures - Possible behavioural responses to farm disturbance resulting in altered distributions
Land clearing, earthmoving, terrain shaping	- Modi cation of drainage patterns - Increased run-off due to soil compaction and changes in vegetation cover - Modi cation of stream and rivers due to crossings - Run-off carrying sediments and associate contaminants - Wetland destruction - Run-off carrying sediments and associated contaminants - Poisoning via contamination of waste and spills and leaks of hazardous materials - Reductions in species and habitats
Construction and landscaping of onsite facilities, structures and buildings	- Increased run-off due to soil compaction and changes in vegetable cover - Run-off carrying sediments and associated contaminants
Construction and/or upgrade of access roads. Construction of power line connections	-
Camp operation	- Increased collecting, hunting and shing (food for workers)

Activities/ Sources of Impact	Potential effects
Solid and human waste disposal	- Water quality degradation from discharges and leaching - Run-off carrying associated contaminants
Fuel and chemical storage and handling	- Contamination from spills and leaks
Transportation	- Contamination from spills and leaks
Existence of structures	- Accidental releases of insulating uids
Dams for cooling ponds	Individuals killed, damaged or entrapped by intake structures, cooling systems or turbines
Cooling systems	- Disposal of material dredged from ponds or removed from cooling towers - Discharges of cooling tower - Habitat alteration from discharges of cooling tower
On-site equipment	Disruption and dislocation of local and/or migratory wildlife, including disturbance of migratory corridors and breeding, spawning, nesting and calving areasoD (DisturSoil comp2fes of cof.05) Tjloss of hauman f Q Q7ingsoadsges andi
Maintenance	
Fuel washing and preparation	
Fuel combustion	
Solid and human waste disposal	
Fuel and chemical storage and handling	
Existence of structures	
Removal or decommissioning of structures and buildings	
Release of waste water to the sea	
Soil compaction, erosion	
Destruction of vegetation	
Disturbance or loss of habitat	
Habitat removal and/or introduction of barriers like roads	
Construction noise, traf c, or presence of people	
Soil contamination due to disposal of oils and hazardous material	

Activities/ Sources of Impact	Potential effects
Physical removal of sea bed	- Removal of material from sea bed: this causes the removal of benthic animals living in/on sediments leading to their entrainment - Reversibility of impact depends on type of marine species and communities - The recovery of disturbed habitats following dredging depends upon the nature of the new sediment at the dredge site, sources and types of re-colonizing animals, and the extent of the disturbance - Conversion of shallow subtidal to deeper subtidal habitats as a cumulative effect resulting from maintenance dredging
Sedimentation and turbidity	- Suspension/re-suspension of non-contaminated ne material leads to sediment suspension and increase in turbidity level. This would impact all marine organisms including lter feeding organisms, such as shell sh, through clogging of gills and damaging feeding and breathing organs, leading to fatalities. The severity increases with release of organic nutrients attracting large sh, which ultimately would suffer the same fate. - Increases in turbidity also lead to decreases in rates of photosynthesis (absence of light penetrating the water column)
Contaminated sediments	- Heavy metals, oil, and Polychlorinated Byphenyls locked into the seabed sediments in ports and harbors are released into the water column. - Contaminants are taken up by animals and plants (if any), with the potential to cause contamination and/or poisoning. Repercussions on marine fauna include morphological and reproductive disorders. - Bioaccumulation of heavy metals and other petroleum-based contamination released from contaminated sediments - Resulting contamination also causes increases in siltation, hence damaging benthic animals and plants. This in turns causes stress, reduced rates of growth and/or reproduction and even fatalities.
Solid and liquid waste generation	- Direct contamination (i.e. improper disposal)
Discharge of cooling water	- The differences in temperature between the discharge water and seawater may cause localized thermal changes that may negatively affect marine ecology.
Accidental spills of fuels, oil and chemicals	- Anticipation on sediment and water quality
Offshore exploration drilling	
Mobilisation, installation, plug and abandonment and demobilisation	- Physical disturbance of sediments, benthic communities and sensitive seabed habitats.
Well Drilling - discharge of cuttings and uids (Water based drilling uid)	- Burial or smothering of benthic communities - Oxygen depletion in sediments - Changes to sediment structure and quality - Changes to water quality - Potential for toxicity or bioaccumulation effects - Potential for indirect effects on sh - Potential for direct and indirect effects on sensitive seabed habitats
Discharge of waste and wastewater from MODU (Mobile offshore drilling unit) and support / supply vessels	- Reduction in water quality - Effects on plankton and sh
Uplift and discharge of cooling water and produced water	- Reduction in water quality/ temperature effects - Potential impacts on plankton and sh
Discharge of ballast from MODU and support/ supply vessels	- Potential for introduction of non-indigenous species in ballast water and fouling, with knock-on effects to rest of marine ecosystem (secondary impacts)
Underwater noise from vertical seismic pro le (VSP) activities	- Potential for injury / hearing loss, alteration of behaviour, auditory masking, effects on zone of audibility (Cetaceans turtles and seals and Nekton (sh))
Underwater noise from MODU and support / supply vessel operations	- Potential for injury / hearing loss, alteration of behaviour, auditory masking, effects on zone of audibility (Cetaceans turtles and seals and Nekton (sh))

Activities/ Sources of Impact	Potential effects
Light from MODU	- Attraction of seabirds, turtles and larger marine fauna to night time lighting - Potential for disorientation, collision with structures - Positive impacts associated with temporary refuge effects for migratory birds
Logistics base operation - discharge of drainage water	- Local effect on water quality
Logistics base operation – noise generation	- Disturbance of fauna in vicinity of logistics base
Helicopter transfers to Airport	
Dropped Object from MODU (lifting)	
Loss of chemical containment on- board MODU	
Radioactive source lost in hole	
Riser rupture, release of drilling uid to sea	
Shallow gas blowout, release of gas into water column during riserless operations	
Blowout – release of condensate and gas	
Collision of third-party ship with MODU – release of third-party fuel inventory, possible damage to MODU and riser	
Helicopter crash on MODU deck – release of aviation fuel to sea	
Loss of containment during offshore materials transfer to MODU – release of drilling uids or marine diesel to sea	
Loss of rig stability (rig capsize) with release of fuel inventory	
Earthquake resulting in loss of well integrity and release of hydrocarbons to sea	

3.4.2.4 Biodiversity-inclusive analysis of project alternatives phase

Alternatives related to biodiversity that should be considered, as applicable, in the EIA include:

Change the physical layout/design of the project's facilities to avoid impacting certain biodiversity components, such as irreplaceable habitats;

Restore degraded ecosystems on the site to enhance ecosystem services;

Use an ecosystem services approach and green infrastructure;

Introduce design alternatives to avoid adverse effects on marine species;

Consider timing of construction, maintenance and decommissioning; or

Deliver smart conservation that can contribute to species diversity.

