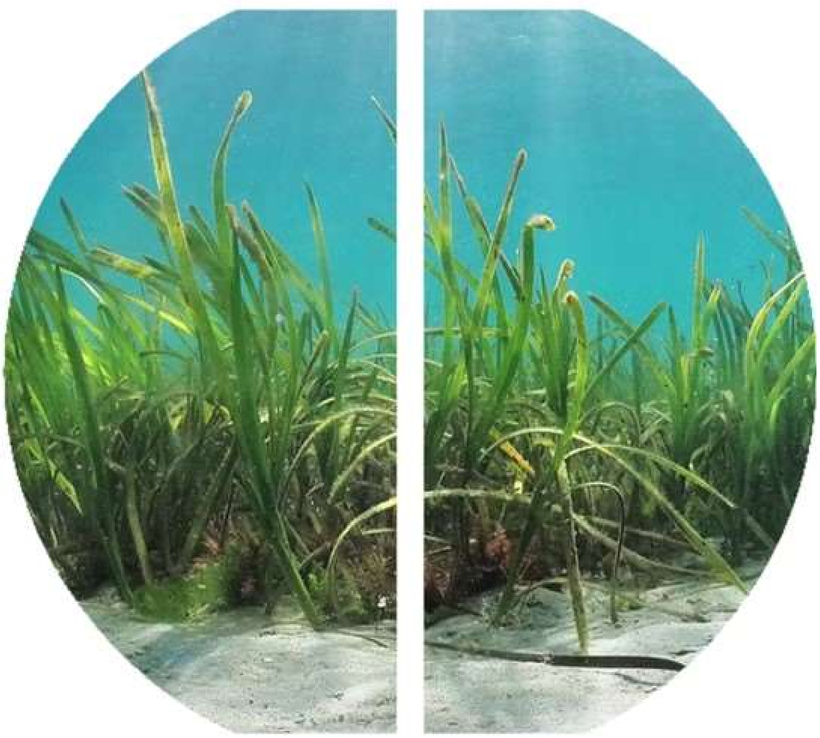
HICHAJOY
l'oasis de goût

HICHA JOY PROJECT

BIODIVERSITY ACTION PLAN



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1. INTRODUCTION

This Biodiversity Action Plan (BAP) for the HICHA JOY project (hereafter referred to as "HJ") provides an overview of how it will protect biodiversity. The project aims to produce tomatoes for export using desalinated water and is situated in the Gabès Governorate of Tunisia, approximately 330 km southeast of the capital, Tunis.

The Project is seeking finance from the International Finance Corporation (IFC) and therefore intends to align with IFC's Performance Standard 6 (PS6) on Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC 2012, 2019) and other good practice guidance.

The key elements of this BAP include:

- Mitigation Hierarchy: The document outlines how the mitigation hierarchy has been systematically applied during the project's design phase to avoid, minimize, restore, and where necessary compensate for impacts on biodiversity. This approach ensures that the project adheres to IFC PS6.

- Assessment of Residual Impacts: A detailed summary of the residual impacts of the project on critical and natural habitats is provided. This assessment highlights the specific challenges and pressures the HJ Project may pose to these sensitive ecological areas.

- No Net Loss (NNL) and Net Gain (NG): The BAP specifies the targets required to achieve either no net loss or a net gain of biodiversity values. It includes a clear explanation of the project's mitigation strategy designed to meet these targets, ensuring alignment with the objectives of IFC PS6.

- Conservation Actions: The document describes additional conservation actions that HJ will implement to promote and enhance the conservation objectives of the IBA/KBA of Sebkhet Dreiaa impacted by the project. These actions are part of HJ's commitment to go beyond mere compliance, supporting broader biodiversity conservation initiatives.

This BAP is intended for external stakeholders, investors, and company staff interested in a non-technical overview of biodiversity management for the project. Operational and monitoring details for managers at Hicha Joy can be found in the Biodiversity Monitoring and Evaluation Plan (BMEP), which organizes the mitigation actions, specialized sub-plans, indicators, baseline values, current status, and targets for ensuring that the management is implemented effectively.

The BAP covers both the terrestrial and marine part of the project and will be regularly reviewed and updated in response to new information, as the project progresses, and as changes occur in the conservation landscape over time.

Additional details regarding biodiversity baselines and impact assessment can be found in the Environmental Impact Assessments (EIAs) developed for this project.

2. PROJECT BACKGROUND

Hicha Joy is a Dutch-Tunisian agricultural enterprise primarily owned by AGROCARE. The project is in the municipality of Oudhref, within the Gabès governorate of Tunisia. It comprises three main components: 1) 120 hectares of high-tech greenhouses, fully equipped with all necessary facilities, enabling a total production capacity of 30,000 tons per year, 2) a seawater desalination plant specifically designed for irrigation purposes with a capacity of 5,000 m³/day, expandable to 10,000 m³/day, and 3) cogeneration and photovoltaic (PV) units.

The project is located in a coastal area where the terrestrial ecoregion is classified as "Mediterranean dry woodlands and steppe" by the WWF (2016). The region experiences an arid climate with annual rainfall ranging between 100 and 150 mm. The soil is predominantly gypsic sandy with halomorphic depressions dominated by steppe vegetation or halophytes. Adjacent to these terrestrial features, numerous salt marshes are present. The marine ecoregion is identified as the Tunisian Plateau/Gulf of Sidra (sensu Spalding, 2017), characterized by a mosaic of wetlands including notably open sandflats and extensive large mudflats with seagrass beds and intertidal channels (Figure 1 & Figure 2).

Within a 10 km buffer of the Project Area, the following legally protected and internationally recognized areas are found: the Ramsar site of the Complexes des zones humides des chott El Guetayate et Sabkhet Dhreia et Oued Akarit Rekhama et Melah, and the IBA/KBA of Sebkhet Dhreia. These two areas overlap (Figure 3).

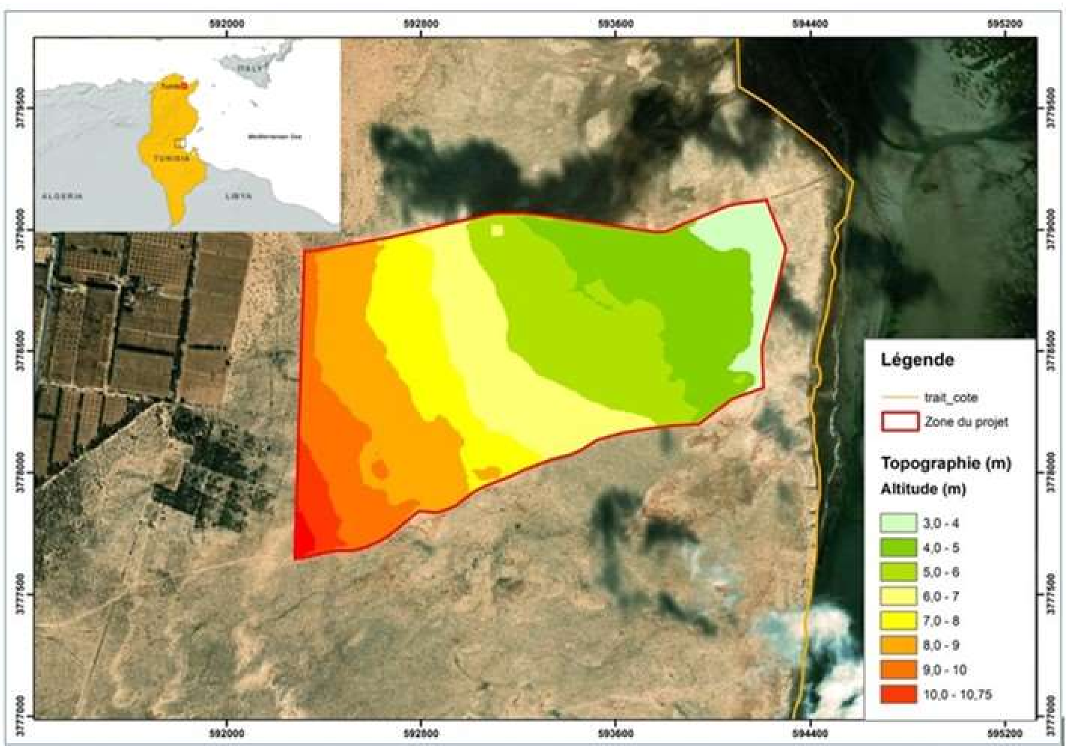

Figure 1 : On-shore location of the HJ project

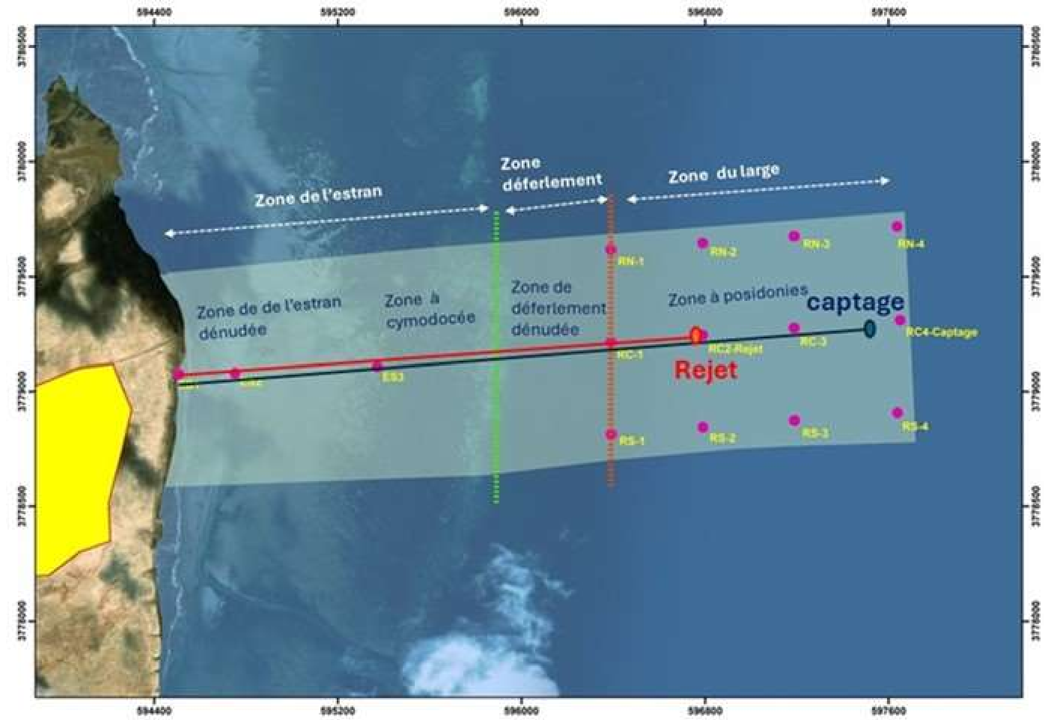

Figure 2 : location of intake and outfall pipelines in intertidal and subtidal zone

Figure 3 : Important zone for biodiversity Within a 10 km buffer of the Project Area

3. NATURAL HABITAT AND MODIFIED HABITAT ASSESSMENT

The spatial distribution of natural and modified habitats within the Project Area is illustrated in Figure 4. The rationale for this classification is detailed in Table 1 below. Table 5.2 displays the areas of natural and modified habitats within the Area of Influence (AoI) and the Project Area. The implementation of the project will result in the loss of natural habitat in both terrestrial and marine environments. Further analysis of potential impacts and relevant mitigation measures are discussed in more detail in Section below.

The majority of the HJ project's footprint is in an area of natural habitat (sensu IFC 2012, 2019) (Figure 4). The total area directly impacted by the physical infrastructure and operations of the project spans 215.2 hectares. Of this, the on-shore footprint is estimated to be 201.2 hectares, while the off-shore footprint accounts for 14 hectares.

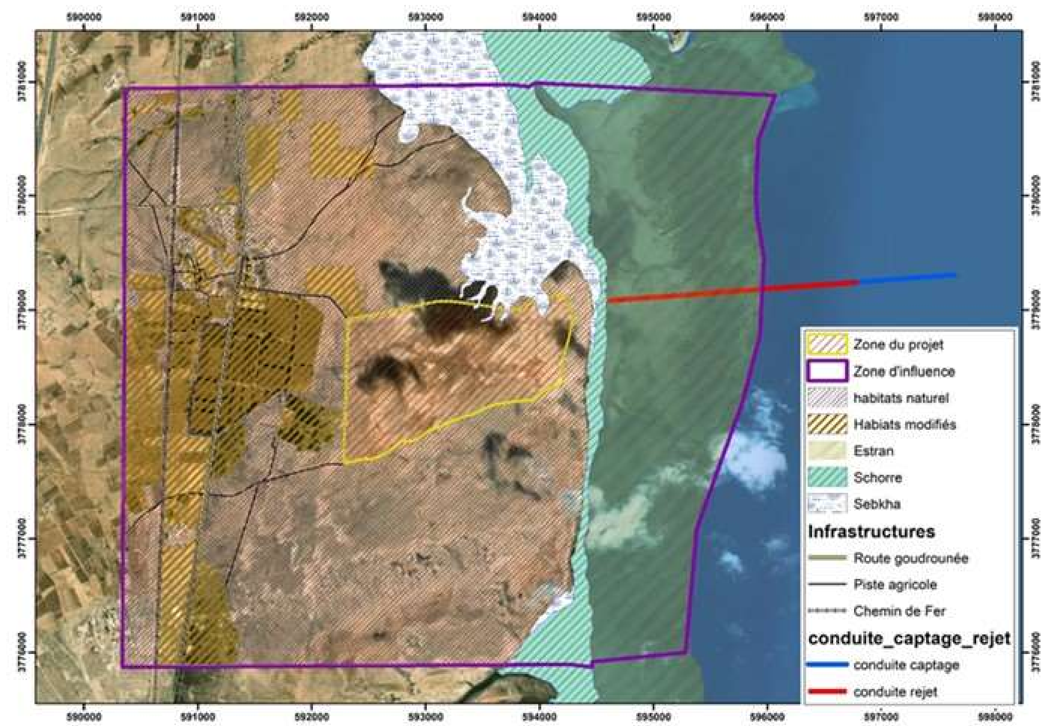

Figure 4 : Natural and modified habitat in the AoI of the HJ project

Table 1 : Natural and Modified Habitats classification within the Project Areas

No	Land Class	IFC PS Habitat Classification	Justification	Photo
1.	Marine water	Natural Habitat	The marine habitat is considered to be natural habitat. It consists of seagrass meadows and circalittoral, situated on the Est of the Study Area. The marine habitat contains species of native origin and human disturbance is limited to fishing activities.	
2.	Intertidal mudflat	Natural Habitat	Intertidal mudflat covers a significant area and is traversed by tidal channels, with some patches of *Cymodocea* prairies.	
3.	Salt marshes	Natural habitat	Typically colonized by *Arthrocnemum indicum*. (Chenopodiaceae), a perennial halophytic shrub, which is frequently inundated with seawater.	
4	Sebkha	Natural habitat	As the result of the arid climate -saline minerals accumulate within restricted coastal plains just above normal high-tide level	

5	Halophytic steppe	Natural habitat	Vegetation dominated by *Salicornia quinqueflora, Limoniastrum monopetalum, Nitraria retusa, Tetraena alba, Haloxylon salicornicum, Halocnemum strobilaceum and Arthrocnemum macrostachyum*	
6	Agroecosystem	Modified habitat	Agricultural land is considered to be modified habitat. Olive farming dominates both dryland and irrigated agriculture	
7	Urban area	Modified habitat	Urban area is considered to be modified habitat. This habitat contains anthropogenic features with limited wildlife and vegetation.	

Table 2 : areas of natural habitat and modified habitat within the footprint of the HJ project

Land Class	Total Area of Assessment (ha)	Project Area (ha)
Natural habitat		
Intertidal mudflat	612	9.3
Intertidal seagrass	87	0.2
Salt marshes	107	0,5
Sebkha	151,5	2,5
Halophytic steppe	1400	198
Oued	6,5	0
Marine subtidal habitat	-	4.7
Subtotal	2277	215.2
Modified Habitat		
Agroecosystem	378	0
Urban area	12	0
Road	13	0
Subtotal	403	0

4. CRITICAL HABITAT ASSESSMENT

4.1 Assessment Criteria

Critical Habitat is defined in PS6 as "areas with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes." Critical Habitats are areas that should be considered the highest priority areas for conservation and provide the lender with an indication of where the risk of a project negatively impacting biodiversity will be highest. This assessment of risk is based on two conservation biology principles, namely vulnerability (degree of threat) and irreplaceability (rarity or uniqueness). Habitat is classified as Critical Habitat if it meets the quantitative thresholds of at least one of the first four criteria. The fifth criterion, which is qualitative, identifies areas associated with key evolutionary processes (Table 1).

4.2 Ecologically Appropriate Area of Analysis (EAAA)

An Ecologically Appropriate Area of Analysis (EAAA) is derived from the distribution of species or ecosystems in question (within and sometimes extending beyond the project's area of influence) and the ecological patterns, processes, features and functions that are necessary for maintaining them.

Table 3 : Criteria and Thresholds for Critical Habitat Assessment (IUCN, 2019)

Criteria	Description	Threshold(s)
Criterion 1: Habitat of significant importance to Critically Endangered and / or Endangered species	Species threatened with global extinction and listed as CR and EN on the IUCN Red List of Threatened Species. Species that are listed nationally/regionally as CR or EN in countries that have adhered to IUCN guidance are relevant and should be determined on a project-by-project basis in consultation with competent professionals.	(a) Areas that support globally important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population AND ≥ 5 reproductive units of a CR or EN species).
	This criterion may also apply to Vulnerable (VU) species where these are at the upper threshold for VU status and could be up-listed to EN or CR with further loss. Subspecies can be included in this criterion where such subspecies are formally recognised and assessed by IUCN.	b) Areas that support globally important concentrations of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in Criterion 1.
		(c) As appropriate, areas containing important concentrations of a nationally or regionally-listed EN or CR species.
Criterion 2: Habitat of significant importance to endemic and/or restricted-range species	The term endemic is here defined as restricted-range. Restricted-range refers to a limited extent of occurrence (EOO). For terrestrial	Areas that regularly hold ≥10% of the global population size AND ≥10 reproductive units of a species

	vertebrates and plants, a restricted-range species is defined as those species that have an EOO less than 50,000 km2.	
Criterion 3: Habitat of significant importance to concentrations of migratory and congregatory species	Migratory species are defined as any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem). Congregatory species are defined as species whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis.	(a) Areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle. (b) Areas that predictably support ≥10 percent of the global population of a species during periods of environmental stress.
Criterion 4: Areas with highly-threatened and/or unique ecosystems	These are ecosystems that have been assessed by the IUCN as part of the Red List of Ecosystems.	a) Areas representing ≥5% of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN. b) Other areas, not yet assessed by IUCN, but determined to be of high priority for conservation by regional or national systematic conservation planning.
Criterion 5: Areas associated with key evolutionary processes	Evolutionary processes are often strongly influenced by structural attributes of a region, such as its topography, geology, soil and climate over a period of time.	There is no quantitative threshold associated with Criterion 5. Assessment of this criterion is usually considered heavily reliant on scientific knowledge, and thus would be triggered in areas that have already been investigated.

For the purposes of this assessment, three EAAAs have been defined to cover three components, including EAAA for terrestrial fauna and EAAA for migratory and non-migratory marine fauna (Table 3).

The EAAAs were used to assess the applicability of the Critical Habitat criteria and thresholds and the relevance of the Critical Habitat determined.

