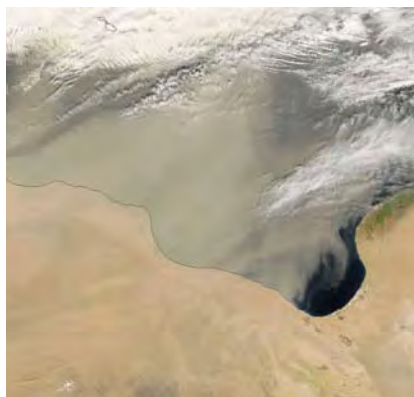
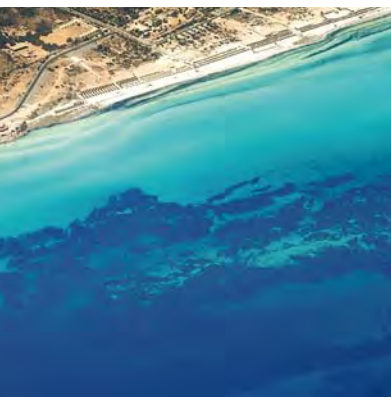




Towards a Representative Network of Marine Protected Areas in Libya



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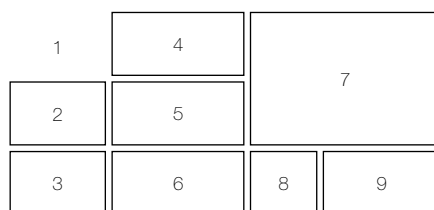
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Towards a Representative Network of Marine Protected Areas in Libya

July 2011

This report was prepared by Abdelmaula Hamza, Chedly Raïs and Alain Jeudy de Grissac (IUCN) with the support of Renaud Dupuy de la Grandrive, Mar Otero, Deborah Jouno Bernardon, Jill Harry and François-Xavier Bouillon



Cover pictures:

- 1 *Oblada melanura* (1877), Vincent Fossat (1822-1891). Coll. Muséum d'Histoire naturelle de Nice.
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- 6 *Posidonia oceanica* meadows along sandy and rocky coast in western Tripoli. © RDG / RAC-SPA.
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- 9 Fishermen in their flouka. Gulf of Bumba. © RDG / RAC-SPA.

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FOREWORD

This report was prepared within the framework of the MedRAS Project (Mediterranean Representative Areas and Species), financed by the MAVA and TOTAL Foundations, the Spanish Agency for International Cooperation (AECID), and coordinated by the IUCN Centre for Mediterranean Cooperation (Malaga, Spain).

The MedRAS project was implemented in its pilot phase in two sites, the Libyan coastline and the Alboran Sea. The reports for Libya and the Alboran Sea will be produced separately, but follow the same methodology. In 2011 and 2012, the methodology developed for MedRAS will be implemented in other sites in the Mediterranean, within the framework of a new project funded by the MAVA foundation and called NEREUS.

The strong coordination and cooperation between the Environment General Authority of Libya (EGA), the United Nations Development Programme office in Libya (UNDP-Libya), the Regional Activity Centre for Specially Protected Areas of the Mediterranean Action Plan (RAC/SPA-MAP-UNEP), the World Wide Fund for Nature Mediterranean Project Office (WWF-MedPO) and the Centre for Mediterranean Cooperation of the International Union for Conservation of Nature (IUCN-Med) have been the key to the success of this project. When closing the last technical meeting in June 2010, the head of EGA has recommended that this document serve as the basis for development of marine and coastal conservation in Libya for all present and future partners, including in particular the Agreement for the Conservation of Cetaceans of the Mediterranean and Black Seas (ACCOBAMS), the Mediterranean Wetland Initiative (MedWet) and the Network of Managers of Marine Protected Areas in the Mediterranean (MedPAN).

The Libyan report contains a compilation of information from national and international experts and from documentation available on marine and coastal biodiversity in Libya. It proposes and describes sites of conservation interest along the Libyan coast.

A draft version of the report was prepared by Abdulmaula Hamza (General Environment Authority, Libya) and Chedly Rais (Okianos, Tunisia). It was presented and reviewed during a consultation workshop convened by the General Environment Authority of Libya (EGA) in Tripoli on June 15th and 16th, 2010, involving national experts and representatives of the IUCN Med, WWF MedPO and UNDP Libya. The final version was prepared at the end of 2010 by Abdulmaula Hamza, Chedly Rais and Alain Jeudy de Grissac. Additions and corrections were provided in the final stages by Renaud Dupuy de la GrandRive, Mar Otero, Deborah Jouno Bernardon, Jill Harry and François-Xavier Bouillon.