3.4.2.5 Biodiversity-inclusive environmental management plan phase

3.4.2.5.1 Biodiversity mitigation measures

The purpose of this section is to describe the process for developing a management plan for biodiversity impacts. Here management is de ned as any action that corresponds to the four elements of the mitigation hierarchy, as described below and shown in Figure 3-4.

The mitigation hierarchy can be viewed as a prioritized set of possible management responses to anticipated impacts. Where feasible, avoidance and minimization are preferable to rehabilitation/restoration and offsets because they maintain biodiversity components that may be dif cult or costly to replace, or in some cases cannot withstand impacts and remain viable in the project area of in uence or beyond. Avoiding or minimizing an impact can reduce the project's biological, social, and nancial liabilities.

Biodiversity Mitigation Hierarchy
(Adapted from Rio Tinto Biodiversity Strategy)

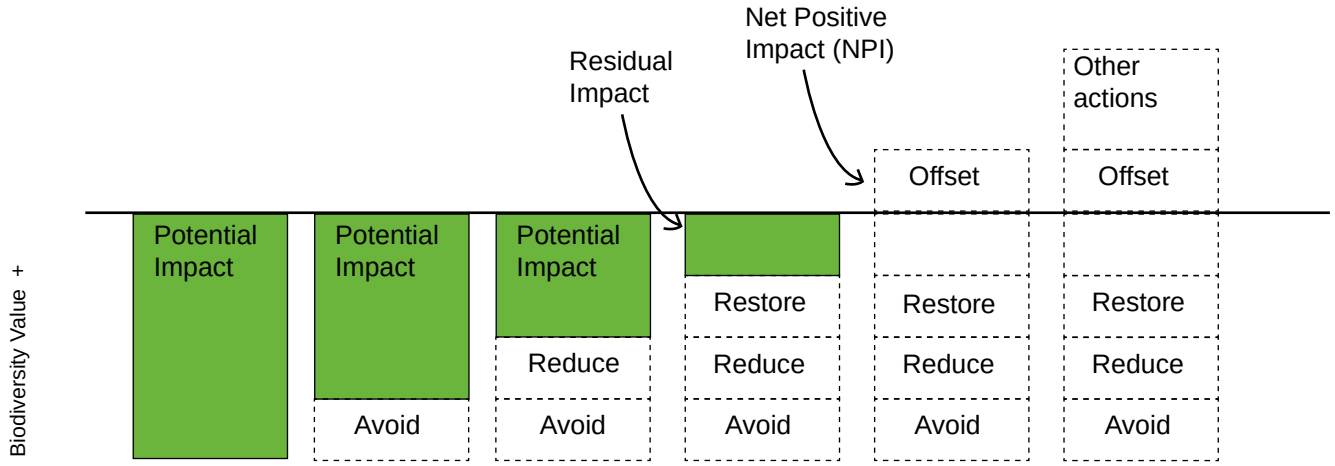


Figure 3-4 Graphical depiction of the mitigation hierarchy [3]

Source: Hardner et al., 2015

1. Avoidance:

"Avoidance" prevents damaging actions before they take place. Avoidance often involves a decision to deviate from the business-as-usual project development path, and should be taken into consideration during the analysis of alternatives as mentioned in Section 3.4.2.4.

The rationale for employing avoidance may include ecological, economic, regulatory and reputational reasons. Avoidance should be considered where there are biodiversity components that are: especially vulnerable and irreplaceable; of particular concern to stakeholders; or where a cautious approach is warranted due to uncertainty in impact assessment or the ef cacy of management measures.

[3] The x-axis does not represent time in the project lifecycle, but rather the sequence in which categories of mitigation are considered when planning management. The metric used to measure change in biodiversity value (e.g., hectares of habitat) is shown on the y-axis.

3. Rehabilitation and restoration:

In cases where a project's activities occur for only a speci c period of time, there may be an opportunity to rehabilitate or even restore biodiversity components on the impacted site.

There may also be situations where some damage to biodiversity is unavoidable, ma3n 0 r418(estor)1ion an ev TJ 0.1428Tw T* [(r)18(ehamediion anness)]ary. er

Both no net loss and NPI are biodiversity status goals for development projects, where biodiversity gains either negate (no net loss) or outweigh (NPI) negative project impacts.

The International Finance Corporation's Performance Standard 6 (PS6) de nes it as follows: "The point at which project-related impacts on biodiversity are balanced by measures taken to avoid and minimize the project's impacts, to undertake on-site restoration and nally to offset signi cant residual impacts, if

3.4.2.5.2 No net loss

No net loss de nition:

No net loss of biodiversity is inextricably linked with both net positive impact (NPI), sometimes referred to as 'net gain', and the often-controversial idea of biodiversity offsetting.

- Implementation of “No Net Loss” of biodiversity

Achieving No Net Loss (NNL) and Net Gain (NG) requires quantifying both the losses of biodiversity caused by a development project and the associated gains (including biodiversity offsets) through implementation of the mitigation hierarchy, in order to demonstrate that overall gains in biodiversity are equal to (NNL), or greater than (NG), the losses. Losses caused by development projects might be direct or indirect, and cumulative with other development projects; and losses and gains include both those that are expected (as a result of project design) and those that are unexpected. It is emphasized that conservation ‘gains’ under biodiversity NNL/NG primarily compensate for losses, such that they do not represent absolute gains for conservation.

Offsetting residual biodiversity impacts, after all other impacts have been avoided, minimized, and restored, require practitioners to deal with a number of different factors. Offset multipliers, where a policy requires the offset of more than one biodiversity unit per unit impacted, are designed to address these. Offset multipliers can be used to deal with the achievement of conservation goals (so-called ‘end- game’ multipliers, where a multiplier is used to support no net loss or net gain); e.g. offsets for certain endangered species require larger offset ratios than for others, or to address social equity and distribution problems (Rayment et al., 2014). Offset multipliers can also be used to address lack of good quality data, the inherent uncertainty of ecological restoration or creation, and the complications of temporary loss of habitat while the offset site is created (Gardner et al., 2013; Pilgrim and Ekstrom, 2014; Tucker et al., 2014).

3.4.2.6 Biodiversity-inclusive monitoring phase

3.4.2.6.1 Overview

Monitoring and auditing are used to see what actually occurs after project implementation has started and whether the proponent is compliant with the environmental management plan (EMP) at the construction, operation and decommissioning stages. Management systems and programmes, including clear management targets and appropriate monitoring, should be set in place to ensure that mitigation is effectively implemented, unforeseen negative effects or trends are detected and addressed, and expected bene ts/positive developments are achieved as the project proceeds. Provision should be made for emergency response measures and/or contingency plans where accidents could threaten biodiversity.