Table 4 : Ecologically Appropriate Area Components

Features	Area (Km^2)
EAAA for Terrestrial Fauna - Footprint of the onshore project - The ramsar site of Chott el Guetayate et Sebkhet Dhreia et Oueds Akarit, Rekhama et Meleh including the IBA/KBA of Sabkhet Dhreia	50
EAAA for marine non migratory Fauna EBSA of the Gulf of Gabès	30 000
EAAA for marine migratory Fauna EBSA of the Sicilian Channel	270 000

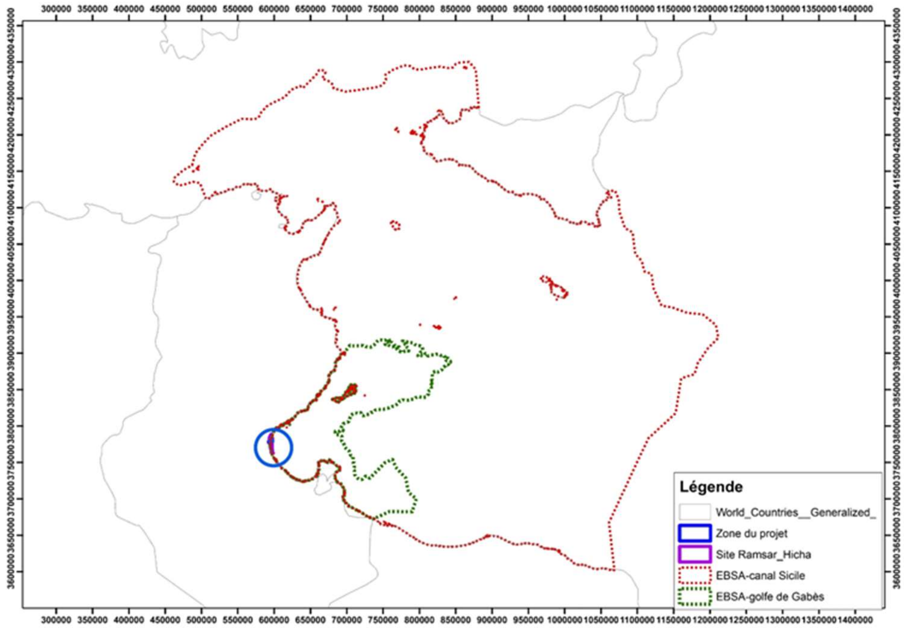

Figure 5 : Ecologically Appropriate Area Components including the Ramsar site, The EBSA of the gulf of Gabès and the EBSA of Sicilian Canal

4.3 Critical Habitat-qualifying biodiversity

A Critical Habitat Assessment and full rationale for inclusion has been completed for the HJ Project (See Appendix 1) and found that 22 species will exceed relevant Critical Habitat-qualifying thresholds (Table 5).

This CHA has determined that 16 species meet Threshold (a) under Criterion 1, three species meet Threshold (a) under both Criterion 1 and Criterion 2, and two species meet Threshold (a) under Criterion 3. Additionally, the *Posidonia oceanica* meadows qualify as CH under Criterion 2.

The area of *Posidonia oceanica* seagrass meadows in Tunisia is estimated to cover 6,369 km², representing 33.5% of its global area of occupancy (Traganos et al., 2022). The largest meadows are located in the Gulf of Gabès, which regularly supports at least 10% of the global population size of the species.

The determinations of critical habitat related to Criteria 1, 2, and 3 primarily involve individual species, the majority of which are chondrichthyans. These species represent the 'biodiversity values for which the critical habitat was designated.'

Table 5 : species exceeding relevant Critical Habitat-qualifying thresholds

Biome	Taxonomic group	Species	English name	IUCN status	Criteria for CHA	Likelihood of CH	Target
Marine	Coral	*Cladocora caespitosa*	Mediterranean Pillow Coral	EN	1a	High	Net Gain
Marine	Bivalvia	*Pinna nobilis*	Fan Mussel	CR	1a & 2	Very High	Net Gain
Terrestrial	Insect	*Thorectes puncticollis*		EN	1a & 2	Possible	Net Gain
Marine	Chondrichthyes	*Squatina squatina*	Angelshark	CR	1a	Possible	Net Gain
Marine	Chondrichthyes	*Aetomylaeus bovinus*	Duckbill Eagle Ray	CR	1a	High	Net Gain
Marine	Chondrichthyes	*Leucoraja melitensis*	Maltese skate	CR	1a &2	Possible	Net Gain
Marine	Chondrichthyes	*Squatina aculeata*	Angelshark	CR	1a	Possible	Net Gain
Marine	Chondrichthyes	*Squatina oculata*	Angelshark	CR	1a	Possible	Net Gain
Marine	Chondrichthyes	*Rhinobatos Rhinobatos*	Common guitarfish	CR	1a	High	Net Gain
Marine	Chondrichthyes	*Glaucostegus cemiculus*	Blackchin guitarfish	CR	1a	Very High	Net Gain
Marine	Chondrichthyes	*Myliobatis aquila*	Common Eagle ray	CR	1a	Possible	Net Gain
Marine	Chondrichthyes	*Carcharhinus plumbeus*	Sandbar Shark	EN	1a	Very High	Net Gain
Marine	Chondrichthyes	*Isurus oxyrinchus*	Shortfin Mako	EN	1a	Possible	Net Gain
Marine	Chondrichthyes	*Mustelus mustelus*	Common smoothhound	EN	1a	Very High	Net Gain
Marine	Chondrichthyes	*Gymnura altavela*	Spiny Butterfly Ray	EN	1a	High	Net Gain
Marine	Chondrichthyes	*Raja radula*	Rough Skate	EN	1a	High	Net Gain
Marine	Chondrichthyes	*Dasyatis totonesei*	Tortonese's Stingray	DD	1a	Very High	Net Gain
Marine	Actinopterygii	*Anguilla anguilla*	European Eel	CR	1a	Very High	Net Gain
Terrestrial/ Freshwater	Aves	*Oxyura leucocephala*	White-headed Duck	EN	1a	Possible	Net Gain
Terrestrial/ Marine	Aves	*Charadrius alexandrinus*	Kentish Plover	LC	3a	Very High	Net Gain
Terrestrial/ Marine	Aves	*Pluvialis squatarola*	Grey Plover	LC	3a	Possible	Net Gain
Marine	Plantae	*Posidonia oceanica*	Neptune Grass	LC	2	Very high	Net Gain

5. PRE-MITIGATION BIODIVERSITY IMPACT ASSESSMENT

During this development phase, the HJ project includes two major components. The first component consists of establishing 120 hectares of high-tech greenhouses and the second component involves constructing a seawater desalination plant, initially capable of processing 5,000 m3 per day, with the potential to expand to 10,000 m3.

Table 6 & Table 7 summarize the most significant impacts that could affect biodiversity within the project's area of influence. Additional details on these impacts are available in the Environmental and Social Impact Assessment (ESIA) for the project. This detailed analysis helps to understand the potential impact of the project on CH and to plan appropriate mitigation measures in accordance with IFC PS6 guidelines.

Table 6 : Terrestrial Impacts Used for the Assessment Arising from Construction on Land

S/N	Impact Type	Description	Impact prior to mitigation
Construction Phase			
1	Permanent Habitat loss	Permanent loss of habitat due to construction of the greenhouses	Approximately 200 ha of halophytic steppe and Sabkha will be lost by the construction of Greenhouses and associated facilities; habitat fragmentation
2	Temporary habitat and vegetation degradation or loss	Habitat will be temporarily affected and/or fragmented during the onshore intake and outfall pipelines installation works	Approximately 0.3 ha of halophytic steppe and 0.5 ha of salt marsh will be lost. The connectivity between habitats will be reduced temporarily
3	Disturbance of fauna	The construction phase typically involves machinery which generates noise and use of artificial lighting.	Acoustic disturbance and light can affect behavior of birds in the IBA, which rely on sound for communication and mating calls
4	Indirect impact	Influx of workers can lead to induced anthropic pressure on the surrounding ecosystems	collecting local vegetation and disturbing fauna
Operational phase			
5	Disturbance of fauna	Light and Noise Pollution	Potential impacts of surveillance lighting disrupts nocturnal wildlife operation of ventilation systems, machinery, and other equipment generates noise, which can disturb local wildlife, particularly sensitive species.

Table 7 : Offshore Impacts arising from Construction in Offshore Area

S/N	Impact Type	Description	Impact prior to mitigation
Construction Phase			
1	Habitat loss	The construction of pipelines involves seabed excavation, dredging, and other ground-disturbing activities. These activities can destroy benthic habitats, and alter the topography of the seabed, which can affect local hydrodynamics and sediment transport patterns.	Approximately 9,3 ha of the intertidal mudflat and 4,7 ha of the subtidal zone will be lost.
2	Seagrass damage	Dredging activities can directly damage or remove seagrass beds. The mechanical action of dredging equipment can remove patches of these plants.	1,3 ha of *Cymodocea nodosa* (including 0.2 ha intertidal) and 1,6 ha of *Posidonia oceanica* will be lost
3	Water quality degradation	Water quality may be degraded for a short term from marine dredging activities.	Degradation of water quality in the marine habitat may result in negative impact on the marine fauna. These effects primarily affect an area a few hundred meters from construction
4	Behavioral disruption by underwater noise	Dredging and navigation during construction generates underwater noise. This noise can interfere with the communication, navigation, and mating behaviors of marine animals	Behavioral changes due to noise include reduced anti-predator defenses and communication difficulties, leading to decreased feeding efficiency and altered social behaviors[1]
5	Direct mortality or injury of marine species	Dredging equipment, can harm or kill marine organisms that come into direct contact with them	This is particularly concerning for slow-moving or sessile (non-mobile) species
Operational phase			
6	Physical Entrainment and Impingement	Marine water intake can cause entrainment of small organisms like plankton and juveniles. Larger organisms may be impinged against intake screens.	The project plans to capture 26,143 m³/day of raw water. This volume of water could have an impact on mobile pelagic fauna and plankton
7	Ecological Impacts of Brine Discharge	Brine discharge impacts marine life by altering osmotic pressure affecting plankton, displacing fish due to	The brine discharged into the sea, with a salinity

[1] The impact of ocean noise pollution on fish and invertebrates lindy weilgart, Ph.d. oceancare & dalhousie university (2018)

		increased turbidity and salinity. It also reduces light penetration critical for photosynthesis affecting sensitive species like *Posidonia oceanica*	of approximately 77.5 g/l and a daily flow rate of 16,143 m³, will impact natural habitats through increased salinity (+1 psu), reduced oxygen levels, turbidity from a hypersaline plume. This can approximately touch radius of 300 meters.

The HJ project comprises two major components: the greenhouses and associated facilities, and the desalination plant. The greenhouses and associated facilities will cover an area of approximately 195.5 hectares, while the desalination plant will occupy around 4.5 hectares of land.

For the marine component of the project, there will be two pipelines: one for water intake and one for reject water. The intake pipeline will have a diameter of 800 mm and a length of 3.5 km. The reject pipeline will have a diameter of 630 mm, a length of 2.5 km, and will be equipped with a diffuser to ensure proper dilution. In this area, 14ha will be disturbed and approximately 2.9 hectares of seagrass will be lost.
The methods statement for construction considers many parameters to avoid any intense negative impacts on animals life and natural habitats.

The total loss of habitat within the footprint of the project components described above is 202.9 ha.

6. IMPLEMENTATION OF MITIGATION HIERARCHY

By aligning with IFC PS6, the HJ Project is committed to sequential implementation of the mitigation hierarchy: avoidance and minimization of impacts, restoration where possible, and if significant residual impacts remain, offset actions to achieve a NNL or NG target.

Avoidance: actions taken to fully prevent impacts to biodiversity values, such as changing the spatial design of a project to prevent impacts in specific locations

Minimization: actions taken to reduce the duration, intensity and/or extent of impacts that cannot be completely avoided

Rehabilitation/Restoration: actions taken to return areas to beneficial use and if possible, assist in the recovery of the ecosystem that has been degraded, damaged, or destroyed

Biodiversity Offset: measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken.

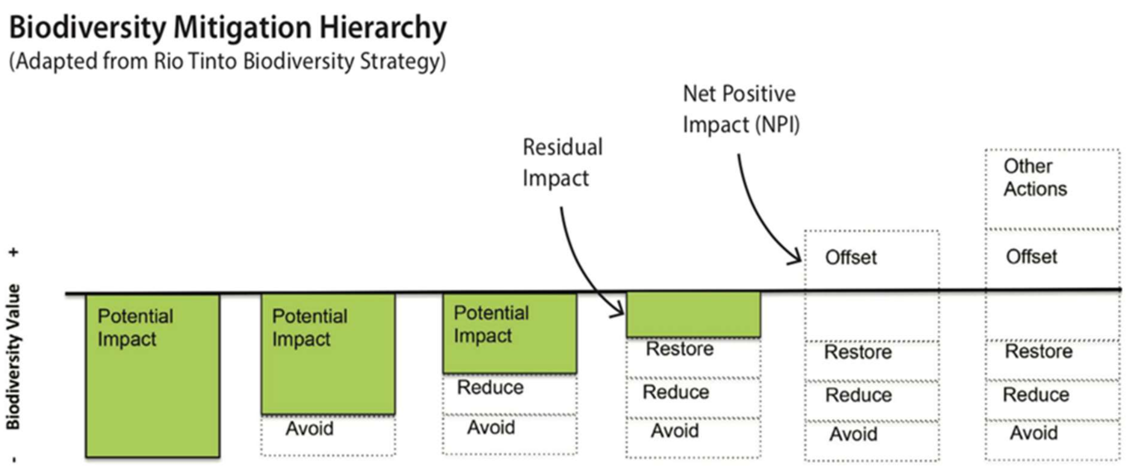

Figure 6 : Mitigation hierarchy and its application in achieving a net gain in biodiversity[2]

[2] Source: Diagram and definitions from Hardner, et al. 2015. Good Practices for Biodiversity Inclusive Impact Assessment and Management Planning. Prepared for the Multilateral Financing Institutions Biodiversity Working Group.

The Project design includes the following key measures to either avoid or reduce effects on natural and critical habitat and priority biodiversity features:

- Opting for an L-profile pipeline with shallower trenches during dredging operations can significantly reduce environmental impacts on critical habitat by minimizing seabed disturbances and sediment suspension.
- Minimisation of the pipeline working width.
- Implementation of seasonal constraints to reduce the risks of affecting fauna species
- Opting for a temporary dike to confine dredging sediments to a specific area, thereby reducing environmental impacts on the surrounding ecosystem and limiting the temporary immersion of dredging spoils in the marine environment.
- The brine outfall is equipped with a 20-meter-long diffuser featuring six 150 mm diameter outlets, which are oriented upwards at a 45-degree angle to optimally disperse the salt concentration in the water.

Two main restoration activities will be implemented as part of the project's commitment to environmental sustainability and compliance with IFC PS6.

6.1 Restoration of habitats temporarily disrupted within terrestrial pipeline installation

The temporary loss of habitat in the construction area is addressed through habitat restoration efforts outlined in the coastal ecosystem restoration management plan. This includes a commitment to restore the 0.3 hectares of affected habitat to its pre-construction state. These restoration measures will be implemented along the onshore pipeline corridor at the end of construction. Here are some examples of measures:

- The topsoil will be restored to its original position after work.
- Removal of weeds and invasive plants from the work area.
- Collection of seeds from adjacent land parcels.
- Planting of seeds.
- Ongoing management of restored areas.

Other measures will be defined in the coastal ecosystem restoration management plan. Taking into account the habitat condition score before the loss of 0.25, the entire construction footprint will be restored to a similar target condition score of at least 0.25. The success of habitat reinstatement will be validated after 5 years, and habitat losses will be recalculated to account for observed restoration outcomes. The scale and scope of habitat improvement and compensation measures will be reassessed after this 5-year review (see Biodiversity monitoring and evaluation plan).

6.2 Restoration of seagrass

The loss of seagrass during dredging activities is addressed through habitat restoration efforts outlined in the seagrass restoration management plan. This includes a commitment to restore the 2.9 hectares of affected habitat to its quality equivalence. These restoration measures will be implemented along the seagrass area at the end of construction. Here are some examples of measures:

- Direct replanting of seagrass shoots in areas where the habitat has been disturbed, using appropriate anchoring methods.

- Engaging local communities in restoration activities to foster ownership of restored seagrass habitats.
- Monitoring the restored habitat to assess the effectiveness of restoration efforts and make necessary adjustments.
- Collaborating with organizations experienced in restoration to ensure coordinated and effective restoration efforts.

Other measures will be defined in the coastal ecosystem restoration management plan. The success of habitat reinstatement will be validated after 1 years, and habitat losses will be recalculated to account for observed restoration outcomes. The scale and scope of habitat improvement and compensation measures will be reassessed after this 1-year review (see Biodiversity monitoring and evaluation plan).

Specific offshore and onshore mitigation and management measures are provided in more details in the BMP and the ESIA. This BAP therefore focusses on measures to address the residual biodiversity impacts that remain following the implementation of the initial steps of the mitigation hierarchy, particularly in relation to delivering NNL and NG.

7. RESIDUAL IMPACTS ON NATURAL / CRITICAL HABITATS

7.1 Onshore Residual Impacts

The loss of onshore critical habitat amounts to 25 ha that comprises approximately 1,54 % of the IBA/KBA of Sebkhet Dreiaa (1620 ha[3]).

The footprint of the project on natural habitat is estimated at 175 ha.

All these Critical/Natural area is an halophytic steppe dominated by *Salicornia quinqueflora*, *Limoniastrum monopetalum*, *Nitraria retusa*, *Tetraena alba*, *Haloxylon salicornicum*, *Halocnemum strobilaceum* and *Arthrocnemum mac*ro*stachyum*.

In the Hicha area, the construction of greenhouses and associated facilities will result in the loss of approximately 200,5 hectares of halophytic steppe and sabkha, leading to significant habitat fragmentation. Additionally, about 0.3 hectares of halophytic steppe and 0.5 ha of salt marsh will be lost will be temporarily lost during the construction of onshore intake and outfall pipelines, temporarily reducing habitat connectivity. The destruction of vegetation and soil compaction caused by the use of heavy machinery are likely to adversely affect the natural structure and functionality of the area. To mitigate these impacts, habitat preservation techniques will be implemented, including the removal, storage, and restoration of topsoil layers.

Disturbances and displacements of wildlife may occur during onshore construction works, particularly affecting individuals from three bird species that are part of critical habitats: *Oxyura leucocephala*, *Charadrius alexandrines* and *Pluvialis squatarola*.

A coastal ecosystem restoration management plan will be prepared to guide these efforts, ensuring that both immediate and long-term environmental concerns are addressed effectively.

[3] The situation and area of the Sebkhet Dreia IBA/KBA are problematic. The area provided in the text is 580 hectares (a sebkhet of about 380 hectares, and an intertidal area of about 200 hectares) around a central point at 34° 9' 58" North, 10° 1' 28" East, whereas the area indicated on the provided map is 1620 hectares. In line with the precautionary principle, we have used the larger area.