LIST OF ACRONYMS

AECID	Spanish Agency for International Cooperation and Development
EGA	Environment General Authority of Libya
FAO	Food and Agriculture Organisation
GECOL	General Electricity Company
RAC/SPA	Regional Activity Centre for Specially Protected Areas
IUCN	International Union for Conservation of Nature
MAP	Mediterranean Action Plan
MedPAN	Network of Managers of Marine Protected Areas in the Mediterranean
MedRAS	Mediterranean Representative Areas and Species
SMW	Secretariat of Marine Wealth
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WWF-MedPO	World Wide Fund for Nature – Mediterranean Project Office

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INTRODUCTION

Due to its paleogeographic and ecological background, the Mediterranean Sea hosts a relatively high diversity and endemism of marine species and habitats. In relation to human occupation of the Mediterranean coasts over thousands of years, these unique species and habitats are increasingly under threat from human activities, and in particular at the present time from fishing practices, unsustainable tourism, coastal development, pollution and the exacerbating effects of climate change. These threats are among the main causes of biodiversity losses and species decline.

International conventions and fora such as the Convention on Biological Diversity (CBD), the Barcelona Convention and the UN World Summit on Sustainable Development have recognized and stressed the importance of establishing a network of effectively managed and representative Marine Protected Areas (MPAs) by 2012, a target recently reviewed during the CBD meeting in Nagoya (Aichi Declaration). In the Mediterranean, the main partners for marine and coastal conservation have highlighted the need for increasing the number and enhancing the quality of Mediterranean MPAs, both in national waters and on the high seas, to reduce biodiversity loss. Among others, the Regional Activity Centre for Specially Protected Areas (RAC/SPA, UNEP-MAP – Barcelona Convention), the Agreement on the Conservation of Cetaceans of the Black and Mediterranean Seas (ACCOBAMS-CITES Convention), the World Wide Fund for Nature - Mediterranean Project Office (WWF-MedPO), the Centre for Mediterranean Cooperation of the International Union for Conservation of Nature (IUCN-Med), the Mediterranean Wetlands Initiative (MedWet, Ramsar Convention) and other organisations such as the Network of Managers of Marine Protected Areas in the Mediterranean (MedPAN) are combining their efforts for marine and coastal conservation. Currently, as registered officially by Mediterranean States under the Barcelona Convention in 2010, 750 Marine and Coastal Protected Areas have been created in the Mediterranean Sea, mainly on an opportunistic basis, two-thirds of them being along the northern coast of the basin.

Therefore, important habitats and associated marine species on the high sea and along the southern and eastern Mediterranean coast are under-represented and under-protected. The Mediterranean Representative Areas and Species (MedRAS) project, presented below, aims at identifying priority habitats and species in these areas to be managed and protected.

THE MedRAS PROJECT

The MedRAS Project is an initiative financed by the MAVA Foundation, Total Foundation and the Spanish Agency for International Cooperation and Development (AECID), and coordinated by IUCN-Med with many Mediterranean partners. Its general objective is to help Mediterranean countries to identify and develop the most representative and coherent network of areas of conservation interest. Its implementation is conducted with the participation of scientists and practitioners from the participating countries. Its methodology consists of the following three main steps:

- Develop a standard analysis methodology that takes into account the latest scientific developments in the disciplines of spatial planning, marine ecology, species modelling and remote sensing. This will include developing standardized definitions, defining operating principles and guiding criteria for data collection, storage and analysis on the scale of the Mediterranean Sea.
- Gather, compile, assess and analyze data of selected pilot sites representative of different eco-regions in the Mediterranean Sea.
- Identify the spatial distribution and extent of major threats including human activities, in particular fishing, shipping, land and marine based pollution as well as invasive species.
- Produce maps of sensitive areas and spatial distribution of sites in need of protection which are not included in the current system of MPAs. These maps will be made available to regional and national management and conservation planners.

1. The socio-economic context of the marine and coastal environment in Libya

Libya is an African country bordering the Mediterranean Sea. Its coastline extends over 1,970 km with important portions that are still in very good natural condition. Although petroleum exploration and exploitation, fisheries at sea and urbanisation of the coast are the most important human activities, many others exist in the Libyan coastal zone: the following table provides a more accurate list.

A brief description of the main economic sectors of relevance to the marine and coastal environment is presented hereafter.



Fig. 1:
Libyan Arab Jamahiriya

<http://www.un.org/depts/cartographic/map/profile/libya.pdf>

Economic and trade resources
<ul style="list-style-type: none"> - coastal urbanization and road networks - harbours, canal harbours and tourist harbours - dredging - navigation and shipbuilding industry - artificial islands and offshore terminals - pipelines, underwater cables and pipes - hotels and holiday villages
Economic, mineral and energy resources
<ul style="list-style-type: none"> - hydrocarbon extraction and storage - refineries and chemical industries - heavy industry - thermal power plant - waste processing plants and dumps - alternative energy production - quarries and mines - salt marshes
Historical and archaeological resources
<ul style="list-style-type: none"> - historic sites - wrecks
Social resources
<ul style="list-style-type: none"> - tourism and leisure - swimming and diving - yachting and sailing
Landscape resources
<ul style="list-style-type: none"> - parks, reserves and sanctuaries
Biological resources
<ul style="list-style-type: none"> - demersal and pelagic fishing - aquaculture - fish meals - marine pharmacology and biochemistry

Table 1:
Coastal area and marine resources
(EGA-WWF, 2005)



Fishermen in their flouka. Gulf of Bumba. © RDG / RAC-SPA.