Monitoring and evaluation focused on the counting of species and measuring of surface areas only does not provide suf cient information. Understanding and monitoring the mechanisms behind these changes leads to better understanding of the effects of the intervention and the actual results of mitigation and/or compensation.

The results of monitoring provide information for periodic review and alteration of environmental management plans, and for optimizing environmental protection through good practice at all stages of the project. Biodiversity data generated by environmental impact assessment should be made accessible and useable by others and should be linked to biodiversity assessment processes being designed and carried out under the Convention on
Biological Diversity.

According to the International Finance Corporation’s Guidance Note 6, long-term biodiversity monitoring may be required to validate the accuracy of predicted impacts and risks to biodiversity components posed by the project, and the predicted effectiveness of biodiversity management actions. The monitoring and evaluation programme should include the following: (i) baseline, measures of the status of biodiversity components prior to the project’s impacts; (ii) process, monitoring of the implementation of mitigation measures and management controls; and (iii) outcomes, monitoring of the status of biodiversity components during the life of the project, compared to the baseline. In addition, clients should consider controls, monitoring in comparable areas where project impacts are not occurring to detect effects unrelated to project impacts. The client is expected to develop a practical set of indicators (metrics) for the biodiversity components requiring mitigation and management. Indicators and sampling design should be selected on the basis of utility, that is, their ability to inform decisions about mitigation and management, and effectiveness, their ability to measure effects with adequate statistical power given the estimated ranges of natural variability for each
biodiversity value.

Speci c thresholds should be set for monitoring results that will trigger a need to adapt the management plan(s) to address any de ciencies in performance at all the project phases - construction, operation, and decommissioning. The results of the monitoring programme should be reviewed regularly. If they indicate that the actions speci ed in the management plan(s) are not being implemented as planned, the reasons for failure need to be identi ed (for example, insuf cient staff, insuf cient resources, unrealistic timeline, etc.) and recti ed. If outcome monitoring results indicate that project impacts to biodiversity components were underestimated or that the bene ts to biodiversity from management actions including offsets were overestimated, the impact assessment and management plans should
be updated.

Identi cation of appropriate thresholds

It is necessary to consider appropriate (quanti ed) threshold levels which if exceeded, constitute the potential for remedial action. These threshold levels will be project speci c, although they are often linked to the upper and lower limits of observed natural variability in the baseline. It should be noted that cumulative impacts - impacts of the new project in addition to existing stressors - can result in thresholds

04.

Inspection checklist

4. Inspection checklist

4.1 Purpose and scope of checklist

Questions				Remarks
Mitigation measures 1. Has the Project proponent made a binding commitment to implement the proposed mitigation measures or that the mitigation measures are just suggestions or recommendations? Are adequate mitigation measures considered to reduce impacts during the Project phases (e.g., noise,vibrations, turbid water, dust, exhaust gases,and wastes)? If the Project's activities adversely affect the biological environment, are adequate mitigation measures considered to reduce impacts?				

Is an offset appropriate given the signi cance of the impact on biodiversity? Are avoidance, minimization, or restoration measures practicable and more appropriate?			

1. Are all water discharge licenses valid?

Is a wastewater treatment system being used and properly maintained on site?

If no, is wastewater diverted through the wastewater networks to a WWTP?

5. Is any wastewater discharged to the storm drains?
6. If so, is the wastewater being pre-treated?

Are measures provided to properly direct ef uent to silt removal facilities?

Are sedimentation traps and tanks free of silt and sediment?

9.

Is the site kept clean? (i.e. free of litter, good housekeeping practices)

Are construction wastes/recyclable wastes and general refuse removed off site regularly?

Are construction wastes collected and disposed of properly by licensed collectors?

Are chemical wastes, if any, collected and disposed of properly by licensed collectors?

Are chemical wastes, if any, properly stored and labelled?

7. Are oil drums, if any, properly stored and labelled?
8. Is there any indication of oil spillage?

Are there proper measures to control/mitigate any oil spillage?

Are wastes (i.e. sludge, oils, and solids) generated from the project facilities properly treated and disposed of in accordance with the Lebanese regulations?

Is offshore dumping of dredged soil properly disposed in accordance with the Lebanese regulations?

1. Is water recycled wherever possible?

Are measures in place for preventing water pipe leakage and wastage?

Are diesel-powered plants and equipment shut off while not in use to reduce excessive use?

Are any energy conservation practices being adopted?

Are any renewable energy alternatives being adopted?

Environmental Status of the Establishment

Meets the conditions required (Circle one): Yes No

Does not meet the conditions required, especially for the following:

Baseline description

Stakeholder participation

Alternatives analysis

Impact assessment

Mitigation measures

Monitoring plan:

- Air quality

  Specify: _____

- Noise management

  Specify: _____

- Odor management

  Specify: _____

- Waste management

  Specify: _____

- Resource conservation

  Specify: _____

- Emergency response plan

  Specify: _____

Suggestions:

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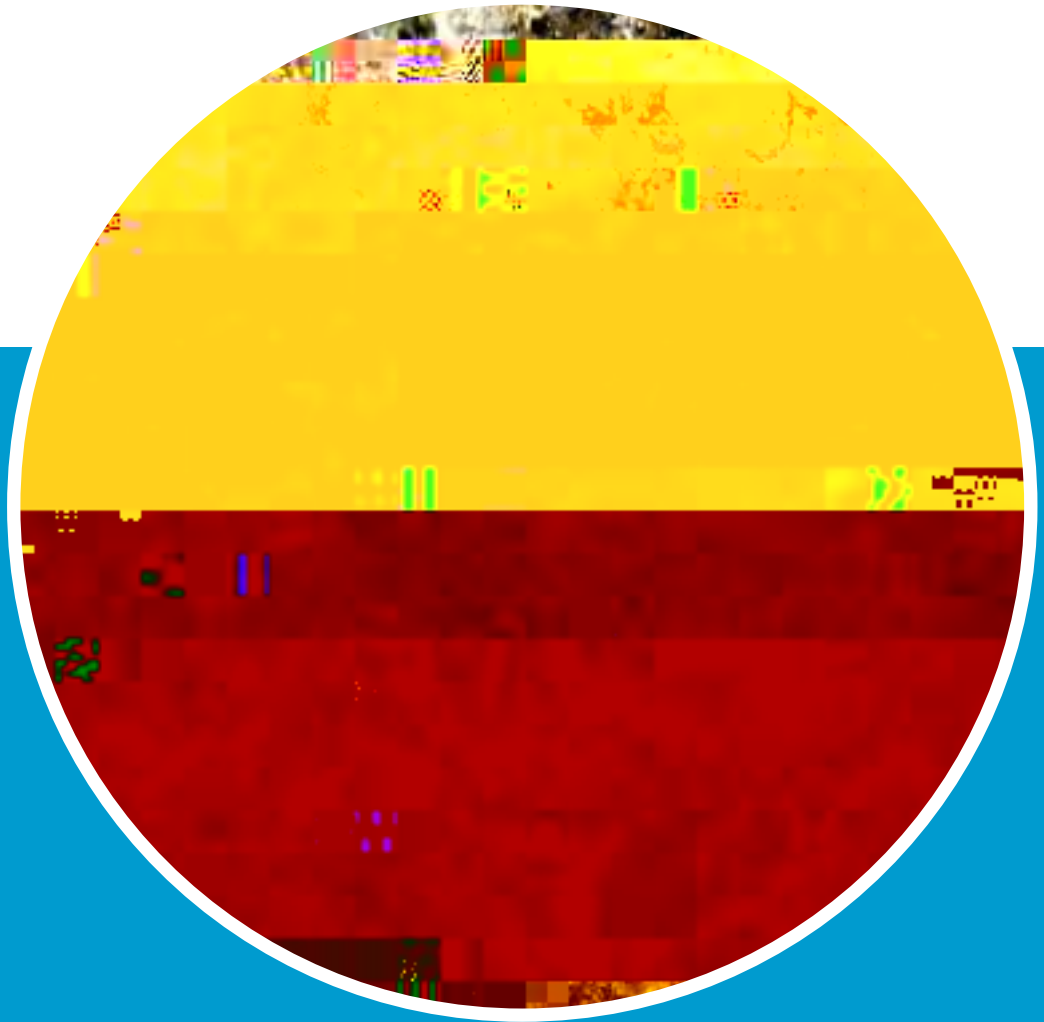