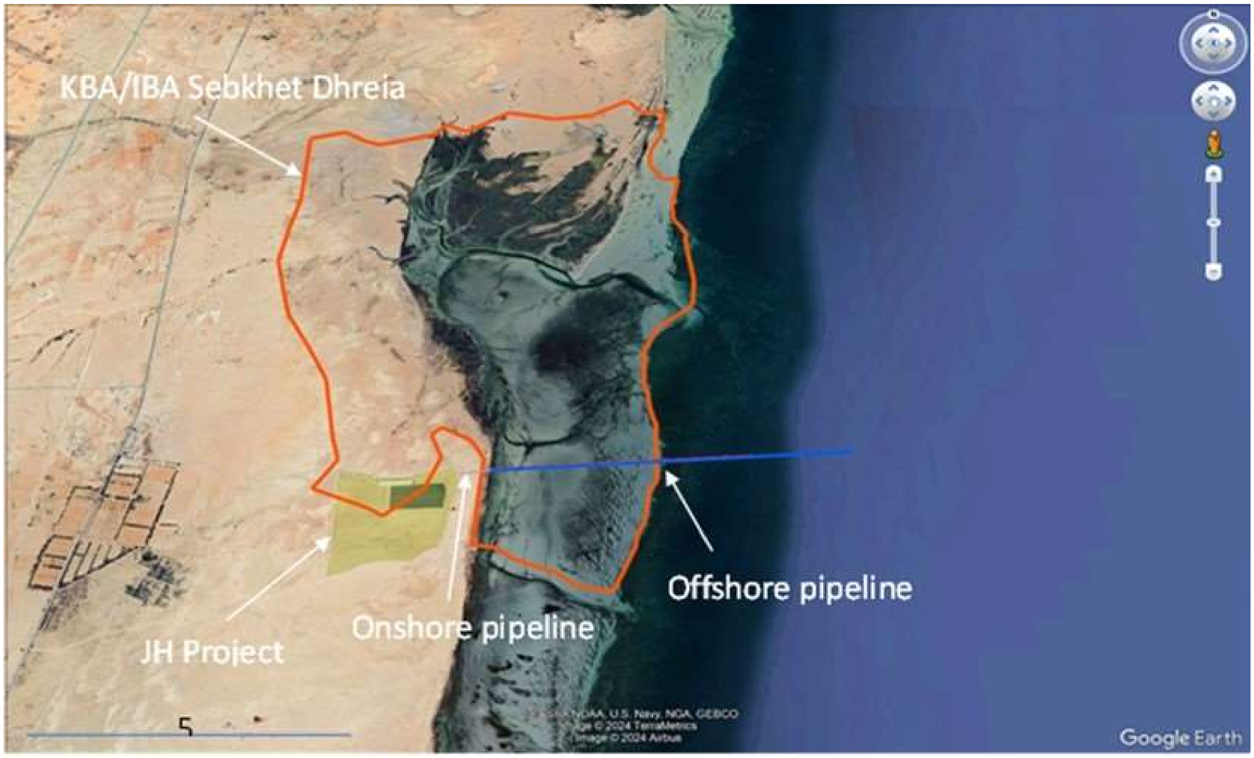

Figure 7 : location of the HJ Project within the IBA/KBA of Sekhet Dhreia

7.2 Offshore Residual Impacts

The installation of the intake and outfall pipeline will lead to the loss of critical habitat in the Ramsar site and the Important Bird Area (IBA)/Key Biodiversity Area (KBA) of the Sebkhet Dhreia marine area. Additionally, constructing a temporary dike to create an elevated work platform in the breaker zone, facilitating the use of terrestrial equipment necessary for trench excavation and pipeline installation, will also result in habitat loss. The total loss of critical /natural habitat within the offshore zone is estimated to 15 ha, including the temporary dike. All of it is in Critical Habitat because the marine EAAA extends beyond the Ramsar site.

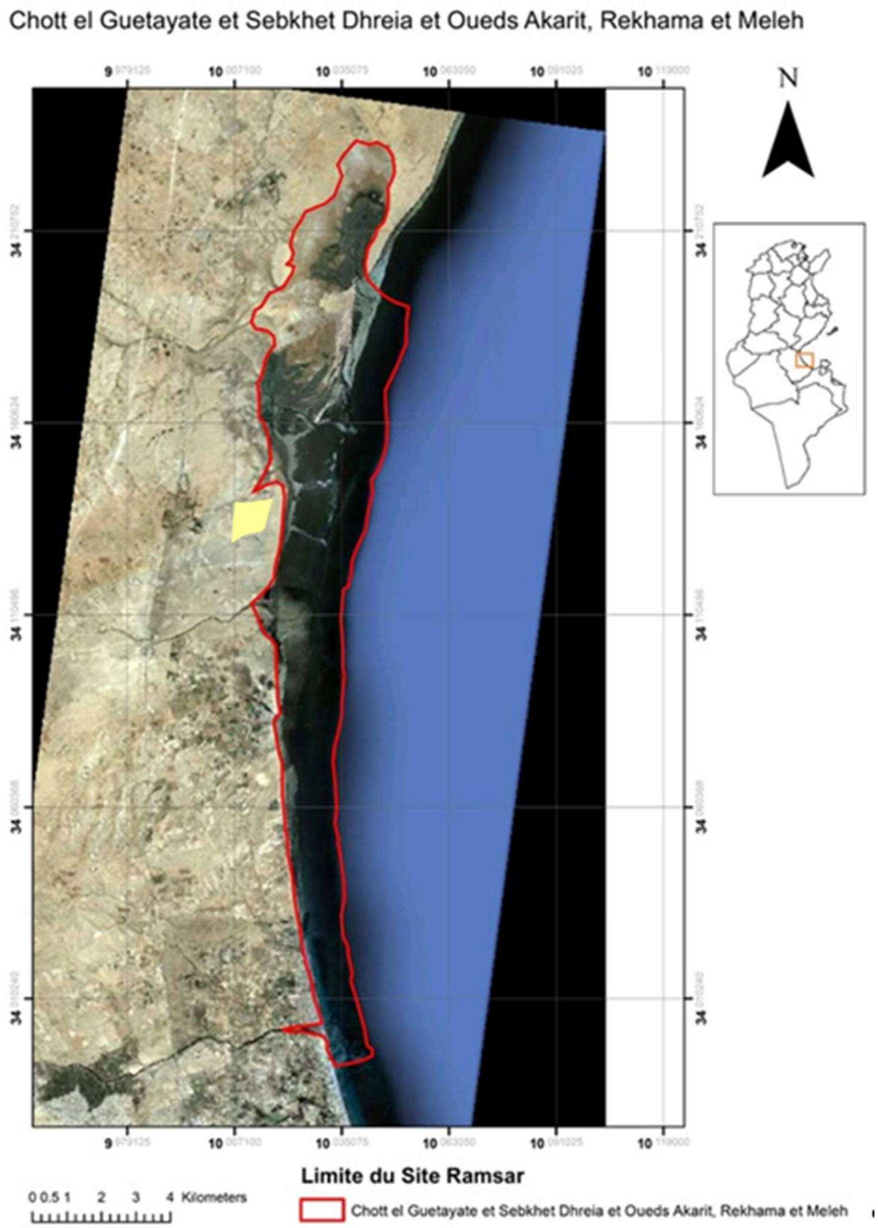

Figure 8 : location of the HJ Project within the Ramsar site

Among these 15 ha, approximately 12.1 ha consist of soft sediment, while the remainder consists of seagrass meadows. Specifically, 1.3 ha of *Cymodocea nodosa* and 1.6 ha of *Posidonia oceanica* meadows will be lost.

The surveys conducted during the Environmental Impact Assessment (EIA) have shown that the intertidal zone is devoid of benthic vegetation up to a distance of 870 meters. Beyond this distance, a meadow of *Cymodocea nodosa* appears from the shore and extends up to 1250 meters. Following this is the wave-breaking zone devoid of seagrass. Seagrasses meadow of *P.ocenanica* begin to appear from 2400 meters and extend up to 3500 meters with a coverage percentage of 65%, as seen in **Error! Reference source not found.**

In the soft sediment, the disturbance is transient and will last for a few months. Recovery rates reported in the literature suggest that a recovery time of 6 to 8 months is required after the cessation of work [4]

For *Cymodocea nodosa*, which is considered a pioneer seagrass, natural recovery is relatively fast and typically takes between 1 and 2 years. The natural recovery of *P. oceanica*, on the other hand, has been observed to be lengthy, extending over a period of 7 years post-operations, and only in the absence of additional disturbance. However, recent studies suggest that restoration efforts can accelerate this recovery process. To facilitate successful restoration, it is imperative to have a comprehensive understanding of the local environmental conditions. Some parameters, such as sediment composition analysis, water quality, and seagrass health assessment, have already been collected as part of the ESIA. A more detailed study will be conducted as part of the seagrass restoration management plan. This detailed study will include biodiversity surveys, including potential grazers and invasive species.
The Critical Habitat Assessment has designated this area as critical habitat for 22 marine species, including 14 species of sharks and rays. However, the likelihood of interaction with the project is low, especially concerning sharks and rays, due to their remarkable capacity for movement and ability to avoid areas of disturbance. The most significant risk is the mortality of *Pinna nobilis*, which may occur. In 2011, the density of this species was reported to be 1.5 individuals per 100 m2 at depths ranging from 0.3 to 6 meters [5], but these values may have changed due to a parasitic epidemic in 2016, which led to substantial mortality within this species.

Disturbances and displacement of wildlife may occur during offshore construction works, particularly affecting individuals from three bird species for which the area has been designated as critical habitat.

A coastal ecosystem restoration management plan will be developed to guide these efforts, ensuring that both immediate and long-term environmental concerns are effectively addressed.

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[4] Newell, R. & Seiderer, Lindsay & Hitchcock, David. (1998). The impact of dredging works in coastal waters: a review of the sensitivity to disturbance and subsequent recovery of biological resources on the sea bed. Oceanography and marine biology. 36. 127-178

[5] Rabaoui, Lotfi & Tlig-Zouari, Sabiha & Ben Hassine, Oum Kalthoum. (2010). Modelling population density of *Pinna nobilis* (Bivalvia) on the eastern and southeastern coast of Tunisia. Journal of Molluscan Studies. 76. 340-347

8. COMPENSATION / ENHANCEMENTS

The HJ Project has impacted natural and critical habitats, necessitating compensatory measures to achieve No Net Loss (NNL) for natural habitat impacts and Net Gain (NG) for critical habitat impacts (IFC, 2012, 2019).

Species for which the Project has a NG commitment will need additional conservation actions, even if there are no impacts predicted.

8.1 Onshore

8.1.1 Approach

A commonly utilized method for assessing terrestrial habitat losses and determining a project's obligation to achieve No Net Loss (NNL) or Net Gain (NG) is through the use of biodiversity metrics. These metrics enable the quantification of biodiversity loss and the identification of the necessary quality hectares to achieve NNL. In the case of critical habitats, additional quality hectares are required to attain NG. The metric employed is based on the Habitat Hectares metric (Gamarra et al., 2018).[6]

For this assessment, simplifications were made to the Habitat Hectares metric, particularly regarding the approach to condition assessment. While the original approach requires detailed information about the components of a pristine habitat type, such data were not available for this assessment. Instead, the habitat types were determined based on field survey findings and categorized into quartiles ranging from fully intact to severely degraded habitats.

- 1 = Vegetation of the highest pristine naturalness, high representation of specialists, no occurrence of species indicating degradation (generalists).
- 0.75 = Vegetation of high pristine naturalness, only random occurrence of generalists.
- 0.5 = Vegetation with decreased naturalness and minor signs of degradation, not typical association of the indicator species, low proportion of generalists
- 0.25 = severely degraded and functionally compromised habitat.

The field surveys revealed that natural/critical habitats affected by the onshore HJ project were severely degraded but still functioning, influenced by activities such as grazing, clearing, and solid waste deposition. As a result, these habitats were assigned a value of 0.25.

8.1.2 Calculating Biodiversity Loss and Required Gains in onshore area

Based on the biodiversity metric used, 50.32 quality hectares are required to achieve NNL for natural habitat (Table 8). However, as the project affects critical habitat covering an area of 25.3 hectares, additional quality hectares beyond the 6.32 are required to achieve NG. The HJ Project is committed to achieving NG in critical habitats as part of its objectives, and onshore implementation will be carried out through the following approaches:

[6] Gamarra, M., Lassoie, J., & Mideros, J. (2018). Awarding for No Net Loss: A Critical Assessment of Biodiversity Offsetting Metrics and Methods. Journal of Environmental Management, 220, 38-43.

- Improving habitats adjacent to the project perimeter in accordance with the "like-for-like or better" principle
- Restoration of habitats temporarily disrupted within the working width during terrestrial pipeline installation, which will be detailed in the Coastal Ecosystem Restoration Plan.
- Implementation of additional conservation actions aimed at promoting and enhancing the conservation objectives of the protected sites in the KBA/IBA/Ramsar Site.

Table 8 : Quality Hectares Required to Achieve NNLin the onshore HJ project area

Quality Hectares Required to Achieve NNL			
Habitat	Area Lost As project footprint (ha)	Existing Condition	Quality Hectares for NNL (ha)
Natural habitat (Halophytic steppe)	176	0.25	44
Critical habitat (Halophytic steppe)	25.3	0.25	6.32
Total	201,3		50.32

8.1.3 Improving habitats adjacent to the HJ project

To ensure the attainment of the 50.32 quality hectares necessary for achieving NNL, we propose enhancing habitats around HJ project in consultation with relevant stakeholders (DGF, APAL, NGOs). IBA/KBA of Sabkhet Dhreiaa totaling an area of 1620 ha provide ample opportunities for habitat improvement. Ground surveys within these areas have identified potential sites for enhancement. The plan will target various habitat types and key fauna species, including birds, and micromammals, aiming to increase habitat heterogeneity and biodiversity. Enhancement measures include:

- Creating small islands within the wetlands to provide nesting and foraging grounds for birds. These islands will enhance habitat diversity and support breeding, passage, and wintering bird populations, contributing to the overall biodiversity of the ecosystem
- Planting native specimens of halophytic plants and other species adapted to saline and arid conditions.
- Manage invasive species that may compete with native vegetation and compromise restoration efforts. This may require manual removal, controlled burning, to restore ecological balance in the restored wetlands.

These measures are technically feasible and align with habitat conditions. Considering a starting condition of 0.25, raising the condition to 0.75 over 201,3 hectares will generate a biodiversity gain of 100,65 quality-hectares. To ensure the long-term success of these habitat enhancement projects, it is imperative that the benefits persist beyond the project's immediate impacts. The approach prioritizes sustainability by continuously monitoring and adapting efforts to maximize habitat resilience and biodiversity

8.1.4 Implementation of additional conservation actions

To achieve the necessary biodiversity gains to achieve the NNL and to obtain additional gains to achieve NG in biodiversity, the HJ project has identified several additional conservation actions. These projects were evaluated based on their ability to provide biodiversity gains and their feasibility of implementation.

Although officially classified as part of the Ramsar site, the habitats experience significant degradation due to various pressures such as solid waste mis-managament and unregulated bait collection (Polychaete and razor clam). The feasible projects presented in Table 11 could be initiated with the University of Gabès, Association for Biodiversity Conservation in the Gulf of Gabès (Ascob syrtis) and the Association of Wetlands of south Tunisia (AZHST). The objective will be to achieve biodiversity gains across the entire Ramsar site of Chott el Guetayate et Sebkhet Dhreia avec les oueds Akarit, Rekhama et Meleh.

Table 9 : Onshore additional conservation actions

Offset Measure	Biodiversity Gains	Responsible
1 Provide assistance to existing local monitoring programs to address Kentish plover, with a focus on the critical habitat area where the project site is located.	Would help in better understanding the population dynamics and habitat requirements of Kentish plovers, leading to more targeted conservation efforts and potentially increasing their numbers.	University of Gabès AZHST Ascob syrtis HJ
2 Provide support to local stakeholders to develop a program to manage and reduce existing non-natural predation risks to improve nesting success for priority species	Reducing threats from predation, especially during nesting periods, the nesting success of priority species could be enhanced, ultimately contributing to their population stability or growth	University of Gabès Ascob syrtis AZHST HJ
3 Provide funding to support the development of a Management plan of the Ramsar Site; including support to the implementation of recommended management approaches and monitoring programmes.	Facilitate coordinated conservation efforts and ensure that management approaches are based on scientific recommendations, leading to better protection and restoration of habitats within the Ramsar site	DGF APAL Contactor HJ
4 Provide support to the provision of increased awareness of the local community on the biodiversity value of the area and how to conserve features of interest.	By educating the local community about the biodiversity value of the area and the importance of conservation, it can lead to reduced human impacts on ecosystems, and increased participation in conservation activities.	Ascob syrtis AZHST HJ
5 Solid Waste removal in the coastal zone of the Ramsar site	Removing solid waste from the coastal zone of the Ramsar site would prevent pollution and habitat degradation	Ascob syrtis AZHST HJ
6 Assist the municipality of Oudhref establishing a controlled landfill for the Hicha area, which is currently disposing of waste near the Ramsar site."	Would prevent further pollution of the Ramsar site and surrounding habitats, thus protecting biodiversity and ecosystem health	HJ

8.2 Offshore

8.2.1 Calculating Biodiversity Loss and Required Gains in offshore area

The total loss of critical /natural habitat within the offshore zone is estimated to 15 ha of which 3 ha is in the Ramsar site / IBA / KBA of the Sebkhet Dhreia.

Among these 15 ha, approximately 12.1 ha consist of soft sediment, while the remainder consists of seagrass meadows. Specifically, 1.3 ha of *Cymodocea nodosa* and 1.6 ha of *Posidonia oceanica* meadows will be lost.

In the soft sediment, the disturbance is transient and will last for a few months. Recovery rates reported in the literature suggest that a recovery time of 6 to 8 months is required after the cessation of work. HJ have committed to achieving NG through implementing additional conservation actions for the intertidal zone.

The impacts on *Posidonia* seagrass considered here are both direct, involving the uprooting of seagrass meadows, and indirect, resulting from increased turbidity due to suspended sediments during dredging and hypersaline plumes during the exploitation phase, leading to reduced light penetration and affecting seagrass growth.

The offset actions we have identified is the use of measures promoting seagrass re-establishment in surrounding areas through the deployment of artificial reefs. These reefs will also protect against shallow trawl fishing, which remains highly active in the region, and provide additional habitats for fish. By attracting fish, whose feces provide concentrated nutrients for the seagrass, the artificial reefs increase the primary production of the entire ecosystem [7]. This resource enhancement technique is already being implemented by the DGPA in the Gulf of Gabes.

The concept of 'like for like' offsets relate to character and quality equivalence, including species diversity, functional diversity and composition, ecological integrity or condition and ecosystem services can be applied for seagrass restoration. A metric to ensure the character and quality equivalence of impacted and offset seagrass meadows might include the following parameters used in monitoring programs assessment of percent cover determined in reference to the seagrass before dredging, shoot density and phenological parameters.

To ensure a net gain for biodiversity, >2.9 hectares of seagrass will be restored, supplemented by the deployment of 24 artificial reefs. Given the complexity of estimating the biodiversity offset, we have utilized this number of 24 artificial reefs as a precautionary principle. The final outcome of the offset will be monitored to ensure it achieves a Net Gain.

[7] Andskog Mona A., Layman Craig and Allgeier Jacob E. 2023Seagrass production around artificial reefs is resistant to human stressorsProc. R. Soc. B.29020230803

8.2.2 Improving marine habitats

To ensure NG, we propose deployment of 24 artificial reefs. This activity will be done in consultation with relevant stakeholders (DGPA, INSTM, NGOs). Enhancement measures include:

- Conducting ecological assessments before and after reef deployment
- Monitoring the artificial reefs over time to assess their structural integrity, colonization by marine organisms, and contribution to local fisheries productivity.
- Engaging local communities in reef monitoring to foster ownership of the artificial reef sites.
- Collaborating with research organizations to conduct research on the ecological dynamics of artificial reefs and their role in supporting marine biodiversity and ecosystem resilience.