1.1. FISHING AND FISHERIES

Fishing activity in Libya is an active and growing sector of the economy. Although the sector employs a low number of Libyans (less than 0.0025%), it can be classified as one of the main economic activities for the population in the coastal area (Table 2).

Estimated employment (2003)	
Primary sector	11 500 Full-time and part-time fishermen
Secondary sector	3 500 (landing site services, marketing, administration, canneries)
Gross value of fisheries output (2003, est.)	US \$100 million
Trade (2003)	
Value of imports	US \$40 628 000
Value of exports	US \$10 476 000

Table 2:
Employment and economic value of the fishing sector in Libya.
Source: COPEMED, 2005.

Libyan fishermen use four different techniques: artisanal fishing, Lampara (purse seine) fishing, coastal trawling and tuna fishing (Lamboeuf *et al.*, 2000). Previously, sponge fishing was a common activity, in decline since the 1960's due to the shift to industrial fishing, diseases and pollution (Otmán and Karlberg, 2007).

The four types of artisanal fishery were being used along the Libyan coastline in 2000, dominated by popular flouka (Lamboeuf, 2000), a modified Mediterranean traditional small boat (Fig. 2).

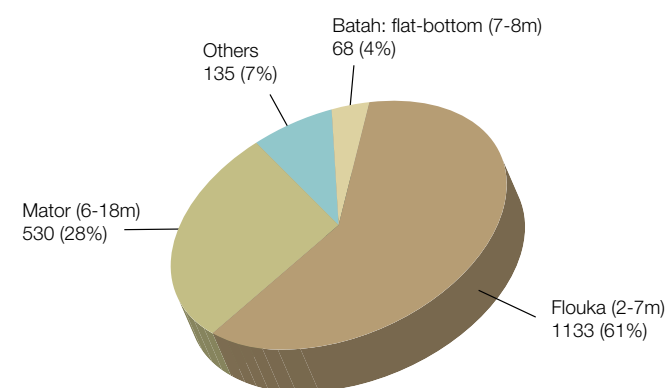


Fig. 2:
Total number and percentage of fishing craft types in Libya, blue representing other types.
Data source: Lamboeuf *et al.*, 2000.

The fishing fleet and consequently the fishing effort are located towards the western section (55%) of the coast (Tripoli region: Misuratah-Tunisian border, Fig. 3). It may be driven by the presence of historic fishing communities in the area and the extension of the continental shelf (55,000 sq km), which is the far eastern end of

the Gulf of Gabes shelf in Tunisia, with shallow waters, seagrass meadows and high productivity compared with the remaining two sections of the Libyan coast.

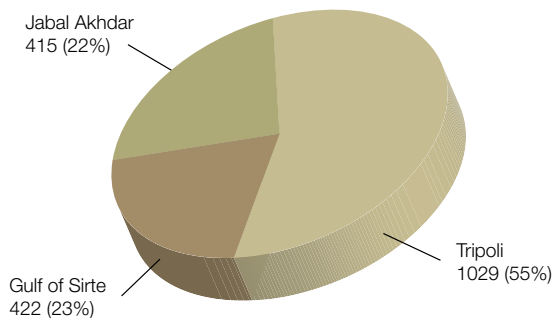


Fig. 3:
Number and relative percentages of the fishing fleet in Libya in each region.
Data source: Lamboeuf *et al.*, 2000.

The Libyan catch was below 10,000 tons until 1980, when the industry received a boost and the catch steadily increased to its climax in the year 2000 (Fig. 4), with more than 50,000 tons (FAO-COPEMED, 2010). However, the last ten years have witnessed a continuous decrease in fish landings (20% less than the 2000 catch), certainly due to a concentrated effort in the same areas, leading to overfishing and lack of management and control of fishing activities. This supports the need and urgency of establishing a national network of marine protected areas to contain such decline.

Most of the catches are related to artisanal vessels fishing with nets and targeting demersal fishes, and Lampara boats targeting small pelagic fishes, while the industrial tuna fishery provides less than four percent of the total landed. Inland fishery is negligible (FAO-COPEMED, 2010).