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Appendices

Appendices

Annex 1: Legal framework

Legislation	Year	Title	
			The law de nes dangerous waste and hazardous substances, and includes general provisions for handling hazardous waste, and sets sanctions in case of non-compliance with the provisions of the law Article 4 stipulates that: Every producer, exporter, distributer, holder or transporter has to prove to authorities that the dangerous wastes that he produces, exports, distributes, holds or transports are of the types that can be disposed according to the provisions of this law and the regulations to be issued for its application Article 6 stipulates that, it is not allowed, in any condition whatsoever, to import or hold or transport nuclear wastes or wastes polluted with nuclear radiation, or waste that contain toxic hazardous chemicals or materials dangerous to the public safety Article 7 stipulates that wastes shall be disposed either 1) by the person in charge of the wastes or 2) by public or private organizations

	Legislation	Year	Title	Key requirements
				Article 44 requires a permit for the import, handling or disposal of dangerous/ hazardous chemicals (application decree not issued) Article 47: Shall be considered of public interest the protection of nature and the prevention and combat of deserti cation and the protection of all fauna and ora species and its habitats and the biological balances and environmental regulations and biodiversity, in the course of facing all deterioration, pollution and disappearing risks Article 48: The natural resources management and the protection of biodiversity in Lebanon is based on: Making a survey of the existing fauna and ora species, especially those incurring the risk of disappearance. Submitting all activities that might harm the environment to the prior noti cation of the ministry of environment. Proposing the plans of protection of the fauna and ora species habitats and the conditions of their living and development. Proposing the creation of national parks and natural reserves and protected areas and proposing the conditions of protection of natural sites and landscapes. Setting up a control system to gain access to the biological and bio genetic resources and its use in accordance with the conventions and international treaties that Lebanon had rati ed, or will do so, in agreement with concerned ministries. Participation of the citizens and private and public institutions to the protection of biodiversity and sustainable development of natural resources. Decrees taken in Council of ministers upon the proposal of the minister of environment and the concerned ministers shall specify the details of implementing the provisions of this article According to the law, MOE has the powers for monitoring inspection and enforcement
5.	Law No. 690	2005	Organization of the Ministry of Environment	The MoE is responsible for all matters related to the environment sector. It holds the following tasks (among others): - Develop strategies, policies, projects and action plans, activities and studies for environmental protecting and sustainability of natural resources - Prepare legislation, speci cations and standards for environmental protecting and sustainability of natural resources - Participate in the development of preventive plans to respond to disasters - Determine the environmental conditions for licensing the establishment and investment of institutions - Determining the environmental conditions related to land use and to the protection of the marine beaches, rivers, springs, lakes, marshes and valleys - Determine the environmental conditions related to land use in order to protect it from such activities that might cause any damage to the surrounding environment - Determine the areas that are appropriate to create reserves as well as the conditions that must be available, the rules and regulations to run them - Determine hunting seasons, locations, and the species the hunters are permitted to hunt, as well as the species of ora and fauna that are threatened or endangered Conducting tests and analysis to determine the pollution rates of air, soil and water and propose and follow up the implementation of measures taken by the concerned authorities

	Legislation	Year	Title	Key requirements
6.	Law No. 251	2014	Lawyers and investigation judges for environmental related cases	The law assigns fulltime lawyers and investigation judges for environmental related cases, and de nes environmental crimes
7.	Law No. 77	2018	Water Resources Law	The law aims to organize, develop, and protect water resources. It also aims to promote sustainability by strengthening water establishments
8.	Law No. 80	2018	Integrated Solid Waste Management	The law sets integrated solid waste management principles. It provides guidelines for the management of non-hazardous waste and hazardous waste
9.	Law No. 130	2019	Protected Areas	The Law classi es the categories of protected areas, sets the requirements for their establishment, includes supervision and management requirements and de nes zoning within protected areas
10.	Law No. 170	2020	Establishment of the Al Abbasieh nature reserve in Tyre Casa, located on a section of the coastal area and the marine area	The Law aims to preserve marine and coastal biodiversity and ecosystems and natural resources in the reserve, and to protect it from the risks of pollution and any other threats.
11.	Decree No. 5243	2001	Classi cation of industrial institutions	Amends Decree No.4917/1994 on the classi cation of hazardous, dangerous and harmful to health institutions (based on Legislative Decree 21/L/1932)
12.	Decree No. 8018	2002	Determining the rules, procedures and conditions for licensing and investment of industrial establishments	This decree determines the conditions of constructing, investing, renewal and modifying licenses for industrial establishments
13.	Decree No. 9765	2003	Monitoring of industrial institutions	Monitoring, measures and penalties related to the industrial structures for the protection of the environment and public health
14.	Decree No. 9765	2003	Control measures and penalties relating to industrial establishments	All industrial institutions are subject to the provisions of this decree, regardless of their classi cation The Decree sets the principles of inspection of all industrial institutions, and the measures and sanctions to be applied in events of violation
15.	Decree No. 13389	2004	Types of wastes of health institutions and how to discharge them	Classi es medical waste types and sets the requirements for disinfection, storage and disposal
16.	Decree No. 2275	2009	Organization and mandates of the MoE.	Application Decree on the Organization and mandates of the Ministry of Environment, its divisions and departments
17.	Decree No.2366	2009	National Land Use Master Plan	Classi es lands and organizes the territory based on the following major guidelines: - Structure the territory around the major urban centers; - Associate all regions to the national economic development; - Distribute the major public facilities in an effective and integrated manner; - Unite the territory with an ef cient and developed transportation network; - Insure an urban development of good quality, respecting the characteristics of each region; - Highlight and bene t from the natural wealth of the country; - Exploit the water resources in a sustainable way; and - Resolve ef ciently the problems of quarries, wastewater and solid wastes