These measures are technically feasible and align with habitat conditions. We estimate that the proposed enhancements can target improvement of habitat quality over more than 2,4 hectares.

8.2.3 Implementation of additional conservation actions

The laboratory of Marine Biodiversity and Environment at the University of Sfax has conducted benthic surveys in an area adjacent to Hicha, gathering a significant amount of data on the distribution of marine habitats and species across the Gulf of Gabès. HJ will support this laboratory in publishing and promoting project survey data to facilitate research on the impact and best practices for bait collection in the intertidal zone of the Hicha area, known for its disruptive activities. Other feasible projects are presented in Table 9. The objective of the offshore additional conservation action will be to deliver biodiversity gains for marine critical habitat.

Table 10 : Offshore additional conservation actions

Offset Measure	Biodiversity Gains	Responsible
1 Support research on the impact and best practices for bait collection in the intertidal zone of the Hicha	This research can lead to more sustainable harvesting methods that minimize negative effects on intertidal biodiversity in the KBA area.	University of Sfax Ascob syrtis HJ
2 Provide support to local researchers to undertake tagging of Blackchin Guitarfish to better understand movements and habitat use and guide protection help to understand habitat inter-linkages and also define if there are important offshore aggregation areas that may warrant further conservation action and protection.	Understanding the spatial ecology of this species, identify and protect critical habitats and migration routes	University of Sfax INSTM Ascob syrtis HJ
3 Provide support to local researchers to undertake survey of Fan Mussel to verify the survival of this species	This information is crucial for assessing the remaining population and implementing targeted conservation actions	University of Sfax INSTM Ascob syrtis HJ
3 Provide support to Raise awareness about the importance of the intertidal zone and the need for conservation actions.	Can help protect and preserve intertidal habitats and the diverse species that rely on them.	Ascob syrtis AZHST HJ

9. STAKEHOLDERS ENGAGEMENT

The pipeline works, as well as the adjacent areas designated for habitat enhancements to achieve NNL/NG, are located within the Ramsar site. Through measures aimed at achieving NNL/NG, HJ is committed to improving the designated sites. Consultations with key stakeholders of the Ramsar site have been conducted as part of the EIA process, including with the focal point of Tunisia in the Ramsar Convention, Direction General of Forests who has issued approval for the works within the Ramsar site. Similarly, consultations have been undertaken with the APAL "**A**gence de **P**rotection et **A**ménagement de **L**ittorale," which gives the principal approval for this project in addition the Ministry of Equipment, Housing and Territorial Development also gives the approval to cross the 100 m between the land and the foreshore area. Other stakeholders are informed about the project such as the marine fishing authority, the marine guard authority to inform them of the objectives of the project. This consultation will continue throughout the duration of the BMEP, on a semi-annual basis.

The outcomes of the actions outlined in this BAP, as well as the results of monitoring, will be shared with any other stakeholders identified during the implementation of the BAP.

10. BIODIVERSITY MANAGEMENT AND MONITORING PLANS

A Biodiversity Monitoring and Evaluation Plan (BMEP) summarizes indicators, target values, and current status. This Excel workbook is updated on a regular basis.

APPENDIX 1: Critical habitat assessment

Preliminary Critical Habitat Assessment

Value	Common Name	Habitat Association	Target value for KBA or Protected Area?	IBAT (Y/N)	Expected in Baseline (Y/N)	Confirmed in Baseline (Y/N)	Conservation Status		EOO (km2)	Range Restricted	AOO (km2)	EAAA (km2)	Criterion 1			Criterion 2	Criterion 3		Criterion 4		Criterion 5	Likelihood of CH	Comments
							Global	National					1.a.	1.b.	1.c.	2.a.	3.a.	3.b.	4.a.	4.b.			
Anthozoa																							
Cladocora caespitosa		Marine	NA	Yes	Yes	Yes	EN	NA	1,995,6 85.679	No	1.792.000	270.000 (EBSAs Sicilian Channel)	Yes	NA	NA	NA	NA	NA	NA	NA	NA	very High	*Cladocora caepitosa* is the only endemic zooxantehellate in the Mediterranean Sea. This coral species is a long lived coral species with the generation length estimated to be about 30 years (Casado-Amezúa et al., 2015) and can form banks at the present time (Morri et al., 1994). In the last 40 years, Cladocora caespitosa was observed several times in outer parts of the Gulf of Gabes (El Kateb et al. 2016) (See Sheet 24). Some living corals are known to occur in the south-eastern of the Kerkennah Island and in the north-eastern part of Djerba Island (El Lakhrach et al., 2012). Significant mortality of this species was observed off Haouaria in northeastern Tunisia in 2017 (Ghanem et al. 2019). Therefore, it is possible that this species could trigger Criterion 1. In accordance with the precautionary principle, this species could possibly qualify the EAAA as being located in Critical Habitat.
Insecta																							
Thorectes puncticollis		Terrestrial	NA	Yes	No	Yes	EN	NA	80.000	Yes	NA	50	Yes	Yes	NA	NA	NA	NA	NA	NA	NA	very High	This species was described from museum collections (Baraud, J. 1965). It is rare in Tunisia (I. Labidi pers. obs. 2013). As with other Thorectes species, this species could have fragmented subpopulations because its flightless characteristic. Moreover, 80% of the known subpopulations are in coastal areas and suffer agriculture intensification and habitat modification. It is suspected that at least 50% of the subpopulations could remain in small and isolated areas, and are unlikely to be viable. The population is considered severely fragmented (Verdú et al., 2015) . This Coleoptera is classified as having a limited and fragmented range (See Sheet 23), with anywhere from 1 to 95 percent of the known global population potentially in the EAAA. Consequently, there is a possibility that this species may meet the criteria for both Criterion 1 and 2. In line with the precautionary principle, the presence of this species could potentially designate the Project area as Critical Habitat.

Bivalvia																							
Pinna nobilis	Fam Mussel	Marine	NA	Yes	Yes	Yes	EN	NA	1,819,158.439	Yes	1,336.000	270.000 (EBSAs Sicilian Channel)	Yes	Yes	NA	NA	NA	NA	NA	NA	NA	High	This species is endemic to the Mediterranean Sea, where it is distributed throughout the basin, occurring from the mediolittoral zone from the low tide level to approximately 60 m depth (See sheet 25),The majority of populations have experienced a significant decline since the onset of a mass mortality event that began along the Spanish coasts in autumn 2016 (Vázquez-Luis et al., 2017). These events have rapidly spread eastward throughout the species' range (Carella et al., 2019; Katsanevakis et al., 2019). Mass mortalities have been reported in many populations in the eastern Mediterranean from 2018 to 2022, including Tunisia, Malta, Greece, Cyprus, and Turkey (IUCN, 2018; Labidi, 2023). Rabaoui et al. (2010) observed that prior to the initial mass mortality event, the average and maximum measured fan mussel densities in the eastearn coast of Tunisia were 0.015 and 0.56 ind/m2. However, since the occurrence of mass mortality events, many of the populations used to calculate these density values have vanished (IUCN, 2019). Some living specimens have recently been observed by Labidi et al. (2023) in the Bizerte lagoon. Therefore, it is possible that this species could trigger Criterion 1. In accordance with the precautionary principle, this species could possibly qualify the EAAA as being located in Critical Habitat.
Chondrichthyes																							
Carcharias taurus	Sand Tiger Shark	Marine	NA	Yes	Yes	Yes	CR	NA	255,408,789.792	NO	796.000	270.000 (EBSAs Sicilian Channel)	NA	NA	NA	NA	NA	NA	N/A	N/A	N/A	Very low	The Sand Tiger Shark has a circumglobal distribution but is now rare in the Mediterranean, the last known record of the Sand Tiger Shark was of an individual captured in 2008 and with no records since, it is suspected that there are less than 250 mature individuals remaining in the Mediterranean and that the species is considered Critically Endangered and locally Possibly Extinct (Walls and Soldo 2016, Bargnesi et al. 2020). Its extent of range overlaps with the EAAA, but the total population is suspected to reductions of >80% over the past three generation lengths (74 years) have decreased by over 80% in the last three generations .It is unlikely that the EAAA will support significant concentrations of this species (i.e. at least 0.5% of the global population and 5 reproductive units). Therefore, a judgement call was made to exclude the species from qualifying marine habitat as critical habitat in terms of criterion1 given that the qualifying thresholds are unlikely to be exceeded.

Squatina squatina	Angelshark	Marine	NA	Yes	Yes	Yes	CR	NA	228,48 8,490.8 09	NO	1,520.000	270.000 (EBSAs Sicilian Channel)	Yes	NA	NA	NA	NA	NA	N/A	N/A	N/A	Very low	This species has been reported off the coasts of Tunisia and Algeria, although it was considered rare in the Gulf of Gabès (Bradai, 2000). Furthermore, fisheries statistics indicate that 180 tonnes of angel sharks (Squatina spp.) were reported landed by Tunisia in 2015, an increase from 125 tonnes in 2014. This species could be present in the EAAA. Therefore, it is possible that this species could trigger Criterion 1. In accordance with the precautionary principle, this species could possibly qualify the Project as being located in Critical Habitat.
Galeorhinus galeus	Tope	Marine	NA	Yes	Yes	Yes	CR	NA	84,240, 820.69 4	NO	2,816.000	270.000 (EBSAs Sicilian Channel)	NA	NA	NA	NA	NA	NA	N/A	N/A	N/A	Possib le	This species is widely distrubuted in the world but genetic and tagging data support the presence of north east and mediterranean population. Many observations indicate that tope has low frequency of occurence in mediterranean sea (Ramírez-Amaro et al. 2020). This species is considered rare in the EAAA (Enajar et al., 2022) . It cannot be ruled out, that ≥ 0.5% of the global population and ≥ 5 reproductive units occur within the EAAA, thus qualifying for Criterion 1.
Aetomylaeus bovinus	Duckbill Eagle	Marine	NA	Yes	Yes	Yes	CR	NA	51,718, 693.13 3	No	776.000	270000 (EBSAs Sicilian Channel)	Yes	NA	NA	NA	NA	NA	N/A	N/A	N/A	High	This species occurs throughout shallow, coastal and offshore waters of the Mediterranean Sea (Ebert and Stehmann 2013). Outside the Mediterranean Sea the range of the species extends in the eastern Atlantic Ocean from northwestern Spain to the Indian Ocean. This species is reported as very commun in the gulf of Gabès (Enajar et al., 2022), It is likely that the area supports globally important concentration ≥ 0.5% of the global population and ≥ 5 reproductive units
Leucoraja melitensis	Maltese Skate	Marine	NA	Yes	Yes	Yes	CR	NA	461,61 1.210	Yes	28.000	25.000 (EBSAs Gulf of Gabès)	Yes	NA	NA	Yes	NA	NA	N/A	N/A	N/A	Very low	The species is endemic to the Mediterranean. Its range now appears to be restricted to the Sicilian Channel between Malta and Tunisia(GFCM 2012). The depth range is 60–800 m, but it is most commonly found between 400–800 m This species is considered rare off Malta and Tunisia (Mourad et al., 2018) The threshold for triggering Critical Habitat for this species is uncertain since the population has not been estimated in this area . Given that limited information available on the presence and extent of this species, this species is considered as restricted-range as anywhere from 1 - 95 percent of the (known) global population could be present in the EAAA. It is therefore possible that this species could trigger Criterion 1 and 2. In accordance with the precautionary principle, this species could possibly qualify the Project as being located in Critical Habitat.

Squatina aculeata	Sawback Angelshark	Marine	NA	Yes	Yes	Yes	CR	NA	17,126,696.351	NO	372.000	270.000 (EBSAs Sicilian Channel)	Yes	NA	NA	NA	NA	NA	N/A	N/A	N/A	Possible	Ragonese et al. (2013) reported a single capture close to the Gulf of Gabès in 2000 during a GRUND survey covering the area between Sicily, Malta, and Tunisia. Bradaï et al. (2006) assessed the Sawback Angelshark as regularly observed in the Gulf of Gabès (Tunisia), according to Capapé et al. (2005) who reported the capture of 27 specimens between 1970 and 2002. This species could be present in the EAAA. It is therefore possible that this species could trigger Criterion 1. In accordance with the precautionary principle, this species could possibly qualify the Project as being located in Critical Habitat.
Squatina oculata	Smoothback Angelshark	Marine	NA	Yes	Yes	Yes	CR	NA	19,936,610.309	NO	532.000	270.000 (EBSAs Sicilian Channel)	Yes	NA	NA	NA	NA	NA	NA	NA	NA	Possible	The species was a common ambush predator over large areas of its coastal and outer continental shelf soft sediment habitat at depths of 10 to 500 m in the Mediterranean Sea and Eastern Atlantic In the central Mediterranean, Ragonese et al. (2013) reported the capture of three Smoothback Angelsharks in 1997, 1998, and 2006 from 2,311 hauls conducted between Sicily, Malta, and Tunisia in the 1994-2009 period. This species is also reported reported for the Tunisian Gulf of Gabès coast (Quignard and Othman 1978). Capapé et al. (1990) recorded 108 specimens and 60 young-of-the-year in Tunisian waters (period not specified), suggesting the shallow waters of the Gulf of Tunis could be a parturition and nursery area. Bradaï et al. (2006) considered Smoothback Angelsharks to be regularly observed in the Gulf of Gabès, and the species was confirmed off the Libyan coast (Lamboeuf et al. 1995). This species could be present in the EAAA. It is therefore possible that this species could trigger Criterion 1. In accordance with the precautionary principle, this species could possibly qualify the Project as being located in Critical Habitat.

Rhinobatos Rhinobatos	Common guitarfish	Marine	NA	Yes	Yes	Yes	CR	NA	18,234,524.715	No	648.000	270.000 (EBSAs Sicilian Channel)	Yes	NA	NA	NA	NA	NA	NA	NA	NA	High	The Common Guitarfish is demersal across sandy, muddy, and shelly habitats, and occurs inshore on the continental shelf to a depth of 180 m (Ebert and Stehmann 2013). It is found in the eastern Atlantic Ocean and Mediterranean Sea and occurs from the southern Bay of Biscay to Angola (Last et al. 2016). It is suspected that the Common Guitarfish has undergone a population reduction of >80% over the last three generation lengths (42 years) based on abundance data and actual levels of exploitation and it is assessed as Critically Endangered. Observations from the 1980s indicate that the Common Guitarfish was prevalent within North African coast and eastern basin of Mediterranean (Quignard and Capapé 1971, Whitehead et al. 1984, Echwikhi et al. 2012, Echwikhi et al. 2013). This species is still caught in the Gulf of Gabès (Bradai, 2001) and has been targeted by artisanal fishers for decades, landings indicate declines in abundance with catches containing a large proportion of immature individuals (Enajjar, 2008). After concertation with local expert (Samira Enajjar, INSTM Sfax) It is likely that the EAAA will support significant concentrations of this species (i.e. at least 0.5% of the global population and 5 reproductive units).
Glaucostegus cemiculus	Blackchin guitarfish	Marine	NA	Yes	Yes	Yes	CR	NA	20,778,805.696	No	784.000	270.000 (EBSAs Sicilian Channel)	Yes	NA	NA	NA	NA	NA	NA	NA	NA	High	The Blackchin Guitarfish is widely distributed in the eastern Atlantic Ocean from the northern coast of Portugal to Angola, including the Mediterranean Sea (where it appears to be more prevalent in the southern and eastern regions) (Capapé 1989, Last et al. 2016). The Gulf of Gabés, and areas of the eastern Mediterranean seem to be a core parts of the species' distribution, the species is still present and in some areas still commonly caught (e.g., Echwikhi et al. 2014, Soldo et al. 2014, Lteif 2015, Newell 2016). It is likely that the EAAA will support significant concentrations of this species (i.e. at least 0.5% of the global population and 5 reproductive units)
Myliobatis aquila	Common Eagle ray	Marine	NA	Yes	Yes	Yes	CR	NA	32,383,902.381	No	1,204.000	270.000 (EBSAs Sicilian Channel)	Yes	NA	NA	NA	NA	NA	NA	NA	NA	Possible	In the Mediterranean Sea, the Common Eagle Ray is sometimes landed in fisheries as bycatch, particularly in the northern Mediterranean Sea (Gurbet et al. 2013). Formerly very abundant in the Gulf of Tunis and Gabès (Capapé, 1976) This species is now reported as rare in the all the tunisian coast (Enajjar et al., 2022). Observations conducted by Enajjar Samira (Rays specialist) show that this species has been observed an average of fifty times per year in the Gulf of Gabès (Personal communication). it can be assumed that ≥ 0.5% of the global population and ≥ 5 reproductive units occur within the EAAA .It is therefore possible that this species could trigger Criterion 1.

Carcharhinus plumbeus	Sandbar Shark	Marrine	NA	Yes	Yes	Yes	EN	NA	247,38 0,198.5 51	NO	1,580.000	270.000 (EBSAs Sicilian Channel)	Yes	NA	NA	NA	NA	NA	NA	NA	NA	High	Carcharhinus plumbeus is widely distributed and undertakes large migrations (Ebert et al. 2013). Records of sandbar sharks are reported throughout the Mediterranean (CAPAPÉ, 1989), but the species seems to be more abundant in the Adriatic Sea, the Levantine Basin and off the Maghrebin shore (BRADAÏ et al.,2004). In the Gulf of Gabès, landings of sandbar sharks occurred year round, especially from March to October (Saidi et al., 2005). However, the Gulf of Gabés is probably a nursery area for this species. The population size of this species is unknown but can be assumed that ≥ 0.5% of the global population and ≥ 5 reproductive units occur within the EAAA .It is therefore possible that this species could trigger Criterion 1.
Cetorhinus maximus	Basking shark	Marine	NA	Yes	Yes	Yes	EN	NA	96,359, 747.05 4	NO	2,052.000	270.000 (EBSAs Sicilian Channel)	NA	NA	NA	NA	NA	NA	NA	NA	NA	Very low	The basking shark is a migratory and widely distributed in all the ocean but never being an abundant species. It is a coastal-pelagic shark found from boreal to warm temperate waters of all seas including Mediterranean Sea (Campagno, 1984).There are no data on the absolute global population size, although it is likely to be greater than 20,000 individuals (IUCN, 2023). Fifteen basking sharkshave been reorded in Tunisian coasts since 1964. The last specimen observed was a male caught accidentally in Cap Negro in Northern Tunisia on 21 may 2019 (Enajjar et al, 2019). Given the relatively small record of this species , it is unlikely that the EAAA will qualify as Critical Habitat for this species.
Isurus oxyrinchus	Shortfin Mako	Marine	NA	Yes	Yes	Yes	EN	NA	69,308, 302.33 6	No	2,048.000	270.000 (EBSAs Sicilian Channel)	Yes	NA	NA	NA	NA	NA	NA	NA	NA	Possib le	There are no data available on the absolute global population size of the Shortfin Mako. In mediterranean sea an estimated decline of 99.9% in abundance and biomass since the early 19th century was reported (Ferreti et al. 2008). This species is cited as commun in the tunisian coast (Enajjar et al., 2022). This species could be present in the EAAA. It is therefore possible that this species could trigger Criterion 1. In accordance with the precautionary principle, this species could possibly qualify the Project as being located in Critical Habitat.