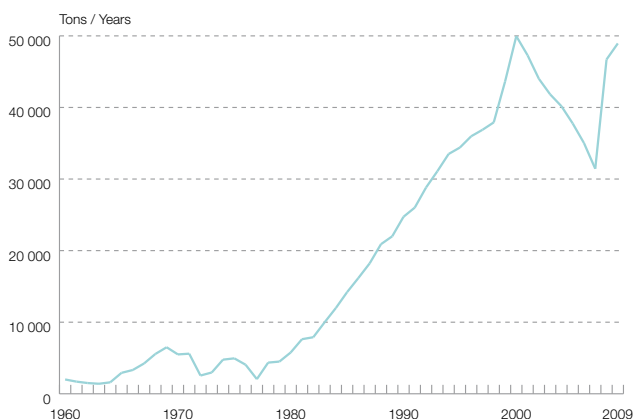


Fig. 4:
Fishery Capture Development in Libya (1960-2006).

The Secretariat of Marine Wealth (SMW) was the administration responsible for managing and developing the fishing sector, until the year 2000 when a decentralisation policy was introduced by the government, and responsibilities were handed over to local municipalities (Shabiyat). This had major consequences on the

fishing activity management system, as the municipalities were then responsible for licensing, definition of fishing gear, areas and seasons, plus control of landings and marketing.

Aquaculture activity started in the Libyan coastal zone at the beginning of the 1990's using wild juveniles of seabass (*Dicentrarchus labrax*), gilthead seabream (*Sparus aurata*) and several species of mullet (*Mugil* spp.). Attempts were undertaken to rear other marine species such as amberjack (*Seriola dumerilii*) or kuruma prawn (*Penaeus japonicus*).

Overall production from aquaculture increased substantially when commercial farms for the rearing of seabream and seabass were launched using imported fingerlings. Their annual production reached about 300 tons in 2008. The farming of bluefin tuna (*Thunnus thynnus thynnus*) is a new activity in Libya, and its annual production is about 400 tons.

In terms of employment, the social impact of aquaculture is limited. The number of full-time employees was estimated at 140 in 2004.



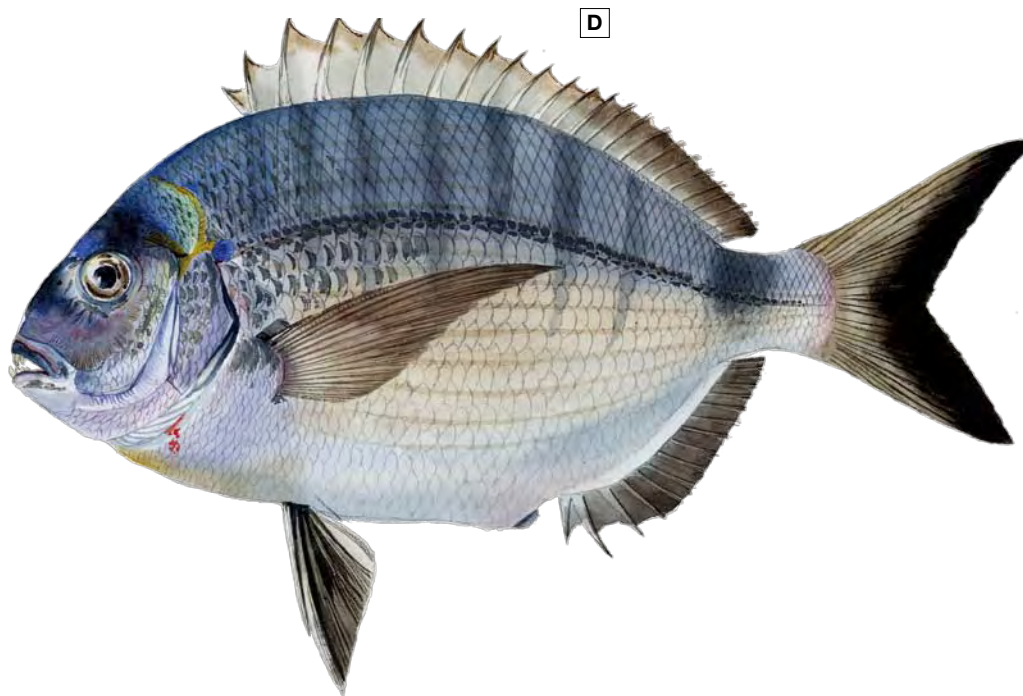
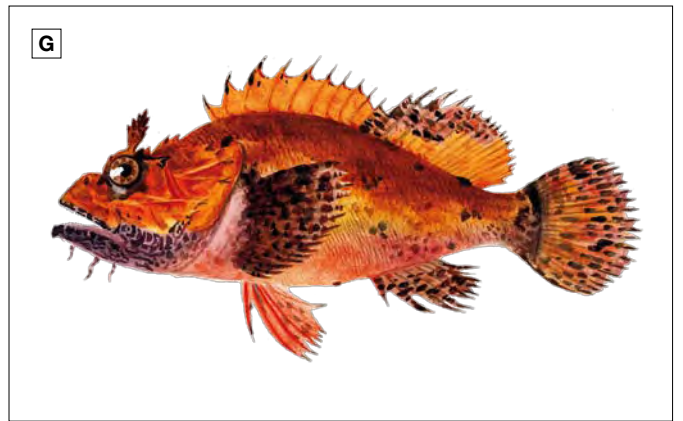
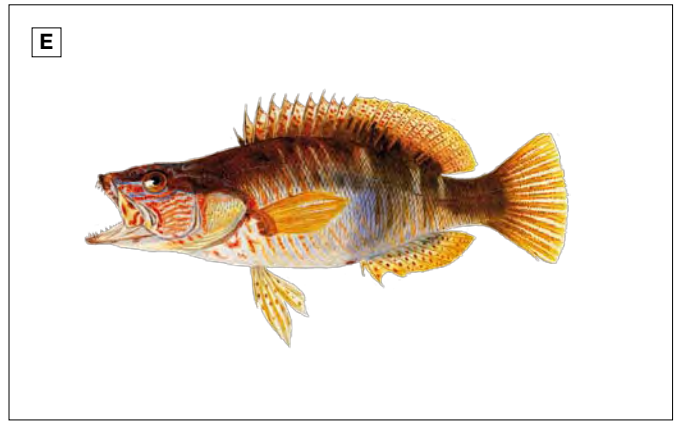
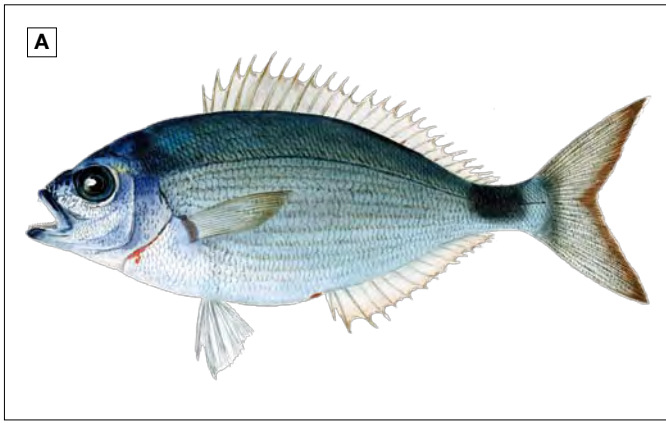
Oil terminal near Farwa lagoon (west of Tripoli). © RDG / RAC-SPA.