	Legislation	Year	Title	Key requirements
18.	Decree No. 230/1	2012	The mechanism for reviewing environmental impact assessment and environmental impact assessment reports	This decree sets out the mechanism for reviewing environmental impact assessment and environmental impact assessment reports
19.	Decree No. 8044	2012	Endorsement of the Management Plan of Tyre Coast Nature Reserve (2011-2016)	Regulates the management of Tyre Coast Nature Reserve
20.	Decree No. 8213	2012	Strategic Environmental Assessment in the public sector	This Decree aims at determining mandatory procedures to be followed for the assessment of potential environmental impacts of any policy, plan, programme, study, investment or organization proposal that tackles an entire Lebanese region or an activity sector, in order to ensure that these activities are compliant with conditions related to health, public safety, the protection of the environment and the sustainability of natural resources
21.	Decree No. 8633	2012	Environmental Impact Assessment	This decree aims at setting forth the rules that shall be considered in the EIA of public and private projects to avoid potential environmental impacts during construction, operation and decommissioning of these projects
22.	Decree No. 8471	2012	Environmental compliance standards for industrial establishments	The decree de nes the Concept of Environmental Compliance and the procedures to get an environmental compliance certi cate (ECC). The ECC certi cate will allow the establishment to bene t from economic incentives set forth in Law 2002/444 and Law 2005/690
23.	Decree No. 3989	2016	Environmental Police	Designation of an Environmental Police Department within the Ministry of Environment to regulate environmental crimes and enforce penalties; and speci cation of their organization and mandates
24.	Decree No. 167	2017	Application of article 20 of law 444/2002. (Tax reduction)	Tax reduction on environmental industry activities and on spending aimed at protecting and preserving the environment in a sustainable manner Reduction of customs duties on the import of equipment and tools that will be used to avoid or reduce or eliminate any form of pollution or treat, recycle and reuse waste
25.	High Commissioner's Decision No. 372	1926	Regulations related to navigation, shermen and shing boats	This decision determines the regulations of shing boats and the fees imposed on them, in addition to determining the penalty for violations of the rules of the marine shing system and shing boats
26	High Commissioner's Decision No. 2775	1929	Monitoring of shing practices in coastal waters	This decision aims to take the necessary measures to protect sh species of all kinds through monitoring coastal shing, determining the places in which shing can be prohibited, as well as the time in which some types of shing are prohibited, determining the types of permissible shing and the means of shing and prohibited methods, as well as determining the fees imposed on shing devices, shing licenses and the imposition of criminal penalties on everyone who violates the provisions of this law
27.	High Commissioner's Decision No. 3178	1930	The navigation of foreign shing boats in Lebanese waters	This decision speci es the conditions that must be met in foreign shing boats and which roam in the Lebanese waters as well as it indicates the penalties in case of violation of the provisions mentioned in this decision

Sponge catching	This decision aims to de ne the conditions given for sponge catching, as well as the fees required to obtain licenses for it, the mechanisms for selling it, and how to control and suppress violations
Prohibiting shing of whales, seals and marine turtles	Prohibiting shing of whales, seals and marine turtles
Establishment of the Committee for eld emergencies for energy issues and aquatic resources	The Committee is directly linked to the Minister of Energy and Water and implements his instructions and recommendations
National Emergency Response Committee (NERC)	The committee comprises of 22 members representing the ministries of National Defence, Interior and Municipalities, Public Health, Public Works and Transport, Telecommunications, Environment, Energy and Water, Education and Higher Education, and Information as well as the Civil Defence and the Lebanese Red Cross. The NERC will develop (1) a general framework for combating disasters, (2) a detailed contingency plan to respond to threats from various types of disaster (i.e., earthquakes, oods, forest- res, landslides, weapons of mass destruction, wars, and radioactive threats), and (3) an emergency management plan when a disaster occurs
Amendment of two speci cations of liquid waste generated by the chemical companies to be discharged into the sea	Amends MoE Decision 8-1/2001. Amendment entailed two speci cations of liquid waste generated by the chemical companies to be discharged into the sea
General conditions to protect cetaceans and marine mammals	General conditions to protect cetaceans and marine mammals (i.e. whales, dolphins, and sea lions)
General conditions to protect sharks and dog sh	General conditions to protect sharks and dog sh
Ban on catching seabirds	Ban on catching seabirds
De ning the procedures for ling and review of	De nes the procedures for ling and review of an objection on MoE Decisions related to EIAs
	Includes the mechanism and procedures to review the EIA scoping reports and environmental impact assessment reports EIAs
	Details the procedure for assigning additional time for MoE staff assigned to reviewing IEE and EIA reports
	Details the review procedure and the required content of the audit studies

Legislation	Year	Title	Key requirements
			Indicate the requested documents that need to be attached to EIA and IEE reports such as: maps, an aerial view of the property, a map matching the tree locations with the proposed construction site within the property

Draft Legislation	Year	Title	Key requirements
			26 articles spread over seven sections Most important articles are the National Council for ICZM Independent unit headed by the Prime

No.	Treaty, convention or protocol	Status	Objective and brief description of relevant articles
			This law implements the civil liability convention which ensures that adequate compensation is available to persons who suffer oil pollution damage resulting from maritime casualties involving oil-carrying ships
			The 1976 Barcelona Convention for Protection against Pollution in the Mediterranean Sea is a regional convention to prevent and abate pollution from ships, aircraft and land based sources in the Mediterranean Sea. This includes, but is not limited to, dumping, run-off and discharges. Signers agreed to cooperate and assist in dealing with pollution emergencies, monitoring and scienti c research. Article (7): Pollution Resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil: The Contracting Parties shall take all appropriate measures to prevent, abate and combat pollution of the Mediterranean Sea area resulting from exploration and exploitation of the continental shelf and the seabed and its subsoil. a)1976 Dumping Protocol: Protocol for the Prevention of Pollution in the Mediterranean Sea by Dumping from Ships and Aircraft. It was amended in 1995 and recorded as: Protocol for the Prevention and Elimination of Pollution in the Mediterranean Sea by Dumping from Ships and Aircraft or Incineration at Sea.