Mustelus mustelus	Common smoothhound	Marine	NA	Yes	Yes	Yes	EN	NA	42,102,299.913	No	1,712.000	270.000 (EBSAs Sicilian Channel)	Yes	NA	NA	NA	NA	NA	NA	NA	NA	HIgh	Even though there is confusion between the two species, *Mustelus mustelus and Mustelus punctulatus*, this small shark seems to be more abundant in the Gulf of Gabès compared to other Mediterranean regions (western, central, and eastern) (Echwikhi et al., 2013). A fishery-independent survey conducted between 2007 and 2008 in this area caught a mean of 2.2 individuals per kilometer of gillnet per day (Echwikhi et al., 2013). In recent decades, a continuous decrease in smoothhounds across the Mediterranean, combined with a contraction in their spatial distribution, has been reported (Colloca et al., 2017). Specifically, it was estimated that the Common Smoothhound and Blackspotted Smoothhound have declined by 88% in the western Mediterranean and Adriatic Sea since the 1920s (Colloca et al., 2017). It can therefore be assumed that ≥ 0.5% of the global population and ≥ 5 reproductive units occur within the EAAA, thus qualifying for Criterion 1.
Rostroraja alba	White skate	Marine	NA	Yes	Yes	Yes	EN	NA	39,848,351.824	No	1,032.000	270.000 (EBSAs Sicilian Channel)	NA	NA	NA	NA	NA	NA	NA	NA	NA	Very low	The overall geographical range of *Rostroraja alba* covers the Eastern Atlantic coasts, including the Mediterranean Sea, and extends into the southwestern parts of the Indian Ocean. Little information is available on the population size of the white skate. However, available data indicate that this species has undergone a reduction in abundance and is now considered rare in the Northeast Atlantic and the Mediterranean. This species was regularly captured by fisheries in Tunisian waters and was common in all Tunisian coastal waters, but captures were more frequent in the northern part of the Tunisian coast (Capape 1976). Captures in the Gulf of Gabès seem to be correlated with water depths greater than 100 meters (Kadri et al., 2014). Given the ray's habitat preference and very large range, it is highly unlikely that the limited and shallow waters of the golf of Gabès would support, , numbers sufficient to meet the 0.5% threshold

Oxynotus centrina	Angular Roughshark	Marine	NA	Yes	Yes	Yes	EN	NA	30,016,465.515	No	524.000	270.000 (EBSAs Sicilian Channel)	NA	NA	NA	NA	NA	NA	NA	NA	NA	Very low	The Angular Roughshark is found in the Northeast and Eastern Atlantic Ocean and the Mediterranean Sea (Ebert et al., 2013). Records along the Tunisian coast are sporadic and temporally distant. The species has been reported off the northern coast (Capapé, 1989) and southward in the Gulf of Gabès (Bradaï et al., 2002). The last captures of two specimens of O. centrina occurred in 2019 (Capapé et al., 2021). It is unlikely that the EAAA will support significant concentrations of this species (i.e., at least 0.5% of the global population and 5 reproductive units). Therefore, a judgment call was made to exclude the species from qualifying marine habitat as critical habitat in terms of criterion 1, given that the qualifying thresholds are unlikely to be exceeded.
Gymnura altavela	Spiny Butterfly Ray	Marine	NA	Yes	Yes	Yes	En	NA	56,923,289.853	No	2,872.000	270.000 (EBSAs Sicilian Channel)	Yes	NA	NA	NA	NA	NA	NA	NA	NA	High	The spiny butterfly ray, *Gymnura altavela*, has a global range spanning four broad ocean regions: the Mediterranean and Black Sea, Eastern Central and Southeast Atlantic, Northwest and Western Central Atlantic, and Southwest Atlantic (IUCN, 2021). This species is commonly found in the Gulf of Gabès (Enajjar et al., 2022) and inhabits shallow coastal waters, including intertidal zones, on sandy and muddy substrates down to depths of 150 meters, but typically at depths of less than 50 meters (Last et al., 2016). Recent genetic analysis supports the existence of two genetically distinct lineages of G. altavela (West and East Atlantic), suggesting the need for further investigation to determine if these lineages represent cryptic species within this endangered ray genus (Vilasboa et al., 2022). Therefore, it is possible that this species could trigger Criterion 1. In accordance with the precautionary principle, this species could possibly qualify the EAAA as being located in Critical Habitat.
Raja radula	Rough Skate	Marine	NA	Yes	Yes	Yes	En	NA	2,170,843.422	No	408.000	270.000 (EBSAs Sicilian Channel)	Yes	NA	NA	NA	NA	NA	NA	NA	NA	High	The Rough Skate occurs throughout the Mediterranean Sea, but mainly in the western region and around the Balearic Islands (Serena 2005) (See sheet 18). This skate is found in coastal waters to depths of ~350 m (Stehmann and Bürkel 1984, Serena 2005). Off the Tunisian coasts, R. radula is frequently captured as a by-catch of demersal trawls throughout the year in shallow coastal waters (Kadri et al., 2013). In the Gulf of Gabes landings occurs throughout the year, especially during spring. According to it's geographical range, It is likely that the EAAA will support significant concentrations of this species (i.e. at least 0.5% of the global population and 5 reproductive units)

Raja undulata	Undulate Skate	Marine	NA	Yes	Yes	Yes	En	NA	2,675,959.324	No	1,952.000	270.000 (EBSAs Sicilian Channel)	NA	NA	NA	NA	NA	NA	NA	NA	NA	very low	The undulate ray is a little known skate from the north-east Atlantic Ocean and Mediterranean Sea (Serena, 2005) (See Sheet 19). Within the Mediterranean Sea, R. undulata has been reported occasionally from the western basin , and with very occasional records from the eastern basin, (Serena, 2005; Capape,´ et al., 2006; Psomadakis et al., 2006). Raja undulata was previously reported off the Tunisian coast (Le Danois, 1925), and since, it was no more recorded, despite thorough investigations were made in the area (Bradai et al., 2004; Rafrafi et al., 2015). Given this informations, it is unlikely that the EAAA will qualify as Critical Habitat for this species.
Leucoraja circularis	Sandy Skate	Marine	NA	Yes	Yes	Yes	EN	NA	16,331,253.809	No	720.000	270.000 (EBSAs Sicilian Channel)	NA	NA	NA	NA	NA	NA	NA	NA	NA	very low	There are two subpopulations of this species, with different situations for the Northeast Atlantic and Mediterranean Sea (See sheet 20). It is likely that there is low connectivity between these two deepwater zones (Coelho et al., 2009). This species seems to be more in the western area of the Mediterranean Sea (Baino et al. 2001). From 1972 to 2007 only 11 specimens were recorded in the north coast of Tunisia at depths between 150 and 350 m and only a single one during 25 years, between 1982 and 2007 (Mnasri et al., 2009). Given this informations, it is unlikely that the EAAA will qualify as Critical Habitat for this species.
Mobula mobular	Spinetail Devil Ray	Marine	NA	Yes	Yes	Yes	EN	NA	222,132,948.008	NO	2,596.000	270.000 (EBSAs Sicilian Channel)	NA	NA	NA	NA	NA	NA	NA	NA	NA	very low	The Spinetail Devil Ray is distributed worldwide in temperate and tropical waters across all oceans (see sheet 21). It is notably observed in the Mediterranean Sea (Notarbartolo di Sciara et al., 2017), with sporadic presence throughout its range (Lawson et al., 2017). The population trend in the Mediterranean Sea is unknown, but it is suspected to be decreasing. In Tunisia, since 1976 only two specimens was observed in 10 years (Bradai & Capapé, 2001). From 2004 to 2014, 11 specimens of Mobula japonica (syn Mobula mobular)were recorded on the northern coast of Tunisia (Capapé et al., 2015). Due to the extensive range of this species and its sporadic occurrence in the EAAA, it is unlikely that the EAAA will support significant concentrations of this species (i.e., at least 0.5% of the global population and 5 reproductive units). Therefore, a judgment call was made to exclude the species from qualifying marine habitat as critical habitat in terms of criterion 1.

Dasyatis tortonesei	Tortonese's Stingray	Marine	NA	No	Yes	Yes	DD	NA	7,490,904.096	Yes	120.000	270.000 (EBSAs Sicilian Channel)	Yes	Yes	NA	NA	NA	NA	NA	NA	NA	Very high	There are no estimates of population trend for Tortonese's Stingray. The species was described from individuals caught off the Tunisian coast (Capapé 1975, 1977). The taxonomic status of this species is considered valid by Fricke et al. (2020) but has been questioned by several authors and synonymized with the Common Stingray by others (Serena et al. 2020). Its potential limited and patchy distribution (see sheet22) , is of concern as it is possible that a large part of its range is threatened by fishing pressure, and it is susceptible to capture in various gear. This species is considered as restricted-range as anywhere from 1 - 95 percent of the (known) global population could be present in the EAAA. It is therefore possible that this species could trigger Criterion 1 and 2. In accordance with the precautionary principle, this species could possibly qualify the Project as being located in Critical Habitat.
Actinopterygii																							
Anguilla anguilla	European Eel	Marine /freshwater	NA	Yes	Yes	Yes	CR	NA	8,442,677.912	Yes	680.000	270.000 (EBSAs Sicilian Channel)	Yes	NA	NA	NA	NA	NA	N/A	N/A	N/A	Very high	In northern Africa, Anguilla anguilla is a non-breeding visitor found along the coast, especially in estuarine habitats and lagoons (See Sheet 26). The decline in eel fishery catches is evident. In Tunisia, over the past two decades, production has decreased from 300 tonnes in 1989 to less than 100 tonnes in 2005 (DGPA). The reasons for this decline are manifold: over-exploitation, river management practices, water pollution, and infestation by hematophagous parasites. Unfortunately, there have been no studies conducted in Tunisia regarding the status of eel stocks or their biomass estimation (Derouiche et al., 2016). Given the substantial decline in catches since 1980, it is suspected that the population will decrease by more than 50% between 1980 and 2025 if immediate and effective conservation measures are not implemented (Azeroual, 2010). Therefore, it is possible that this species could trigger Criterion 1. In accordance with the precautionary principle, this species could possibly qualify the EAAA as being located in Critical Habitat.

Reptilia																							
Chelonia mydas	Geen Turtle	Marine/Terrestrial	NA	Yes	Yes	Yes	EN	NA	118,120,666.598	Yes	2,828.000	270.000 (EBSAs Sicilian Channel)	NA	NA	NA	NA	NA	NA	N/A	N/A	N/A	Very low	The Green Turtle has a circumglobal distribution, occurring throughout tropical and, to a lesser extent, subtropical waters, including the Mediterranean Sea (See Sheet 27). This species is highly migratory, undertaking complex movements and migrations through geographically disparate habitats. After spending a number of years in the oceanic zone, these turtles recruit to neritic developmental areas rich in seagrass and/or marine algae where they forage and grow until reaching maturity (Musick and Limpus, 1997). Nesting occurs in more than 80 countries worldwide (Hirth, 1997), with regular nesting observed in the Mediterranean. At the beginning of the 20th century, Blanc (1935) reported that green turtles were sold in fish markets in Tunisia and considered the species common along the southern coast. Laurent et al. (1990) mentioned its presence in Tunisian waters, but the species was regarded as rare (Bradai et al., 2008). From 2004 to 2015, a total of 14 green turtles (6 stranded and 8 incidentally captured) were recorded in the Gulf of Gabès. Green turtles are primarily caught by shallow water bottom trawling, especially in seagrass areas (Karaa et al., 2016). Recently, a green turtle nesting site was identified on Rejich beach in Mahdia (Ismail et al., 2022). Worldwide population numbers for the green turtle do not exist, and estimates of the number of nesting females are based on nesting beach monitoring reports and publications from 2004. Estimates range between 85,000 and 90,000 nesting females (Sea Turtle Conservancy). Taking into account observations made in Tunisia, it is unlikely that Criterion 1 will be triggered for EAAA.

Aves												270.000 (EBSAs Sicilian Channel)							N/A	N/A	N/A		
Numenius tenuiro	Slender billed Curlew	Terrestrial /Marine/Freshwater	NA	Yes	Yes	Yes	CR	NA	303000	Yes	NA	270.000 (EBSAs Sicilian Channel)	NA	NA	NA	NA	NA	NA	N/A	N/A	N/A	Very low	The population is assumed to be tiny (fewer than 50 individuals and mature individuals) based on the lack of recent records (Azafzaf et al., 2007)). There are no recent confirmed sightings of this species within Europe, where it formerly regularly wintered. At the European level, it is classified as Critically Endangered (Possibly Extinct) (BirdLife International 2015). Since 197O to 1984, there have been nine records of Slender-billed Curlew from Tunisia (Wymenga & van Dijk,1985). It must be accepted now that this small curlew can be considered on the verge of extinction (Isenman et al., 2005). Special survey for this species in 1994, 1997 and 2003 failed to produce any record Azafzaf et al., 2007.). Given this informations, it is unlikely that the EAAA will qualify as Critical Habitat for this species.
Puffinus maureta	Balearic shearwater	Terrestrial /Marine/Freshwater	NA	Yes	Yes	Yes	CR	NA	7E+06	Yes	9	270.000 (EBSAs Sicilian Channel)	NA	NA	NA	NA	NA	NA	N/A	N/A	N/A	Very low	Puffinus mauretanicus breeds almost exclusively in the Balearic Islands. However, some birds also utilize foraging grounds at the extremities of their distribution, including the continental shelf off Algeria and Morocco, as well as in the Gulf of Lion (Afán, 2016). While there have been observations attributed to this species in Tunisia at Hammamet, Cap Serat, Zarzis, and Nabeul (Isenmann et al., 2005), Puffinus mauretanicus remains extremely rare in Tunisia (Chokri M. A., personal communication) and would have an extremely low probability of meeting the 0.5% threshold.
Falco cherrug									2E+07	No	2,124.000	270000 (EBSAs Sicilian Channel)	NA	NA	NA	NA	NA	NA	N/A	N/A	N/A	Very low	This species occurs across a wide range in the Palearctic region, with irregular or vagrant specimens wintering or passing through Tunisia. Since Thiollay's observation in 1977, where he estimated that about 20 birds passed through Cap Bon in 1975 and 1976 during pre-breeding migration, flying towards Sicily , only 1 to 2 individuals have been regularly reported until 1989 (Isenmann, 2005). Since then, the species has become extremely rare (Chokri M. A., personal communication) and would have an extremely low probability of meeting the 0.5% threshold..

Oxyura leucocephala	White-headed Duck	Terrestrial /Freshwater	NA	Yes	Yes	Yes	EN	NA	1E+07	No	1,476.000	270 000 (EBSAs Sicilian Channel)		Yes	NA	NA	NA	NA	NA	NA	NA	Possible	This species is resident in Spain, Algeria, and Tunisia (See sheet 31), with the global population estimated to be between 7,900 and 13,100 individuals, approximately 5,300 to 8,700 of which are mature individuals. In January 2008, a total of 590 individuals were counted at El KALA, which could potentially represent the Maghreb population (Algeria and Tunisia), estimated to be between 400 and 600 birds (Hughes et al., 2006). The White-headed Duck (WHD) is a resident species throughout the year. The Tunisian population of this species is estimated to be around 573 birds (Hamza et al., unpublished data), representing more than 90% of the biogeographic population. Numerous wetlands in Tunisia are recognized as breeding sites for these species (Isenmann et al., 2005). Therefore, it is possible that this species could trigger Criterion 1. In accordance with the precautionary principle, this species could possibly qualify the EAAA as being located in Critical Habitat.
Neophron percnopterus	Egyptian Vulture	Terrestrial /Freshwater	NA	Yes	Yes	Yes	EN	NA	2E+07	No	2,140.000	270 000 (EBSAs Sicilian Channel)	NA	NA	NA	NA	NA	NA	NA	NA	NA	Very low	This species occupies a large range with some isolated resident populations (see Sheet 32). The Egyptian Vulture population in North Africa has experienced a dramatic decline over the last century. Once considered a common and widespread species, its population has considerably decreased. The number of nesting pairs in Tunisia was estimated to be 100-150 pairs for the period 1975-1990 (Isenmann et al., 2005). recent observations have confirmed that it still breeds there (Arkumarev et al., 2019). Preliminary results from research on old nests and newly occupied sites since 2001 have revealed that tens of old nesting sites have been abandoned, while some new sites have been occupied. There has been a decrease of approximately 44% in the total number of breeding pairs compared to the last estimation made in the 1990s (Tunisian Wildlife Conservation Society (TWCS), unpublished data). The national estimate currently stands at about 60–80 pairs, with the majority nesting in the Dorsale Mountains (Isenmann et al., 2005). The Egyptian Vulture breeds in loose colonies in Jebel Zaghouan, Jebel Orbata, Jebel Metlaoui, and Chbika. Given this informations, it is unlikely that the EAAA will qualify as Critical Habitat for this species.

Larus audouinii	Audouin's Gull	Terrestrial /marine	NA	Yes	Yes	Yes	Vu	Na	2E+06	No	1,964.000	270 000 (EBSAs Sicilian Channel)	NA	NA	NA	NA	NA	NA	NA	NA	NA	Very low	This species breeds from the Atlantic coast of Morocco to the southwest, north to Portugal, and east patchily through the Mediterranean (see sheet 33). The global population of Audouin's gull is estimated at 21,161 pairs individuals (Gutiérrez and Guinart, 2008); 90% of the breeding population is found in only four sites, with 70% concentrated in a single site (Ebro delta). The species scavenges around fishing vessels and utilizes discards extensively and very efficiently. The Tunisian Sicily Channel serves as a minor breeding area for Larus audouinii, with a small colony on the Galite archipelago, Tunisia (40 breeding pairs; BirdLife International, 2013), as well as on Zembra (10 pairs; BirdLife International, 2013) and Djerba (5 pairs; Chokri M. A., personal communication). For passage and wintering, this species is generally observed in small numbers along the entire coast, from Tabarka to Djerba, throughout the year (Isenmann et al., 2005). This species is listed as Vulnerable (IUCN, 2024), and it is unlikely that the EAAA support globally important concentrations of an IUCN Red-listed Vulnerable (VU) species. The loss of such a species would likely result in a change in the IUCN Red List status to Endangered (EN) or Critically Endangered (CR), meeting the thresholds of ≥0.5% of the global population.
Curruca sarda	Marmora's warbler	Terrestrial	NA	Yes	Yes	Yes	LC	NA	132000	Yes	NA	270 000 (EBSAs Sicilian Channel)	NA	NA	NA	NA	NA	NA	NA	NA	NA	Very low	The Marmora's Warbler is a Mediterranean endemic species with an insular distribution, inhabiting Sardinia, Corsica, the Balearic Islands excluding Menorca, and some smaller islands along Western Italy in the Tyrrhenian Sea. In 2000, the population was estimated to number between 15,000 and 50,000 breeding pairs (Aymí and Gargallo, 2015). Breeding on Tunisian islands appears to be doubtful according to Guatier T. (In Isenman et al., 2005). As elsewhere in continental North Africa, this species is regularly observed in small numbers in Tunisia, , from October to April in mountainous areas, along the coast, or in desert regions (Isenman et al., 2005). It is unlikely that this species will trigger Criterion 2 for restricted range species.