1.2. OIL EXPLORATION AND PRODUCTION

Depending on the year, oil exports represent 75 to 90% of total Libyan exports, and oil revenues are the major income for the country, regardless of recent efforts to diversify sources of revenue.

Libya has the largest proven oil reserves in Africa (BP, 2008). According to the Organisation of the Petroleum Exporting Countries (OPEC) (2008), Libya had proven oil reserves of 44.27 billion barrels, and 1,540 billion cubic meters of natural gas. The latest Libya Oil & Gas Report from Business Monitor International (BMI) forecasts that the country will account for 7.76% of African regional oil demand by 2014, while providing 16.77% of supply.

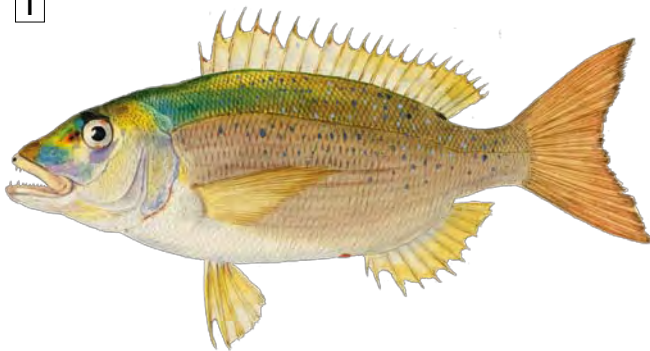
Low production costs and Libya's proximity to oil markets in Western Europe made it the ideal destination for investment in the oil industry. After the lifting of US (2003) and UN (2004) economic sanctions, offshore oil exploration was developed, mainly from 2006, with the arrival of oil firms from around the world. Offshore drilling is conducted up to 50 km from the coastline, which would further increase the country's ability to produce offshore oil and



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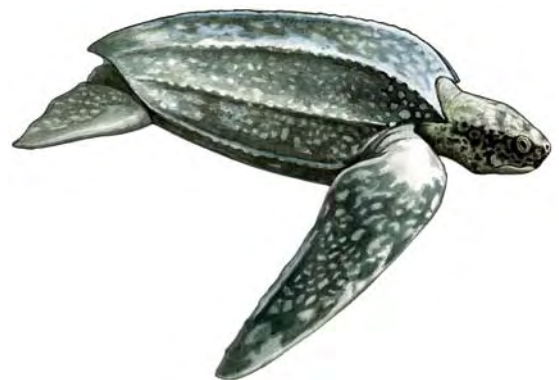


Plate I:

Most significant fish species of trammel net catches (University and Marine Research Centre of Tajura surveys, March 2005-March 2006).