No.	
	Ensuring the identi cation, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage.
	The owner of a sea-going ship may limit his liability in accordance with Article 3 of this Convention in respect of claims arising from any of the following occurrences, unless the occurrence giving rise to the claim resulted from the actual fault or privity of the owner: (a) loss of life of, or personal injury to, any person being carried in the ship, and loss of, or damage to, any property on board the ship; (b) loss of life of, or personal injury to, any other person, whether on land or on water, loss of or damage to any other property or infringement of any rights caused by the act, neglect or default of any person on board the ship for whose act, neglect or default the owner is responsible or any person not on board the ship for whose act, neglect or default the owner is responsible: Provided however that in regard to the act, neglect or default of this last class of person, the owner shall only be entitled to limit his liability when the act, neglect or default is one

No.		
	Grant to join via Law No. 722 dated 15/05/2006.	The Convention aims to ensure and strengthen the protection of underwater cultural heritage. According to the convention, the preservation in situ of underwater cultural heritage shall be considered as the rst option before allowing or engaging in any activities directed at this heritage and recovered underwater cultural heritage shall be deposited, conserved and managed in a manner that ensures its long-term preservation. Also, Underwater cultural heritage shall not be commercially exploited.
	Rati ed via Law No. 728/2006	The convention promotes open exchange of information and calls on exporters of hazardous chemicals to use proper labelling, include directions on safe handling, and inform purchasers of any known restrictions or bans. Signatory nations can decide whether to allow or ban the importation of chemicals listed in the treaty, and exporting countries are obliged to make sure that producers within their jurisdiction comply.
	Rati ed via Law No. 34/2008	The main amendments made in 1995 concerned: 1) the extension of the Convention's geographical eld of application to the coast; 2) the application of the precautionary principle; 3) the application of the "polluter pays" principle; 4) the promotion of impact assessments; 5) the protection and preservation of biological diversity; 6) combating pollution from cross-border movements of dangerous waste; and 7) access to information and public participation.
	CoM Decision 31/2009otectgaaEectgaaE.	The convention represents a signi cant step towards protecting the marine environment from the introduction of non- indigenous species from the uncontrolled discharge of ballast water. The Convention requires all ships to implement a Ballast Water and Sediments Management Plan. All ships will have to carry a Ballast Water Record Book and will be required to carry out ballast water management procedures to a given standard. Parties to the Convention are given the option to take additional measures which are subject to criteria set out in the Convention and to IMO guidelines. At the time the Ballast Water Management Convention was adopted, suitable technologies allowing this strict standard to be met did not exist. Meanwhile, however, companies all over the world have developed novel systems and technologies which are now undergoing a complex approval procedure at IMO or the national approval authorities.
	e7381 Tf0 37. -3.031 Td legall Td (CoM[(P)18(engthen the ps pr)18(otCoM)] TJ 0 TwCT* [(Und Td (CoM H	The Convention prohibits the use of harmful organotin in anti-fouling paints used on ships and establishes a mechanism to prevent the po- tential future use of other harmful substances in anti-fouling systems. (Anti-fouling paints are used to coat the bottoms of ships to prevent sea life such as algae and molluscs attaching themselves to the hull – thereby slowing down the ship and increasing fuel consumption.)
		CITES is an international agreement between governments, which aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival. It regulates the trade of wild species and restricts the exchange of certain species. Today, it accords varying degrees of protection to more than 37,000 species of animals and plants, whether they are traded as live specimens, fur coats or dried herbs. CITES is legally binding on the joined Parties; therefore, they have to implement the Convention. And the convention provides a framework to be respected by each Party, which has to adopt its own domestic legislation to ensure that CITES is implemented at the national level.

No.		
	Adopted on 10 October 2013 and entered into force on 16 August 2017	The Minamata Convention on Mercury is a global treaty to protect human health and the environment from the adverse effects of mercury. It was agreed at the fth session of the Intergovernmental Negotiating Committee on mercury in Geneva, Switzerland and it was adopted on 10 October 2013 at the Conference of Plenipotentiaries in Japan. The Minamata Convention entered into force on 16 August 2017.The Convention draws attention to mercury that has broad uses and is released to the atmosphere, soil and water from a variety of sources. While it is naturally occurring, controlling the anthropogenic releases of mercury throughout its lifecycle has been a key factor in shaping the obligations under the Convention.
	Grant to join via Decree 3320/2018	CMS provides a global platform for the conservation and sustainable use of migratory animals and their habitats. CMS brings together the States through which migratory animals pass, the Range States, and lays the legal foundation for internationally coordinated conservation measures throughout a migratory range. Migratory species threatened with extinction are listed on Appendix I of the Convention. CMS Parties strive towards strictly protecting these animals, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them. Besides establishing obligations for each State joining the Convention, CMS promotes concerted action among the Range States of many of these species. Migratory species that need or would signi cantly bene t from international co-operation are listed in Appendix II of the Convention. For this reason, the Convention encourages the Range States to conclude global or regional agreements. In this respect, CMS acts as a framework Convention. The agreements may range from legally binding treaties (called Agreements) to less formal instruments, such as Memoranda of Understanding, and can be adapted to the requirements of particular regions. The development of models tailored according to the conservation needs throughout the migratory range is a unique capacity to CMS.
		AEWA is an intergovernmental treaty dedicated to the conservation of migratory waterbirds and their habitats across Africa, Europe, the Middle East, Central Asia, Greenland and the Canadian Archipelago. The core activities carried out under AEWA are described in its Action Plan, which is legally binding for all countries that have joined the Agreement. The AEWA Action Plan speci es different measures to be undertaken by Contracting Parties to warrant the conservation of migratory waterbirds within their national boundaries. These include species and habitat protection and the management of human activities as well as legal and emergency measures. In addition, special protective measures are to be implemented for those waterbird populations of particular conservation concern, listed in Column A of the Action Plan. Waterbird species and habitats shall not be affected by the O&G activities.

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	ACCOBAMS is the Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and contiguous Atlantic area is 'a cooperative tool for the conservation of marine biodiversity in the Mediterranean and Black Seas'. ACCOBAMS aims to reduce threats to cetaceans in Mediterranean and Black Sea waters and improve our knowledge of these animals, and is the rst Agreement binding the countries in the two sub regions, enabling them to work together on a matter of general interest. Annex A of the convention includes an indicative list of cetaceans to which the agreement applies. Annex 2 includes the conservation plans which includes the following measures of direct relation to O&G activities: Parties shall: - require impact assessments to be carried out in order to provide a basis for either allowing or prohibiting the continuation or the future