Charadrius alexandrinus	Kentish Plover	Marine /Terrestrial	NA	No	Yes	Yes	LC	NA	NA	No	NA	270 000 (EBSAs Sicilian Channel)	Yes	NA	NA	NA	NA	NA	N/A	N/A	N/A	High	This species has a large range. The worldwide population size is placed in the band 100,000-499,999 mature individuals (BirdLife International, 2015). This species is resident breeder in brackish and saline wetlands, especially sebkhets, in Tunisia. Numbers of breeders is estimated at 5000 birds (Cramp et simmons, 1983. For passage and wintering the the numbers have been estimated at 3400 at Kneiss (Sfax) in 1994 (Isenman et al, 2005). The IBA zone of Sebkhet Dreiaâ seem to hold congregations of ≥1% of the global population (between 700- 1000) BirdLife International, 2001). Therefore, it is possible that this species could trigger Criterion 1. In accordance with the precautionary principle, this species could possibly qualify the EAAA as being located in Critical Habitat.
Mammalia																							
Delphinus delphis	Commun Dolphin	Marine	NA	Yes	Yes	Yes	EN (Mediterranean)	NA	NA	NA	NA	270 000 (EBSAs Sicilian Channel)	NA	NA	NA	NA	NA	NA	N/A	N/A	N/A		Genetic studies indicate a significant level of divergence between Mediterranean and Atlantic populations of the Common Dolphin (Natoli et al., 2008). However, there has been relatively little survey coverage of waters along the North African coast. Sightings and stranding data indicate a regular presence of Common Dolphins in the Aegean Sea (Frantzis et al., 2002); otherwise, these dolphins are rare (Bearzi et al., 2003). There is no basin-wide estimate of abundance for Common Dolphins in the Mediterranean Sea. Vella (Bearzi et al., 2021) combined data from ship and aerial surveys conducted between 1997–2002 and obtained a density estimate of 0.135 dolphins per km². During surveys carried out in Tunisian waters in May 2003 and May 2005, Delphinus delphis were observed in the northern area at depths ranging from 200 to 1000 m (Ben Naceur et al., 2005). Some observations were also mentioned in northern Tunisia (Ben Massouad et al., 2017). This species rarely strands on Tunisian coasts. Only two stranding events were documented. The first event was an alive adult stranded on La Goulette beach (Northern Tunisia) in 1971. The second stranding occurred in 2005 along the central Tunisian coast at Mahdia (Karaa et al., 2012). The most recent stranding was found in March 2021 (Chaieb et al., 2023). Therefore, a judgement call was made to exclude the species from qualifying marine habitat as critical habitat in terms of criterion1 given that the qualifying thresholds are unlikely to be exceeded.

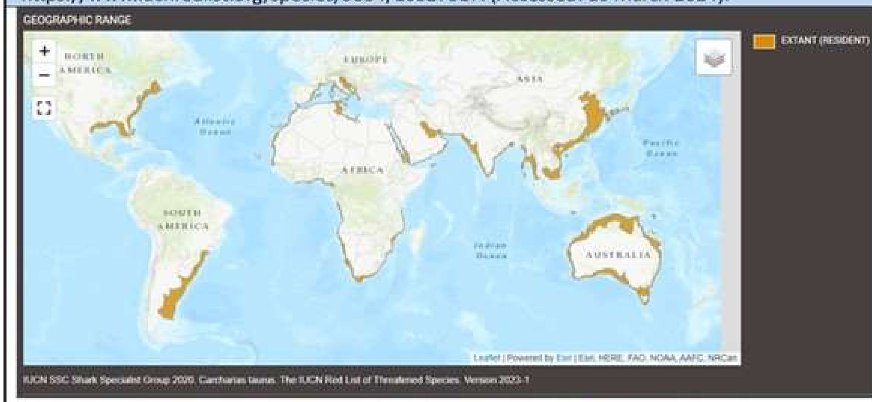
APPENDIX 2: INFORMATION SOURCES AND RANGE MAPS FOR SPECIES EVALUATIONS

Sheet 1
Carcharias taurus
Sand Tiger Shark
(CR)

Literature consulted :

Bargnesi, F., Gridelli, S., Cerrano, C. and Ferretti, F. 2020. Reconstructing the history of the sand tiger shark (***Carcharias taurus***) in the Mediterranean Sea. Aquatic Conservation: Marine and Freshwater Ecosystems 30(5): 915–927.

Walls, R.H.L. and Soldo, A. 2016. Carcharias taurus. Mediterranean. The IUCN Red List of Threatened Species 2016: e.T3854A16527817. Available at: https://www.iucnredlist.org/species/3854/16527817. (Accessed: 16 March 2024).



Source Rigby, C.L., Carlson, J., Derrick, D., Dicken, M., Pacoureau, N. & Simpfendorfer, C. 2021. *Carcharias taurus*. The IUCN Red List of Threatened Species 2021: e.T3854A2876505. https://dx.doi.org/10.2305/IUCN.UK.2021-2.RLTS.T3854A2876505.en. Accessed on 16 March 2024.

Sheet 2
Squatina squatina
Angelshark
(CR)

Literature consulted:

Bradai, M.N. 2000. Diversité du peuplement ichtyque et contribution à la connaissance des sparidés du golfe de Gabès. 600 p. Thèse de Doctorat, Univ. Sfax, Tunisie.

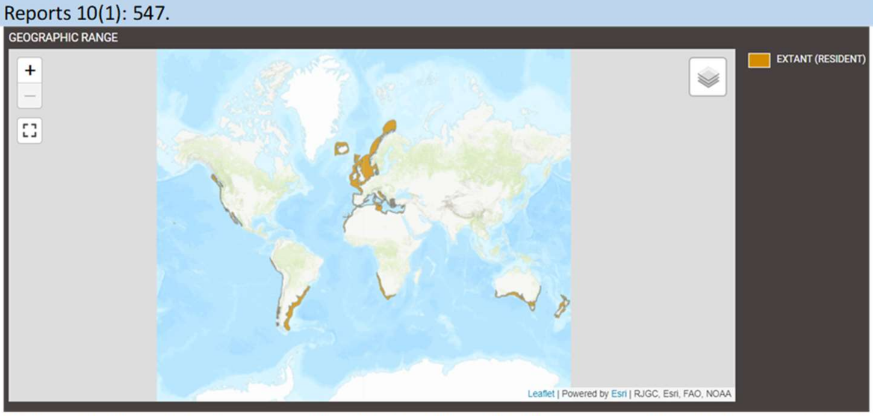
Morey, G, Barker, J., Hood, A., Gordon, C., Bartolí, A., Meyers, E.K.M., Ellis, J., Sharp, R., Jimenez-Alvarado, D. & Pollom, R. 2019. *Squatina squatina*. The IUCN Red List of Threatened Species 2019: e.T39332A117498371. https://dx.doi.org/10.2305/IUCN.UK.2019-1.RLTS.T39332A117498371.en. Accessed on 16 March 2024.

Sheet 3
Galeorhinus galeus
Tope
(CR)

Literature consulted:

Enajjar, S., Saïdi, B. *,Bradai, M. 2022. Elasmobranchs in Tunisia: Status, Ecology, and Biology. 10.5772/intechopen.108629.

Ramírez-Amaro, S., Ordines, F., Esteban, A., García, C., Guijarro, B., Salmerón, F., Terrasa, B. and Massutí, E. 2020. The diversity of recent trends for chondrichthyans in the Mediterranean reflects fishing exploitation and a potential evolutionary pressure towards early maturation. Scientific Reports 10(1): 547.



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Sheet 4
Aetomylaeus bovinus
Duckbill Eagle Ray
(CR)

Literature consulted:

Ebert, D.A. and Stehmann, M.F.W. 2013. Sharks, batoids, and chimaeras of the North Atlantic. FAO Species Catalogue for Fishery Purposes No. 7. Food and Agricultural Organization of the United Nations (FAO). FAO, Rome.

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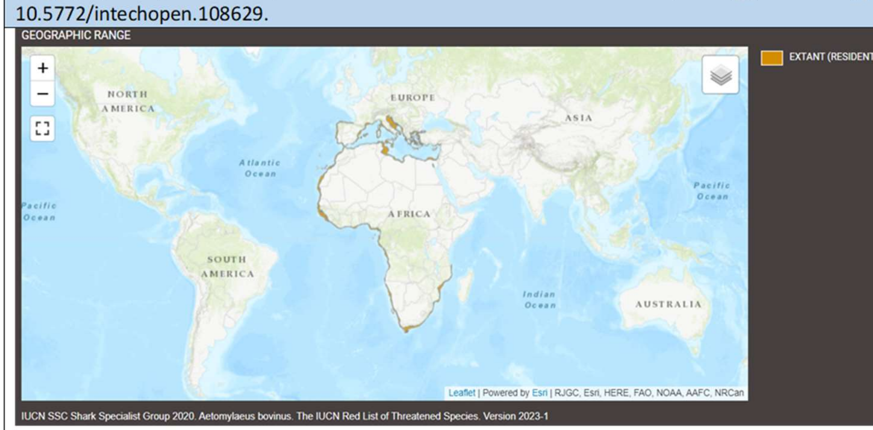

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Sheet 5
Leucoraja melitensis
Maltese Skate
(CR)

Literature consulted:

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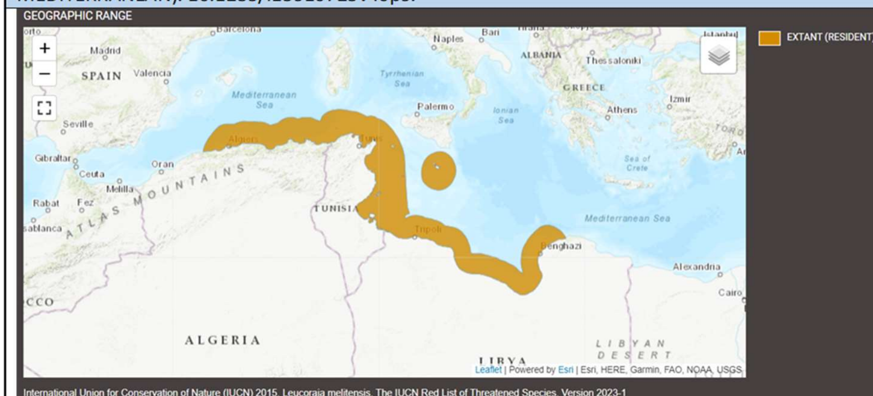

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Sheet 6
Squatina aculeata
Sawback Angelshark
(CR)

Literature consulted:

Bradaï, M.N., Saidi, B., Enajjar, S. and Bouain, A. 2006. The Gulf of Gabès: a spot for the Mediterranean elasmobranches. In: N. Basusta, Ç. Keskin, F. Serena and B. Seret (eds), The Proceedings of the Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, pp. 107-117. Turkish Marine Research Foundation, Istanbul, Turkey.

Capapé, C., Diatta, Y., Seck, A. A., Guelorget, O., Ben Souissi, J., and Zaouali, J. 2005. Reproduction of the sawback angelshark Squatina aculeata (Chondrichthyes: Squatinidae) off Senegal and Tunisia. Cybium 29(2): 147-157.

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Morey, G, Barker, J., Bartolí, A., Gordon, C., Hood, A., Jimenez-Alvarado, D. & Meyers, E.K.M. 2019. Squatina aculeata. The IUCN Red List of Threatened Species 2019: e.T61417A116768915. https://dx.doi.org/10.2305/IUCN.UK.2019-1.RLTS.T61417A116768915.en. Accessed on 16 March 2024.

Figure 2. - Map of Tunisia showing the captures sites (black stars) of Squatina aculeata in the area. BB: Bahiret El Biban; GG: Gulf of Gabès; GH: Gulf of Hammamet; GT: Gulf of Tunis; NC: Northern Coast. [Carte de Tunisie montrant les lieux de captures (étoiles noires) de Squatina aculeata dans la région. BB : Bahiret El Biban. GG : Golfe de Gabès. GH : Golfe de Hammamet ; GT : Golfe de Tunis ; NC : Côte septentrionale.]

Source: Capapé, C., Diatta, Y., Seck, A. A., Guelorget, O., Ben Souissi, J., and Zaouali, J. 2005. Reproduction of the sawback angelshark Squatina aculeata (Chondrichthyes: Squatinidae) off Senegal and Tunisia. Cybium 29(2): 147-157.

Sheet 7
Squatina oculata
Smoothback Angelshark
(CR)

Literature consulted:

Bradaï, M.N., Saidi, B., Enajjar, S. and Bouain, A. 2006. The Gulf of Gabès: a spot for the Mediterranean elasmobranches. In: N. Basusta, Ç. Keskin, F. Serena and B. Seret (eds), The Proceedings of the Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, pp. 107-117. Turkish Marine Research Foundation, Istanbul, Turkey.

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Sheet 8
Rhinobatos rhinobatos
Common Guitarfish
(CR)

Literature consulted:

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Echwikhi, K., Saidi, B. and Bradaï, M.N. 2013. Elasmobranchs longline fisheries in the Gulf of Gabès (southern Tunisia). Journal of the Marine Biological Association of the United Kingdom 64(1): 203-210.

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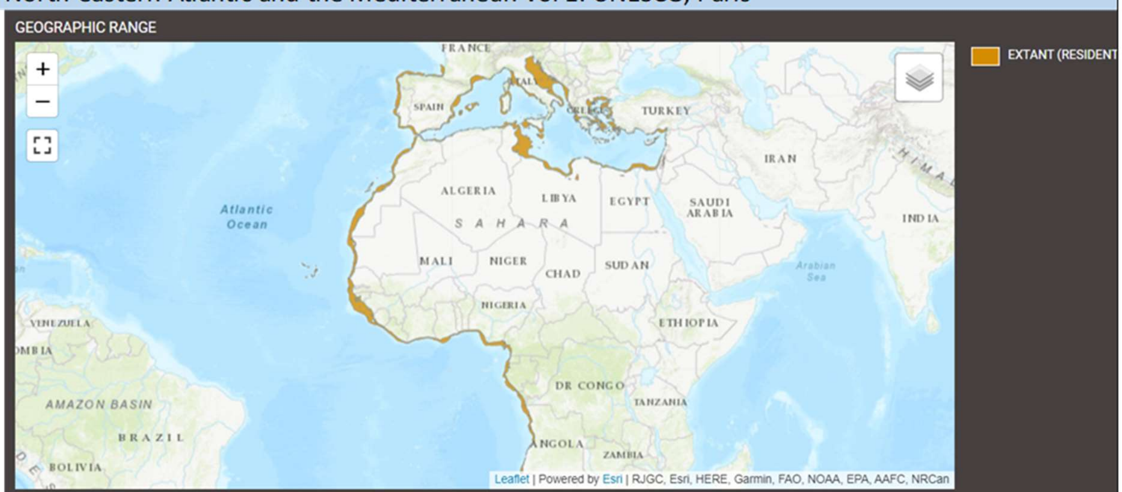
Quignard, J.P. and Capapé, C. 1971. Liste commentée des sélaciens de Tunisie. Salammbô Bulletin de l'Institut national scientifique et technique d'Océanographie et de pêche. 2(2): 13–41.

Whitehead, P.J.P., Bauchot, M.L., Hureau, J.C., Nielsen, J. and Tortonese, E. (eds). 1984. Fishes of the North-eastern Atlantic and the Mediterranean Vol 1. UNESCO, Paris



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Sheet 9
Glaucostegus cemiculus
Blackchin Guitarfish
(CR)

Literature consulted:

Capapé, C. 1989. Les Sélaciens des côtes méditerranéennes: Aspects généraux de leur écologie et exemples de peuplements. Océanis 15(3): 309-331.
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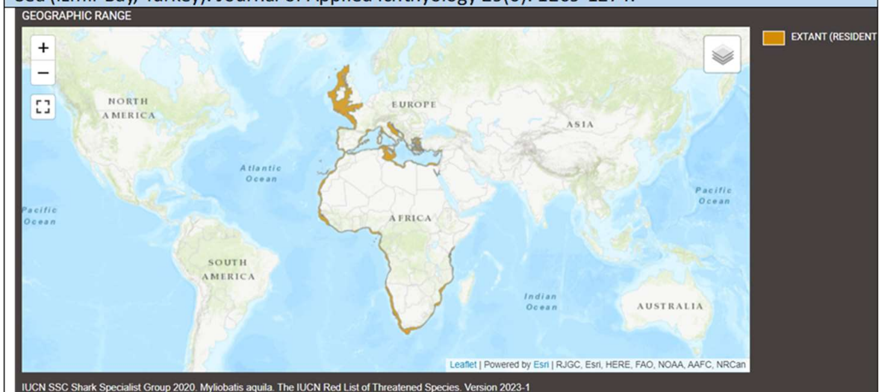
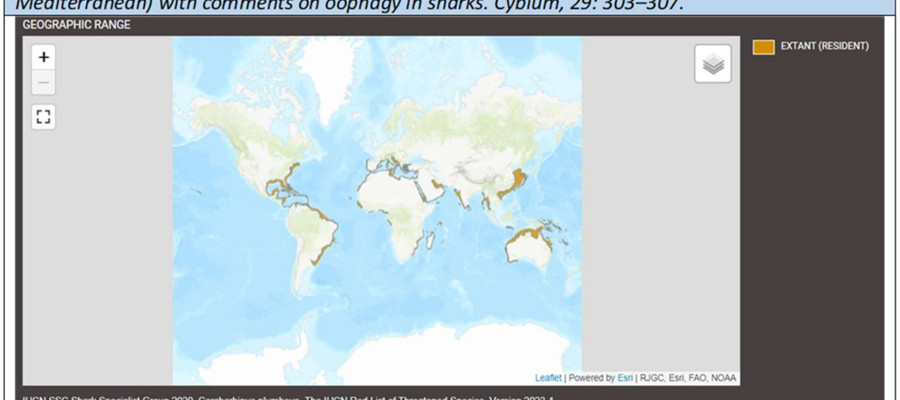
Sheet 10 ***Myliobatis aquila*** ***Common Eagle Ray*** **(CR)**
Literature consulted: Capapé C, Zaouali J. 1976. Contribution à la biologie des Scyliorhinidaedes côtes tunisiennes V. Galeus melastomus Rafinesque, 1810: Régime alimentaire. Archives de l'Institut Pasteur de Tunis. 53:281-291 Enajjar, S., Saïdi, B. *,Bradai, M. 2022. Elasmobranchs in Tunisia: Status, Ecology, and Biology. 10.5772/intechopen.108629. Gurbet, R., Akyol, O., Yalçın, E., and Özaydın, O. 2013. Discards in bottom trawl fishery in the Aegean Sea (Izmir Bay, Turkey). Journal of Applied Ichthyology 29(6): 1269-1274.



Jabado, R.W., Chartrain, E., Cliff, G., Da Silva, C., Derrick, D., Dia, M., Diop, M., Doherty, P., Leurs, G.H.L., Metcalfe, K., Pacoureau, N., Porriños, G., Seidu, I., Soares, A., Tamo, A., VanderWright, W.J., Williams, A.B. & Winker, H. 2021. Myliobatis aquila. The IUCN Red List of Threatened Species 2021: e.T161569A124508353. https://dx.doi.org/10.2305/IUCN.UK.2021-1.RLTS.T161569A124508353.en. Accessed on 16 March 2024.