- A) *Oblada melanura*
- B) *Mullus surmuletus*
- C) *Diplodus vulgaris*
- D) *Diplodus sargus*
- E) *Serranus scriba*
- F) *Diplodus annularis*
- G) *Scorpaena scrofa*
- H) *Sciaena umbra*
- I) *Dentex dentex*

Drawings by Vincent Fossat (1877 to 1879).

Scale 40% and 90% for *Sciaena umbra*

Courtesy Museum d'Histoire naturelle de Nice.

Sea turtles.

J) *Caretta caretta*.

K) *Dermochelys coriacea*.

Drawings by Maurizio Würtz.

gas, though it carries consequential risks of pollution (oil spills) if safety and environment protection measures are not properly defined and strictly followed. Contingency plans were stressed to be part of the safety policies of every firm in this field, and they should be in place for dealing with any oil spills that may occur from oil tankers, oil terminals and offshore pipelines.

1.3. AGRICULTURE

Farming (with grazing) was the main activity of the Libyan population prior to the discovery of oil in the 1960's. The agricultural tradition is deeply rooted in Libya's history since the Roman Empire. However, the arid nature of most of Libya's territory (93% of Libya receives less than 100 mm/year) confined this activity to the Mediterranean coastal strip and the Jabal Nafusah and Jabal Akhdar highlands, as more rainfall (250-300 mm/year) is recorded in the Tripoli-Jefara region and Jabel Akhdar area.

The availability of millions of cubic meters of fossil freshwater from deep desert aquifers, via the Great Man-Made River Project (GMRP) in the northern plains, was developed to increase the irrigated areas and enhance agricultural development (Table 3). However, the speed of water investment for agriculture is still slower than the rate of expansion of the GMRP network in most of northern Libya.

The last 30 years saw a drop in the percentage of the population for whom agriculture is their main profession. While at the end of 1981, there had been 234,000 agricultural workers or 25 per cent of the labour force, by 2002 this had decreased to 101,000 or around only 5 per cent of the labour force (Otman and Karlberg, 2007). This might be related to different causes, including unfavorable climatic conditions, especially drought, the economic value of agricultural activity and changes in land usage, with more urbanisation and development of agricultural land.

Even with all this withdrawal from agriculture, it still contributes to give about 9 per cent of GDP and provides employment for about 5 per cent of the total economically active population (Otman and Karlberg, 2007).

Based on the assumptions made regarding water production for agriculture, the total water requirement to support basic food self-sufficiency and to meet the domestic water demand of 12 million Libyans by the year 2025 is estimated to range from 10.5 to 16.4 km³/year, compared to the 4.3 km³/year at present. When the GMRP becomes fully operational, the total amount of water available for all uses, assuming that the present groundwater production equipment is maintained until 2025, will be in the order of 6.5 km³/year and will thus hardly cover 50% of the country's total water requirement (FAO 2005).

Table 3:

Sources of Water in Libya in 2008 and estimates for 2009-2011 (million g/d)

Source: General Desalination Company.

Source	2008	2009-11
Great Man-Made River	210	352
Ground water	132	163
Desalination	31	75
Total	373	590

The Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) on NASA's Terra satellite captured this image on April 10, 2006. It shows part of Libya's massive water project, known as the Grand Omar Mukhtar, near the city of Suluq.

Water residing in reservoirs appears twice in this image, in the upper right and at the bottom. In both cases, the water appears dark blue. In this false-color image, vegetation appears red, and the brighter the red, the more robust the vegetation.

NASA image created by Jesse Allen, Earth Observatory, using data provided courtesy of NASA/GSFC/METI/ERSDAC/JAROS, and U.S./Japan ASTER Science Team.