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	The objective of the Protocol is to contribute to ensuring an adequate level of protection in the eld of the safe transfer, handling and use of 'living modi ed organisms" resulting from modern biotechnology' that may have adverse effects on the conservation and sustainable use of biological diversity, taking also into account risks to human health, and speci cally focusing on trans-boundary movements.
	The Protocol Concerning Cooperation in Preventing Pollution from Ships and, in Cases of Emergency, Combating Pollution of the Mediterranean Sea is the legal framework within which regional cooperation in the Mediterranean region in the elds of prevention of and response to marine pollution is developing. The 2002 "Prevention and Emergency" Protocol now covers prevention of, preparedness for and response to marine pollution from sea-based sources. Its text was also updated with a view to harmonizing it with the texts of other relevant international legal instruments developed since the adoption of the 1976 Protocol.
	The objectives of integrated coastal zone management are to: (a) facilitate, through the rational planning of activities, the sustainable development of coastal zones by ensuring that the environment and landscapes are taken into account in harmony with economic, social and cultural development; (b) preserve coastal zones for the bene t of current and future generations; (c) ensure the sustainable use of natural resources, particularly with regard to water use; (d) ensure preservation of the integrity of coastal ecosystems, landscapes and geomorphology; (e) prevent and/or reduce the effects of natural hazards and in particular of climate change, which can be induced by natural or human activities; (f) achieve coherence between public and private initiatives and between all decisions by the public authorities, at the national, regional and local levels, which affect the use of the coastal zone. Article 19 on Environmental Assessment states that: 1) Taking into account the fragility of coastal zones, the Parties shall ensure that the process and related studies of environmental impact assessment for public and private projects likely to have signi cant environmental effects on the coastal zones, and in particular on their ecosystems, take into consideration the speci c sensitivity of the environment and the inter-relationships between the marine and terrestrial parts of the coastal zone; 2) In accordance with the same criteria, the Parties shall formulate, as appropriate, a strategic environmental assessment of plans and programmes affecting the coastal zone; 3) The environmental assessments should take into consideration the cumulative impacts on the coastal zones, paying due attention, inter alia, to their carrying capacities.
	Article 28 is related to Transboundary Cooperation, it stipulates that: the Parties shall endeavor, directly or with the assistance of the Organization or the competent international organizations, bilaterally or multilaterally, to coordinate, where appropriate, their national coastal strategies, plans and programmes related to contiguous coastal zones. Relevant domestic administrative bodies shall be associated with such coordination. Article 29 on Transboundary Environmental Assessment stipulates that: 1) Within the framework of this Protocol, the Parties shall, before authorizing or approving plans, programmes and projects that are likely to have a signi cant adverse effect on the coastal zones of other Parties, cooperate by means of noti cation, exchange of information and consultation in assessing the environmental impacts of such plans, programmes and projects; 2) To this end, the Parties undertake to cooperate in the formulation and adoption of appropriate guidelines for the determination of procedures for noti cation, exchange of information and consultation at all stages of the process; 3) The Parties may, where appropriate, enter into bilateral or multilateral agreements for the effective implementation of this Article.o achat:36cant asCatorganismvia Law No. c -11 Art31/2008051 Tw T2 [

No.	Treaty, convention or protocol	Status	Objective and brief description of relevant articles
27.	Nagoya Protocol	Accessed via Law No. 3/2017	The Nagoya Protocol is a multilateral treaty that sets up a legal framework for utilizing genetic resources. It is a supplementary agreement to the Convention on Biological Diversity that provides a transparent legal framework for the effective implementation of one of the three objectives of the CBD: the fair and equitable sharing of bene ts arising out of the utilization of genetic resources. The Nagoya Protocol will create greater legal certainty and transparency for both providers and users of genetic resources by: • Establishing more predictable conditions for access to genetic resources; • Helping to ensure bene t-sharing when genetic resources leave the country providing the genetic resources. By helping to ensure bene t-sharing, the Nagoya Protocol creates incentives to conserve and sustainably use genetic resources, and therefore enhances the contribution of biodiversity to development and human well-being. The Nagoya Protocol creates a legal framework to consider the requests of developing countries (or any country that has rati ed the protocol).
28.	Rati cation of the amendments made to the Barcelona Convention from pollution the Mediterranean Sea: Protocol on Specially Protected Areas and Biodiversity	Grant to join via Law No. 127/2019	The law is issued for approving joining the Protocol of Barcelona Convention concerning Specially Protected Areas and Biological Diversity in the Mediterranean According to the provisions of the SPA/BD Protocol, SPAMIs may be established in the marine and coastal zones subject to the sovereignty or jurisdiction of the Parties and in areas situated partly or wholly on the high sea. The SPAMI's List may include sites which: • are of importance for conserving the components of biological diversity in the Mediterranean; • contain ecosystems speci c to the Mediterranean area or the habitats of endangered species; • are of special interest at the scienti c, aesthetic, cultural or educational levels. The SPA/BD Protocol provides the criteria for the choice of protected marine and coastal areas that could be included in the SPAMI's List (Annex I of the SPA/BD Protocol) as well as the procedure and the stages to be followed with the view of including an area in the List (read more about the procedure) According to the provisions of the SPA/BD Protocol, all the Parties to the Protocol are committed to respecting the protection and conservation measures de ned in the proposal for inclusion

Annex 2: Non-exhaustive list of sources of secondary data

Aspect	Sources of data
	• 4PUPZ[Y` VM 7\ISPJ >VYRZ HUK ;YHUZWVY[ ¶+PYLJ[VYH[L .LUL The National Oil Spill Contingency Plan (NOSCP) in the Lebanese Waters =LYPZVU  • *VU]LU[PVU VU )PVSVNPJHS +P]LYZP[` <UP[LK 5H[PVUZ ,U]P Workshop 4HSHNH :WHPU (WYPS • >...Y[a 4 LK Mediterranean Submarine Canyons: Ecology and Governance. .SHUK :^P[aLYSHUK HUK 4mSHNH :WHPU! 0<*5 WHNLZ • ,SPHZ (;HWWVUUPLY 7 :PUNO : * 2PUN . * 7)YPHPZ (:\YZVJR (1HJX\LZ , 1VTHH 9 2SPUNLY @ (J[P]L