Sheet 11 ***Carcharhinus plumbeus*** ***Sandbar Shark*** **(CR)**
Literature consulted: *Bradai, M.N., Quignard, J.P., Bouaïn, A., Jarbouï, O., et al. 2004. Ichtyofaune autochtone et exotique des côtes tunisiennes : recensement et biogéographie. Cybium.28:315-328* *Ebert, D.A., Fowler, S. and Compagno, L. 2013. Sharks of the World. A Fully Illustrated Guide. Wild Nature Press, Plymouth, United Kingdom.* *Capapé C. 1989 - Les Sélaciens des côtes méditerranéennes: aspects généraux de leur écologie et exemples de peuplements. Océanis, 15: 309-331.* *Saïdi, B., Bradai M.N., Boaïn, A.,Guélorget, O., Capapé, C. 2005. Capture of a pregnant female white shark, Carcharodon carcharias (Lamnidae) in the Gulf of Gabès (Southern Tunisia, central Mediterranean) with comments on oophagy in sharks. Cybium, 29: 303–307.*



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Sheet 12
Cetorhinus maximus
Basking Shark
(CR)

Literature consulted:

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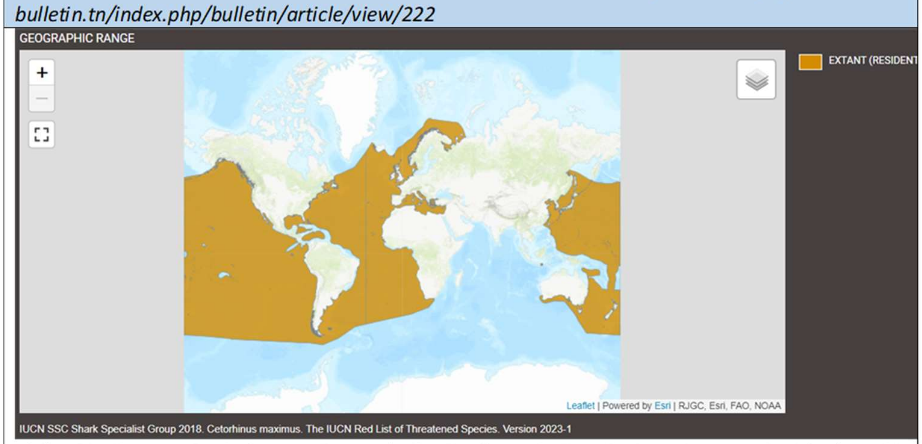

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Sheet 13
Isurus oxyrinchus
Shortfin Mako
(CR)

Literature consulted:

Ferretti, F., Myers, R.A., Serena, F. and Lotze, H.K. 2008. Loss of Large Predatory Sharks from the Mediterranean Sea. Conservation Biology 22: 952-964.

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Sheet 14
Mustelus mustelus
Common Smoothhound
(CR)

Literature consulted:

Colloca, F., Enea, M., Ragonese, S. and Di Lorenzo, M. 2017. A century of fishery data documenting the collapse of smooth-hounds (Mustelus spp.) in the Mediterranean Sea. Aquatic Conservation: Marine and Freshwater Ecosystems 27(6): 1145–1155.

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Sheet 15
Rostroraja alba
White Skate
(CR)

Literature consulted:

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Sheet 16
Oxynotus centrina
Angular Roughshark
(CR)

Literature consulted:

Bradaï M.N., Saïdi B., Ghorbel M., Bouaïn A., GuÉlorget O., Capapé C., 2002.- Observations sur les requins du golfe de Gabès (Tunisie méridionale, Méditerranée centrale). Mésogée, 60: 61-77.

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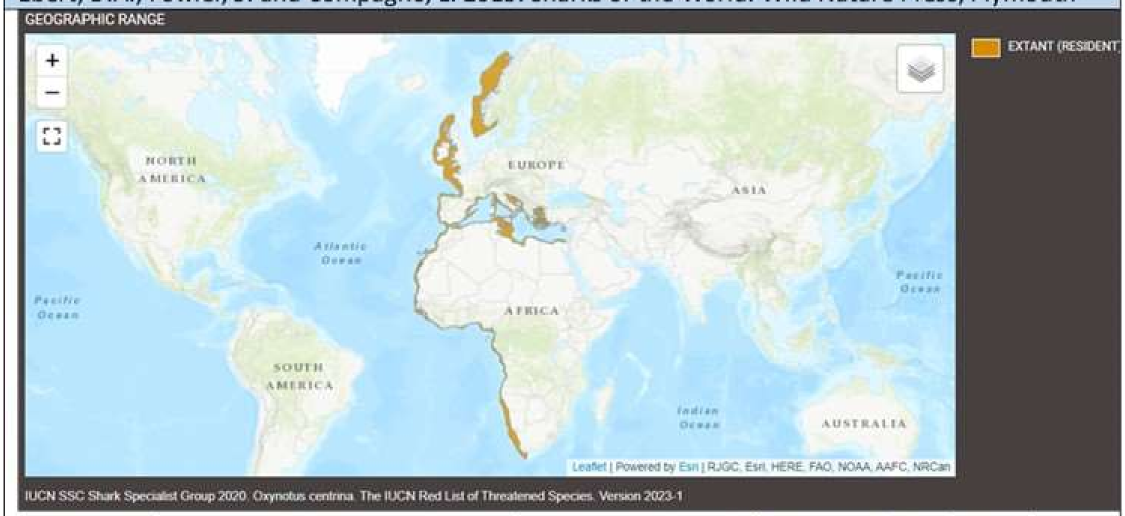

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Sheet 17
Gymnura altavela
Spiny Butterfly Ray
(CR)

Literature consulted:

Enajjar, S., Saïdi, B., Bradai, M. 2022. Elasmobranchs in Tunisia: Status, Ecology, and Biology. 10.5772/intechopen.108629.

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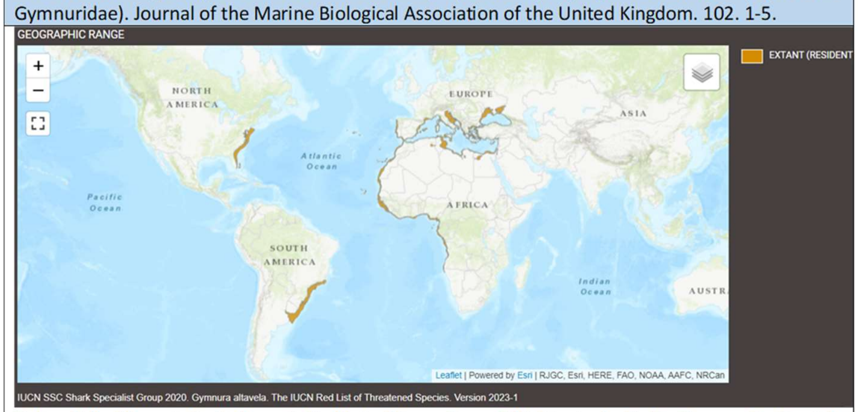

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Sheet 18
Raja radula
EN

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Kadri, H., Saidi, B., Marouani, S., Bradaï, M.N. and Bouaïn, A. 2013 . Age, growth and reproductive biology of the Rough Skate, Raja radula (Chondrichthyes: Rajidae), off the Gulf of Gabès (southern Tunisia, central Mediterranean). Marine and Freshwater Research 64(6): 540-548.

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Sheet 19
Raja undulata
EN

Litterature cited :

Bradai M.N., Quignard J.P., Bouain A., Jarboui O., OuannesGhorbel A., Ben Abdallah L., Zaouali J. & Ben Salem S. 2004. Ichtyofaune autochtone et exotique des côtes tunisiennes: Recensement et biogéographie. Cybium, 28: 315- 328.
Capape, C., Gu ´ elorget, O., Vergne, Y., Marqu ´ es, A. & Quignard, J. P. (2006). Skates and rays ` (Chondrichthyes) from waters off the Languedocian coast (southern France, northern Mediterranean): a historical survey and present status. Annales, Series Historia Naturalis 16, 165–178.
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Sheet 20
Leucoraja circularis
EN

Litterature cited :
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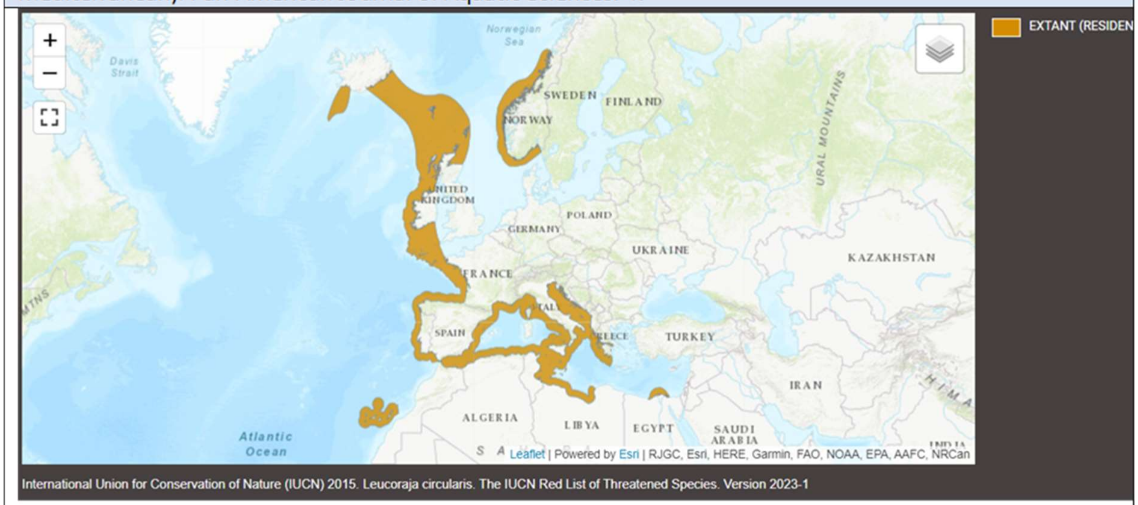

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Sheet 21
Mobula mobular
EN

Litterature cited :
Bradai, Mohamed & Capapé, Christian. (2001). Captures of the giant devil ray, Mobula mobular, in the Gulf of Gabes (Southern Tunisia, Central Mediterranean).. Cybium: international journal of ichthyology. 25. 389-391.
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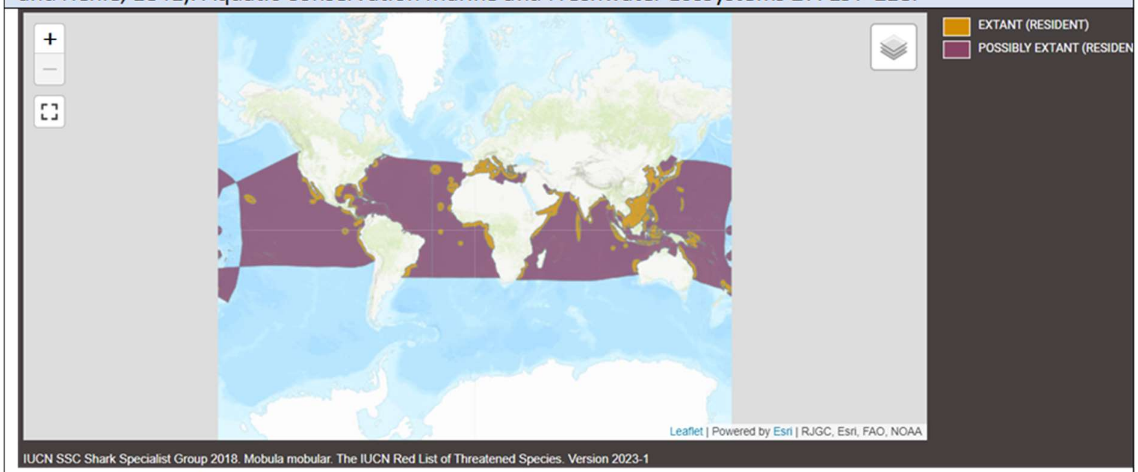

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Sheet 22
Dasyatis tortonesei
DD

Litterature cited :

Capapé, C. 1977. Les espèces du genre Dasyatis Rafinesque, 1810 (Pisces, Rajiformes) des côtes tunisiennes. Cybium 3(2): 75–105.
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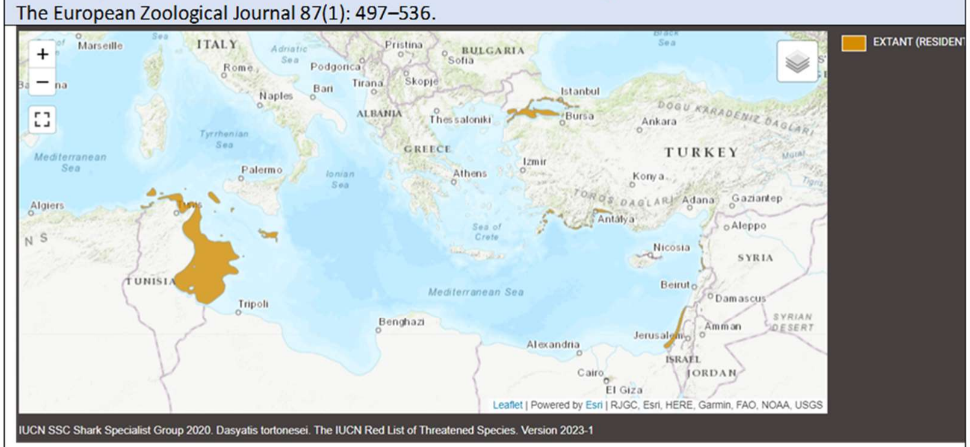

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Sheet 23
Thorectes puncticollis
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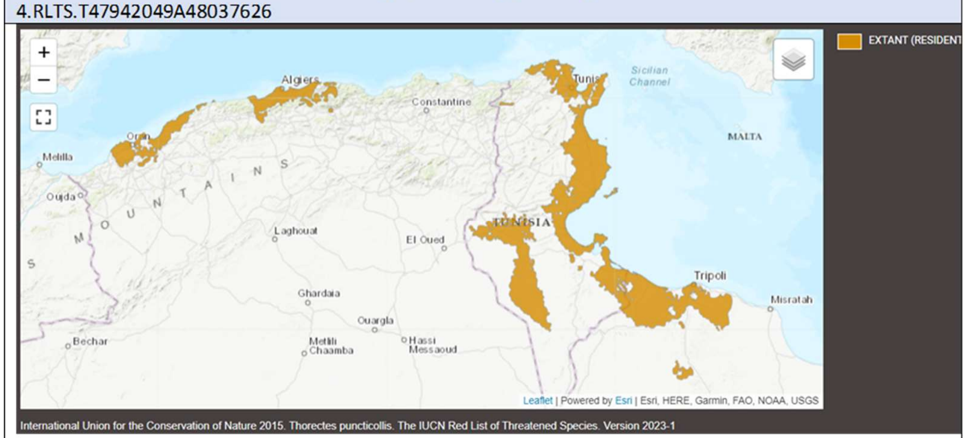

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Sheet 24
Cladocora caespitosa
EN

Litterature cited :

Casado de Amezua, P., Kersting, D., Linares, C.L., Bo, M., Caroselli, E., Garrabou, J., Cerrano, C., Ozalp, B., Terrón-Sigler, A. and Betti, F. 2015. Cladocora caespitosa. The IUCN Red List of Threatened Species. Available at: https://dx.doi.org/10.2305/IUCN.UK.2015-2.RLTS.T133142A75872554.en.

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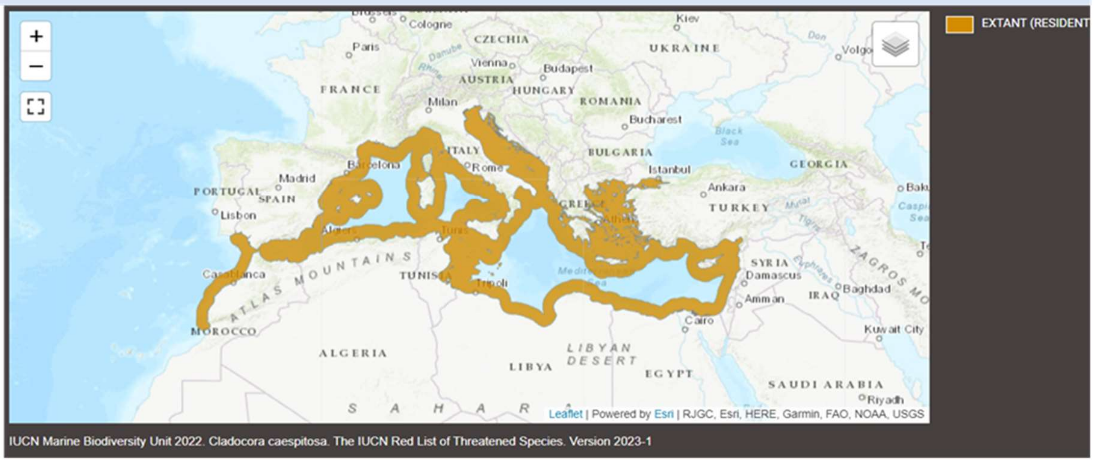

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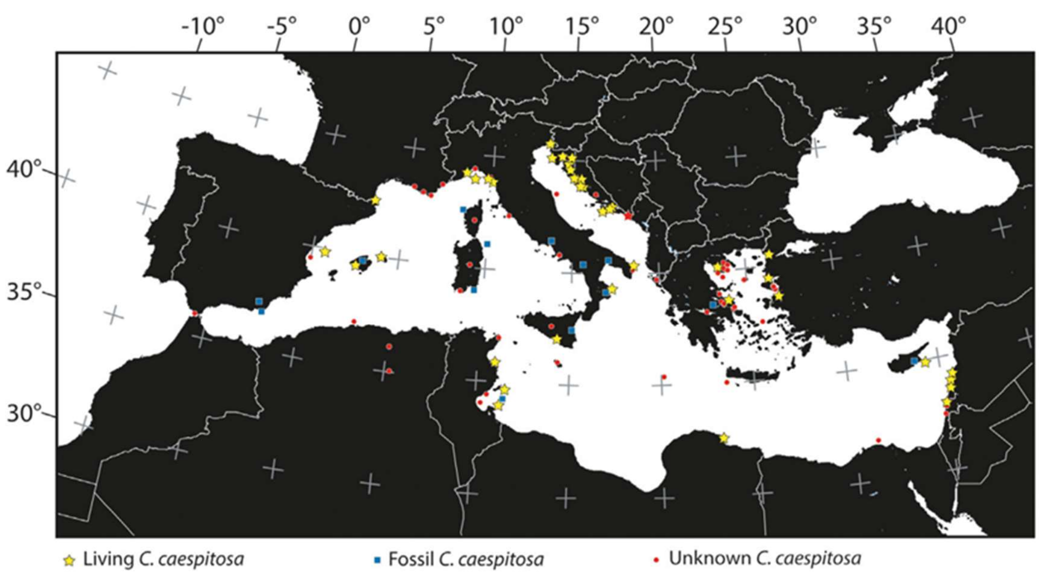

Distribution of the living *C. caespitosa* (yellow stars), fossil *C. caespitosa* (blue square) and location of C. caespitosa where their state (living or fossil) is unknown (red circles)

Sheet 25
Pinna nobilis
EN

Litterature cited :