<http://earthobservatory.nasa.gov/IOTD/view.php?id=6454>



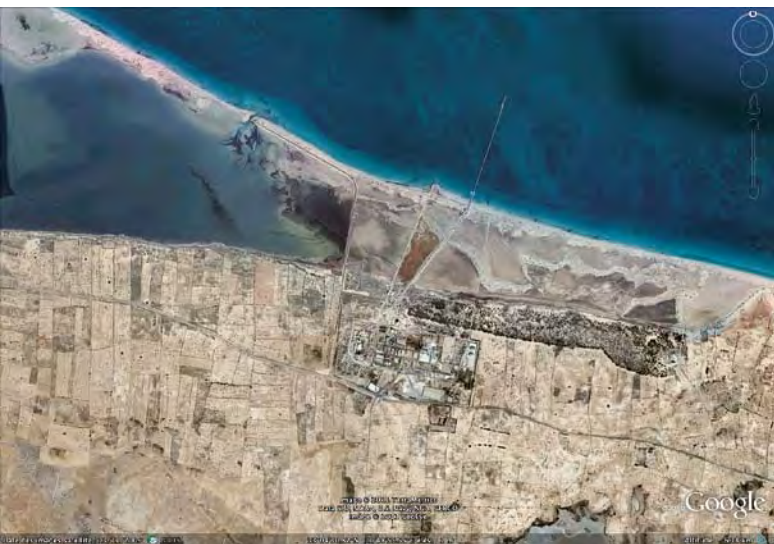
1.4. INDUSTRY

Industrial activities in the coastal region of Libya is confined to large cities, like Tripoli, Misurata and Benghazi, with some centres of specialised industrial complexes (petrochemicals, oil and gas refineries, steel industry).

The petrochemical complex in Abukammash (near Farwa Lagoon in the west) is a continuous risk to the marine environment, even if no pollution crises have been reported to date.

The oil refineries on the coastal area, including those in Zawiya, Ras Lanouf, Brega, Zwitina, Tobruk, are another source of potential oil pollution; as is the steel and iron company in Misuratah.

In fact, most of the state-owned companies have contingency plans for accidental pollution incidents, developed in collaboration with the EGA and Mediterranean Action Plan (MAP) over the past 20 years.



Farwa Lagoon and petrochemical complex in Abukammash.

1.5. ELECTRICITY AND WATER DESALINATION

As of January 2004, Libya had an electric power production capacity of about 4.7 gigawatts (GW). Most of Libya's existing power stations are being converted from oil to natural gas, and the state-owned General Electricity Company (GECOL) is building several new power plants to run on natural gas, primarily to maximize the volume of oil available for export purposes.

Libya is also looking at potential wind and solar projects, particularly in remote regions where it is impractical to extend the power grid.

Several desalination plants were introduced along the coast of Libya (see Table 4) from 1976 to 2002. The production of these stations, usually an accessory to steam power plants, is very low due to the lack of management, local skills and spare parts.

Desalination may remain the ultimate solution to the water shortage crisis in the whole of North Africa, and in Libya in particular, after a few decades when fossil water resources will have reached a state of depletion.



Zuwarah desalination plant (Nalut). © GoogleEarth.

Table 4:
Capacity of desalination plants installed along the Libyan coast (million g/d).

Source: General Desalination Company.

Location	Capacity (million g/d)	Operation date
Gulf of Bumba	6.6	1990
Zliten	6.6	1992
Soussa	2.2	2000
Tobruk	8.8	2002
Abutraba	8.8	2006
Zwara	8.8	2006
Total	41.8	



Theater of Leptis Magna. © RDG / RAC-SPA.

1.6. TOURISM

Tourism in Libya was for many years a minor contributor to the national economy, but after the lifting of US and UN sanctions, the government has developed the tourism sector and hopes that it will support the national income more significantly.

In the year 2004, Law no.7 on tourism development was approved. In 2005, the Tourist Development Board was established, empowered with much wider abilities than the previous board: preparation of a comprehensive national tourist development plan, support (with earmarked budget) and development of necessary infrastructures such as roads, electricity and water supplies for tourist sites, as well as the ability to identify and distance sites dedicated to tourism from either already built-up or undeveloped state or private sector-owned sites and locations (GPC decree no. 180/2005; Otman and Karlberg, 2007).

The following table (5) shows the recent changes in tourist numbers, and average spending per tourist per day.

The plan for developing tourism 1999-2018 targets 25 out of 29 coastal sites for marine (diving) and beach tourism, 21 of these sites having a high marine/coastal biodiversity conservation value.

Category	2006 statistics	2008 statistics
Total number of tourists	125,480	759,771
Cruise tourists	83,938	8,218
Average length of stay	7 days	7 days
Average spending (tourist/day)	60 Euros	120 Euros

Table 5:

Source: General Board of Tourism and Traditional Industries.
www.libyan-tourism.org

The lack of a clear legal framework for species/habitat protection in Libya may trigger the loss of habitats at these sites, due to tourism development and associated construction work. Although the current environmental legislation (Law no.15/2003 on the Environment) states in its articles and executive regulations that the Environment Impact Assessment process must be followed prior to developing any area in Libya, it is apparently only properly followed in the oil and gas industry: most other national authorities do not respond positively to these regulations.