Aspect	Sources of data
Winds and Waves	• 5. 0(:HPSPUN +PYLJ[PVUZ ,UYV\[L ,HZ[LYU 4LKP[LY 5H[PVUHS .LVZWH[PHS 0U[LSSPNLUJL (NSUDA) 9LWVY[MYVT! :[H[PJ-PSLZ 5(=F7<): :+ 7\I 7\I IR WKM • 467>; +.34; The National Oil Spill Contingency Plan (NOSCP) in the Lebanese Waters =LYPZVU YLZWVUZPISL MVY P[Z KL]LSVWTLU[THPU[LUH • (V\U 5 : /HYHQHSP / (8\LHL\SV\ 7 7YLSPTPUHY` H prospects in Lebanon. Elsevier, 53 (May), Retrieved from: O[[WZ! KVP VYN YLULUL • ;,+6 ;YPWVSP >LH[OLY :[H[PVU • *OLTLSSV 9 :LYNPV : =LYTL[PK YLLMZ PU [OL 4LKP[ZLH SL]LS HUK Z\YMHJL [LTWLYH[\YL JOHUNLZ Chemistry and Ecology, 27 from: https://doi.org / • :HMHKP * >PUK HUK ^H]L TVKLSSPUN MVY [OL L]HS\H[P HUK WYV[LJ[PVU HHVYKLK I` HUJPLU[ OHYIV\YZ Journal of Archaeologica -LIY\HY` Retrieved from: https://doi.org /j.jasrep.
Currents and tides	• 467>; +.34; The National Oil Spill Contingency Plan (NOSCP) in the Lebanese Waters =LYPZVU • *OLTLSSV 9 :LYNPV : =LYTL[PK YLLMZ PU [OL 4LKP[ZLH SL]LS HUK Z\YMHJL [LTWLYH[\YL JOHUNLZ *OLTPZ[Y` HUK from: O[[WZ! KVP VYN • 5H[PVUHS .LVZWH[PHS 0U[LSSPNLUJL (NSUDA) Sailing Directions (En route)-Eastern Mediterranean 5. 0(
Sea Water Quality	• (IIV\K (IP :HHI 4 -HROYP 4 9VTHUV 1 * 2HZZHI 4 ; Apports Fluviaux et Industrielles sur les Populations Phytoplanctoniques dans la Région de :LSHH[H 4LY 3L]HU[PU >(;4,+ 5V]LTIYL • (IIV\K (IP :HHI 4 -HROYP 4 :HKLR , HUK 4H[HY 5 A environmental Status of Lebanese Littoral Waters using nutrients and chlorophyll-A as indicators. • (IIV\K (IP :HHI 4 H Tintinnids of the Lebanese Coastal Waters (Eastern 4LKP[LYYHULHU *59: 3LIHUVU <597 47 9(* :7(47(WW • (IIV\K (IP :HHI 4 -HROYP 4 :HKLR , HUK 4H[HY 5 I ,U]PYVUTLU[HS :[H[\Z VM 3LIHULZL 3P[[VYHS >H[LYZ <ZPUN 5\[Y Indicators. Lebanese Science Journal, • 3HRRPZ : Le phytoplancton marin du Liban (Méditerranée orientale): biologie, biodiversité, biogéographie. Roma: Aracne. • 3HRRPZ : 5V]LS 3HRRPZ = HUK ALPKHUL 9 Le zooplancto 4tKP[LYYHUtL 6YPLU[HSL ! IPVSVNPL Publications de l'Université IPVNtVNYH Libanaise. • 5H[PVUHS *V\UJPS MVY :JPLU[PÄJ The CNRS Research Vessel 7YVQLJ[.

Aspect	Sources of Data
	• -HSSHO 9 6SHTH A /VSHPS / 4HYPUL 8\HSP[` (Z *VHZ[! 4PJYVIPVSVNPJHS HUK *OLTPJHS *OHYHJ[LYPZ[PJZ HUK

Aspect	Sources of Data
• 5 H K L Y 4 H U K ; H S O V d of Lebanon 4 V , . , -	Updating the 2002 SAP-BIO National Report for the Country
•	

Aspect	Sources of Data
	• *YVZZ / 9PaR * 2OHSPS 4 HUK Population Status 3 and Conservation Activities on Sea Turtle Nesting Beaches in South Lebanon, 2005. Retrieved from: O[[W! ^^^ ZLH[\Y[SL VYN 7+- *YVZ)*.--,44,+(::,;4,+>,::*6(::4,39(*:7(<5,74(7<5+7;LJO9LWVY[WKM
	• 0<*5 Lebanon's Marine Protected Area Strategy: Supporting the management of important marine habitats and species in Lebanon)LPY\[3LIHUVU .SHUK :^P 4HSHNH :WHPU! [OL 3LIHULZL 4PUPZ[Y` VM ,U https://portals. P\JU VYN SPIYHY` UVKL
	• /YHV\P) : :HKLR 9 :PUKHJV 9 =LUJOP (;OL data on distribution. Zoology in the Middle East, Retrieved from: O[[WZ! KVP VYN
	• 4V, <5,7 .,- National Biodiversity Strategy and Action Plan – NBSAP
	• 9HTHKHU 1HYHKP . 9HTHKHU 1HYHKP 4)HYH ; ;OL of Lebanon. Sandgrouse, 30
	•)PYK 3PML 0U[LYUH[PVUHS *V\U[Y` WYVÄSL! 3LIHUVU http://www.birdlife.org/ KH[HaVUL/ country/lebanon *OLJRLK!
	• 5HKLY 4 HUK ;HSOV Updating the 2002 SAP-BIO National Report for the Country of Lebanon 4V, .,-
	• 46, <5+7 .,- :[H[L VM 3LIHUVU» Z)PYKZ HUK 0)(Z :753
	• *VKPUH .HYJxH 4 4PSP[qV ; 4VYLUV 1 .VUamSLa :VS Mediterranean seabirds. Marine Pollution Bulletin, 77 ¶ 9L[YPL https://MYVT: KVP VYN Q THYWVSI\S
	• 9HTHKHU 1HYHKP . :[H[\Z HUK KPZ[YPI\[PVU VM TPNYH

Aspect	Sources of Data
	• *YVJL[[H - APIYV^P\Z /)P[HY . ;LTWSHKV 1 HUK 6SP]L OVTVNLULP[` PU [OL LHZ[LYU 4LKP[LYYHULHU :LH 0! [OL VWP from Lebanon. Mediterranean Marine Science. Retrieved from: O[[W! K_ KVP VYN TTZ  • *V\[\YPLY * 0 , )LUUL[[ 4 ) 9PJOHYKZVU ( 1 4`Z[L Strip solved. Oryx • 5V[HYIHY[VSV KP :JPHYH .)YHKHP 4 5 4VYL` . 4HYZOHS ( /PJOHT 4 )\JHS + +\S]` 5 /LLUHU 9QPUV*HL[VZVY9UVIH 0U! 0<*5 IUCN Red List of Threatened Species =LYZPVU 9etrieved from: iucnredlist.org • +LKLS (:HHK (-HROYP 4 ka[...YR) *L[HJLH Mediterranean Sea during the cruise in summer 2008. 1)SHJR :LH 4LKP[LYYHULHU ,U • (IIV\K (IP :HHI 4 (UU\HS J`JSL VM [OL TPJYVaVVWSH waters surrounding the Palm Island Nature Reserve (north Lebanon), with special attention to tintinnids. Mediterranean Marine Science, • 3HRRPZ : Le phytoplancton Marin du Liban (Méditerranée orientale): biologie, biodiversité, biogéographie. Roma: Aracne. • 3HRRPZ : 5V]LS 3HRRPZ = HUK ALPKHUL 9 Le zo TtKP[LYYHUtL VYPLU[HSL ! IPVSVNPL IPVKP]LYZP[t IPVNtVN

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