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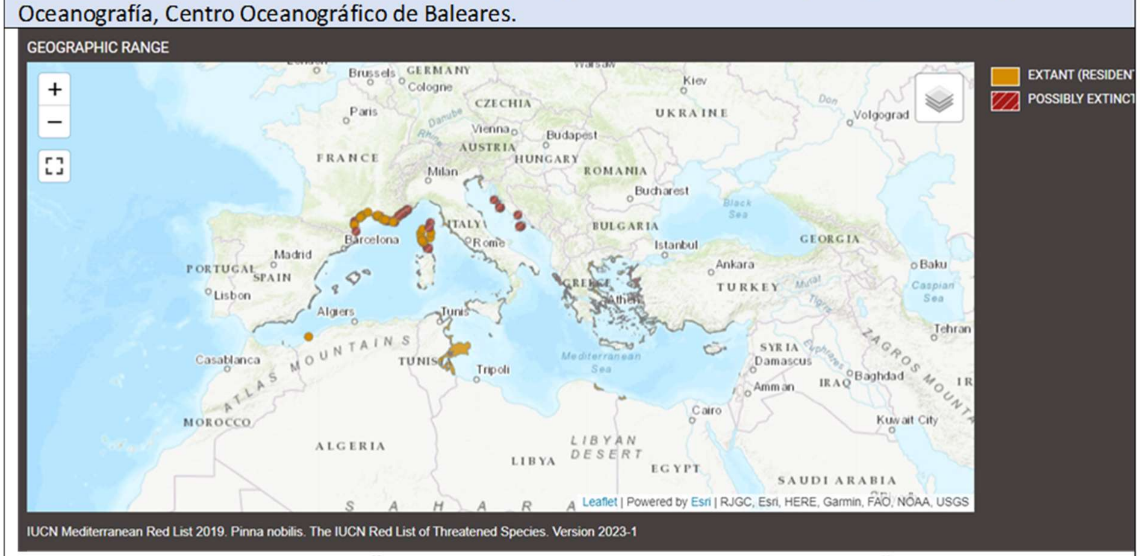

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Sheet 26
Anguilla anguilla
CR

Litterature cited :
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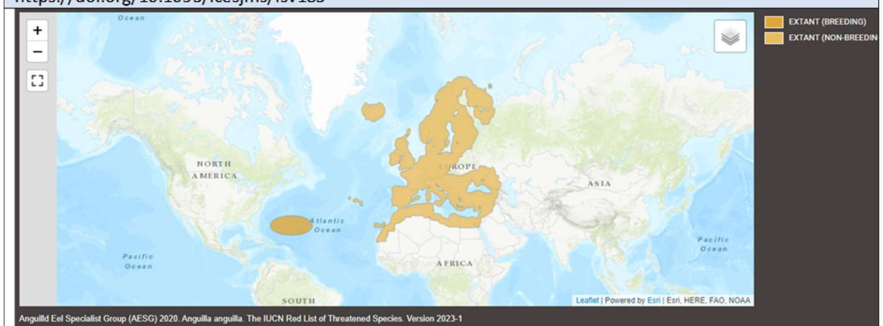
Derouiche, E. , Besma Hizem Habbechi, Med. Mejdeddine Kraïem, Pierre Elie, Estimates of escapement, exploitation rate, and number of downstream migrating European eels Anguilla anguilla in Ichkeul Lake (northern Tunisia), ICES Journal of Marine Science, Volume 73, Issue 1, January 2016, Pages 142–149, https://doi.org/10.1093/icesjms/fsv185



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Chelonia mydas
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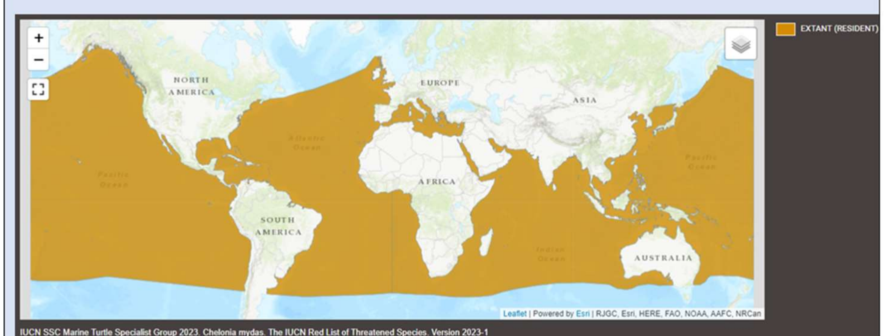

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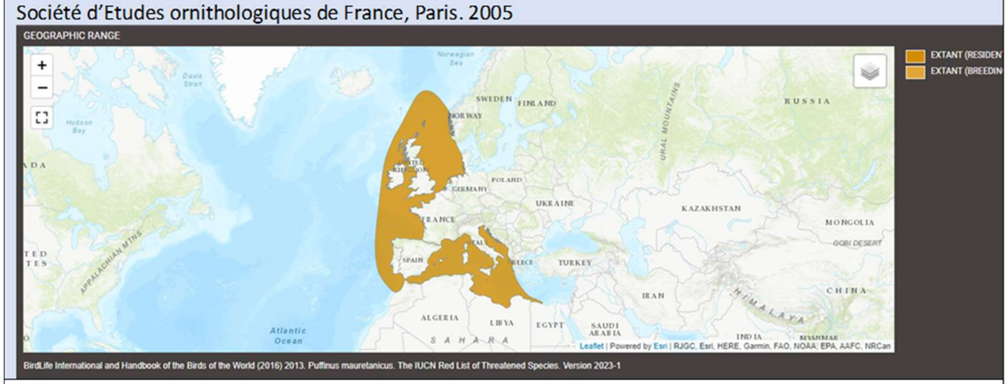
Sheet 28 *Numenius tenuirostris* CR
Litterature cited : Azafzaf, Hichem & Adam, Gretton & Kiss, J. & Smart, Michael & Zenatello, Marco & Azafzaf, Claudia. (2007). Search for the Slender-billed Curlew (Numenius tenuirostris) in Tunisia in January 2003. Ostrich - Journal of African Ornithology. 78. 505-505. Wymenga, Eddy & van Dijk, Klaas. (1985). Slender-billed Curlew Numenius tenuirostris in Tunisia in February 1984. Dutch Birding. 7. 67-68. Isenmann, P., Gaultier, T., El Hili, A., Azafzaf, H., Dlensi, H. & Smart, M. Oiseaux de Tunisie – Birds of Tunisia. Société d’Etudes ornithologiques de France, Paris. 2005

Source : BirdLife International. 2018. *Numenius tenuirostris*. The IUCN Red List of Threatened Species 2018: e.T22693185A131111201. https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22693185A131111201.en. Accessed on 17 March 2024.

Sheet 29 *Puffinus mauretanicus* CR
Litterature cited : Afán, I. 2016. Ecological response of marine predators to spatio-temporal environmental variability in resource availability. PhD thesis, Universitat de Barcelona, Spain. 265 p. Azafzaf, Hichem & Adam, Gretton & Kiss, J. & Smart, Michael & Zenatello, Marco & Azafzaf, Claudia. (2007). Search for the Slender-billed Curlew (Numenius tenuirostris) in Tunisia in January 2003. Ostrich - Journal of African Ornithology. 78. 505-505. Wymenga, Eddy & van Dijk, Klaas. (1985). Slender-billed Curlew Numenius tenuirostris in Tunisia in February 1984. Dutch Birding. 7. 67-68. Isenmann, P., Gaultier, T., El Hili, A., Azafzaf, H., Dlensi, H. & Smart, M. Oiseaux de Tunisie – Birds of Tunisia. Société d’Etudes ornithologiques de France, Paris. 2005



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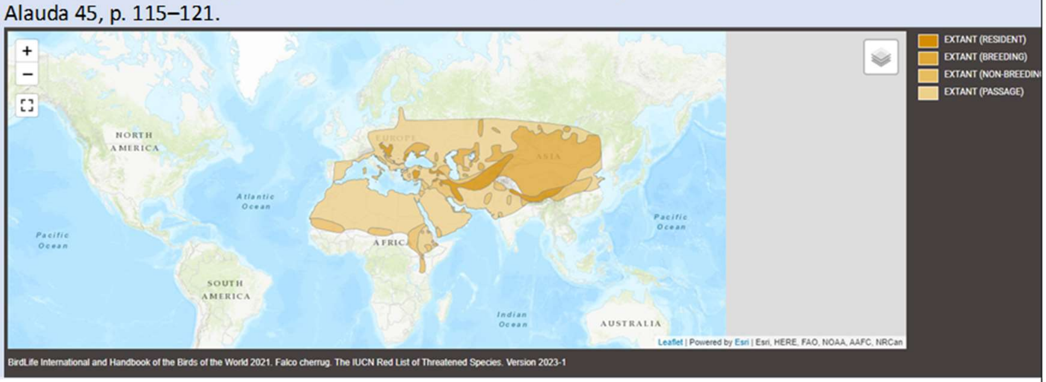
Sheet 30
Falco cherrug
EN

Litterature cited :
Isenmann, P., Gaultier, T., El Hili, A., Azafzaf, H., Dlensi, H. & Smart, M. Oiseaux de Tunisie – Birds of Tunisia. Société d'Etudes ornithologiques de France, Paris. 2005.
Thiollay J. M. (1977): Importances des populations de rapaces migrateurs en Mediterranee Occidentale. Alauda 45, p. 115–121.



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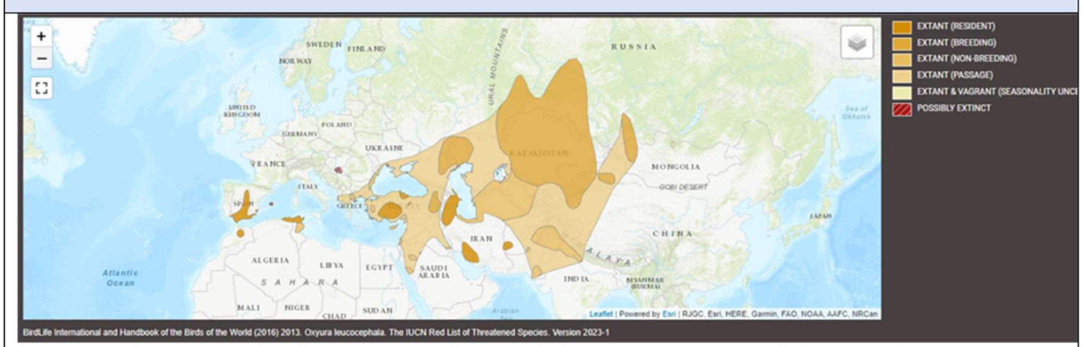
Sheet 31
Oxyura leucocephala
EN

Litterature cited :
Isenmann, P., Gaultier, T., El Hili, A., Azafzaf, H., Dlensi, H. & Smart, M. Oiseaux de Tunisie – Birds of Tunisia. Société d'Etudes ornithologiques de France, Paris. 2005.
Thiollay J. M. (1977): Importances des populations de rapaces migrateurs en Mediterranee Occidentale. Alauda 45, p. 115–121.



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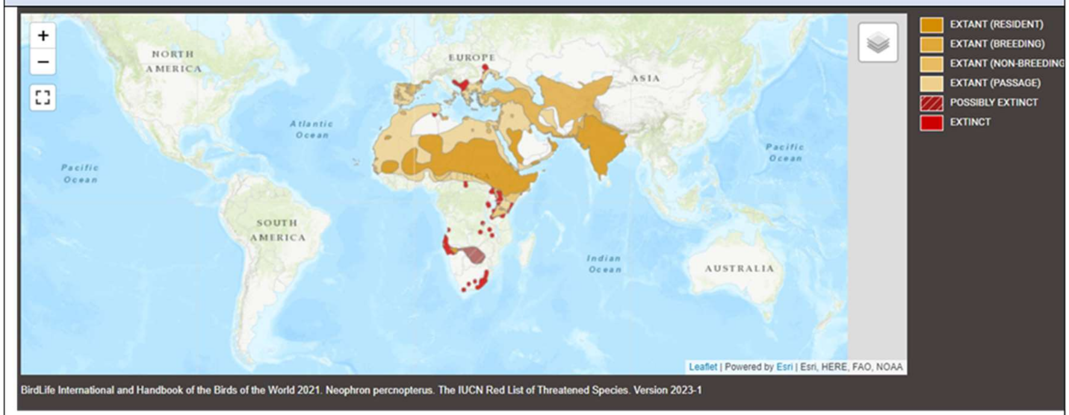
Sheet 32
Neophron percnopterus
EN

Litterature cited :

Arkumarev V., McGrady M. and Ivaylo A. A literature review of occurrence of Egyptian Vulture (Neophron percnopterus) resident in Africa. Vulture News 77 November 2019.
Isenmann, P., Gaultier, T., El Hili, A., Azafzaf, H., Dlensi, H. & Smart, M. Oiseaux de Tunisie – Birds of Tunisia. Société d'Etudes ornithologiques de France, Paris. 2005.



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Sheet 33
Larus audouinii
VU

Litterature cited :

BirdLife International. 2013. IUCN Red List for birds. Downloaded from http://www.birdlife.org.
Gutiérrez, R.; Guinart, E. 2008. The Ebro Delta Audouin's Gull colony and vagrancy potential to northwest Europe. British Birds 101(8): 443-447.
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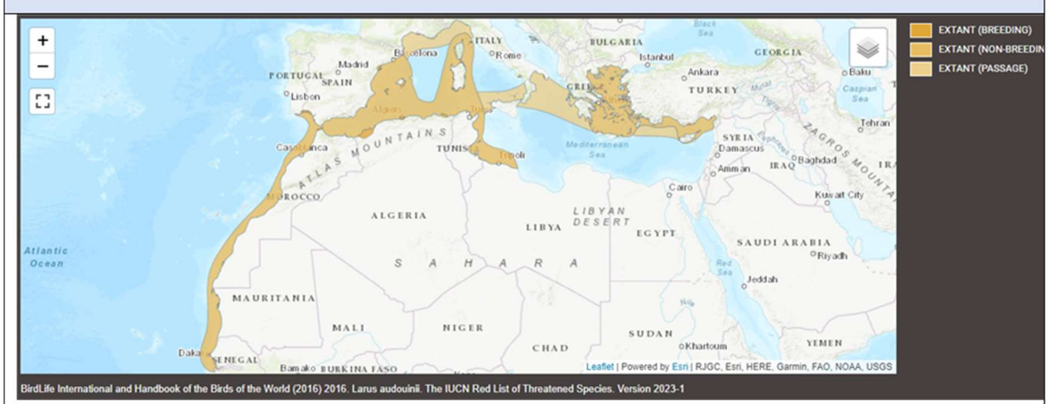

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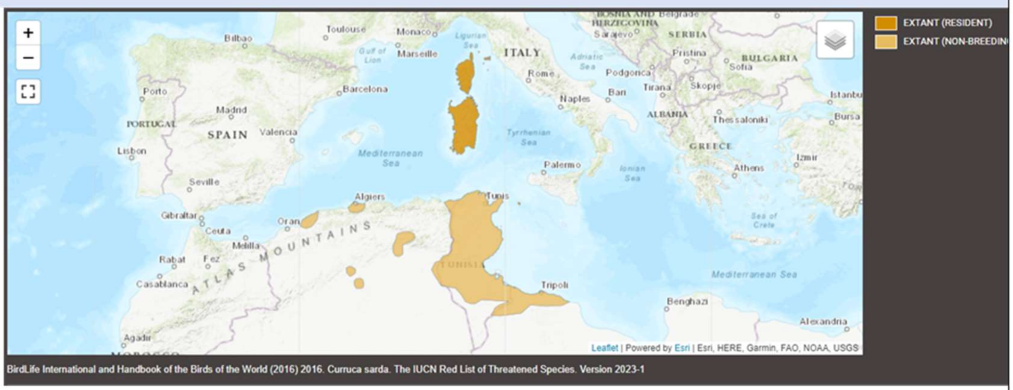
Sheet 34 *Curruca sarda* VU
Litterature cited : Aymí, R. and Gargallo, G. 2015. Marmora's Warbler (Sylvia sarda). In: del Hoyo, J., Elliott, A., Sargatal, J., Christie, D.A. and de Juana, E. (eds), Handbook of the Birds of the World Alive, Lynx Edicions, Barcelona.Isenmann, P., Gaultier, T., El Hili, A., Azafzaf, H., Dlensi, H. & Smart, M. Oiseaux de Tunisie – Birds of Tunisia. Société d'Etudes ornithologiques de France, Paris. 2005.

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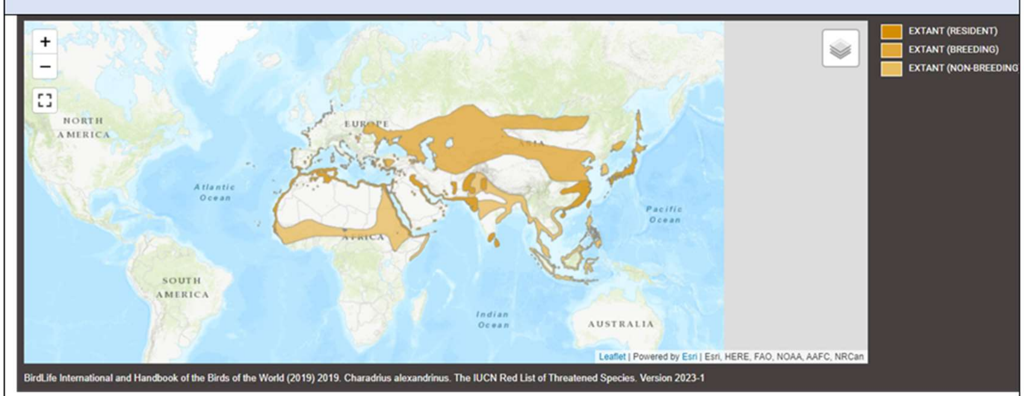
Sheet 35 *Charadrius alexandrinus* LC
Litterature cited : Cramp S. & Simmons K.E.L. (1983) The Birds of the Western Palearctic Volume III. Oxford University Press, Oxford, New York, 913 p Isenmann, P., Gaultier, T., El Hili, A., Azafzaf, H., Dlensi, H. & Smart, M. Oiseaux de Tunisie – Birds of Tunisia. Société d'Etudes ornithologiques de France, Paris. 2005.

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Sheet 36
Delphinus delphinus
LC

Litterature cited :

Bearzi, G. 2003. Delphinus delphis (Mediterranean subpopulation). The IUCN Red List of Threatened Species 2003: e.T41762A10557372. https://dx.doi.org/10.2305/IUCN.UK.2003.RLTS.T41762A10557372.en. Downloaded on 14 April 2020.

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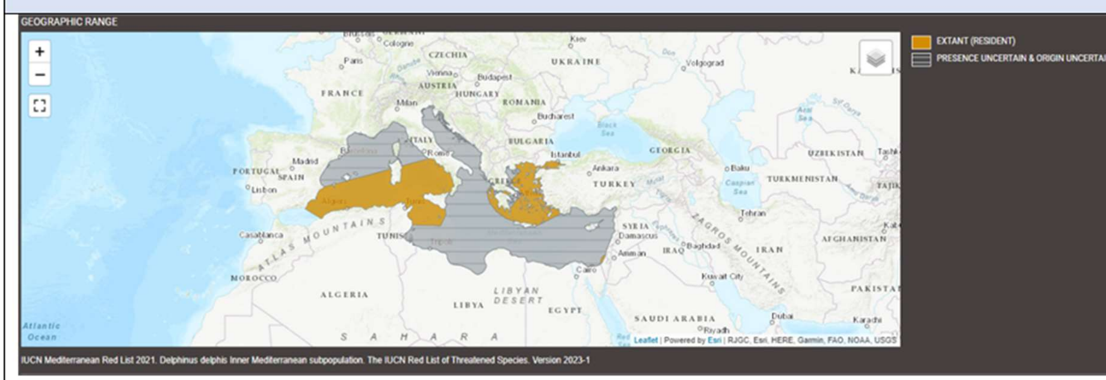

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