2. General overview of the marine and coastal environment in Libya

2.1. GEOMORPHOLOGY OF THE COASTS

From the border with Tunisia to the border with Egypt, the Libyan coast can be divided geomorphologically into seven sectors:

2.1.1. Ras Ajdir to Tripoli (180 km)

This part (32.50N, 13.14E) is characterised by a lack of gulfs and bays, as it takes the general shape of a concave coastline, with very few bays at wadi mouths, the port of Tripoli's rocky headland and the sand bar comprising Farwa Island to the west of the country. The beaches on this part of the coast are white sand, low, but in some areas reaching 10 m of sand dunes, followed by several sebkhas (from Sabratah to Ras Ajdir), such as Samdine, Brega, the Zourara saltpans, and Abukammash which also forms a trans-boundary site with Tunisia.

2.1.2. Tripoli to Misuratah (220 km)

This sector features medium-elevated rocky formations with steep coastal slopes, small sea headlands and some narrow bays at wadi mouths, as in Wadi Kaam and Wadi Lebda (Leptis); the elevation is due to the contact of the foothills of the western mountain (Nefusa Mt) with the sea (from Garabulli to Khoms), with continuous wave action on this sandstone/limestone coast.



Posidonia oceanica meadow near the UNESCO World Heritage site of Sabratha. © RDG / RAC-SPA.



Fishing village (north of Garabulli). © RDG / RAC-SPA.

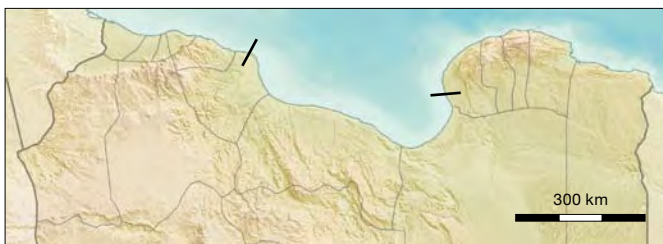
2.1.3. Misuratah to El-Magroon (680 km)

The longest stretch of the Libyan coast, with simple coastal structures, dominated by sandy shores, of different sizes and topography, such as the eastern and middle parts represented by flat sandy coasts, with few medium-elevated parts around halophytic vegetations, whilst the western part (near Misuratah) features higher sand dune beaches (20 m ASL). Sclerosed sand dunes are also abundant in the middle and western parts of this sector, playing a major role in coastline shape and evolution, resulting from wind and marine erosion actions.

The most extended Sebkhias are found in this sector, such as Sebkhiet Qaser Ahmed, Taourgha, Hisha, Ras Lanouf, Bisher, Brega, Ajdabiya and Karkura. These sites are mostly at, or even lower than, sea level, some of them having a direct input from sea water and some receiving flush rain streams from wadis.

2.1.4. El-Magroon to Tolmitah (190 km)

This sector is marked by the presence of coastal slopes and caves in the eastern part, caused by either karestic or marine erosion of the medium-elevated limestone coastline. The remaining part is less elevated and specifically rich in coastal lagoons and sebkhias that connect with the sea, and/or have freshwater input, giving a brackish-rich habitat.



Gulf of Sirte. © RDG / RAC-SPA.

2.1.5. Tolmitah to Ras Tin (250 km)

The steepest and most elevated Libyan coasts are to be found in this section, as some limestone coastal formations reach >100 m (Ras Hilal and Lathroon), with the Green mountain running down to the sea, directly or with a very narrow coastal plain. This area is also relatively richer in coastal headlands (e.g. Ras Buazza, Ras Karsa, Ras Hilal and Ras Amer). The high elevated slopes are intersected with deep narrow wadis, emptying into narrow bays such as Wadi Khalij and Wad Jarma.

The beaches in this part of the coast vary from narrow sandy beaches to gravelly or rocky boulders in some parts, as a result of sand precipitation in wadi mouths or strong wave action on limestone formations.

2.1.6. Ras Tin to Elba (90 km)

This stretch forms an arc in a north-south direction, giving the Gulf of Bumba, with intense sandy formations and low topography, and the extensive presence of coastal lagoons and sebkhas. This area has the highest number of small islands in Libya, such as the island of Elobah (syn. names Elba or Um Elmarakeb Island) to the east, Barda Island to the north-east, and the islands of Wetya, Misuratah and Um Elgarami in the middle of the gulf. Several wadis also empty into this Gulf, such as Wadi Tememi, Wadi Qusaibat and Wadi Elmaalaq.



Coastal lagoon. Gulf of Bumba.
© RDG / RAC-SPA.

Coast of Cyrenaica.
© RDG / RAC-SPA.



2.1.7. Elba to Bir Ramla (160 km)

The coastline here runs in an east-west direction, offering the highest proportion of curving coastline in the country, with short wadis with high, steep edges emptying into the sea (e.g. Wadi Ungelanez) in small to medium-sized gulfs. Miocene limestone formations cover most of this sector, making coastal slopes of over 40 m east of Tobruk. The remaining coasts vary from low to medium elevated rocky shores to gravel coasts, with limited small sandy beaches (in some areas less than 1000 m long, as in the northern Ain Ghazala beaches).

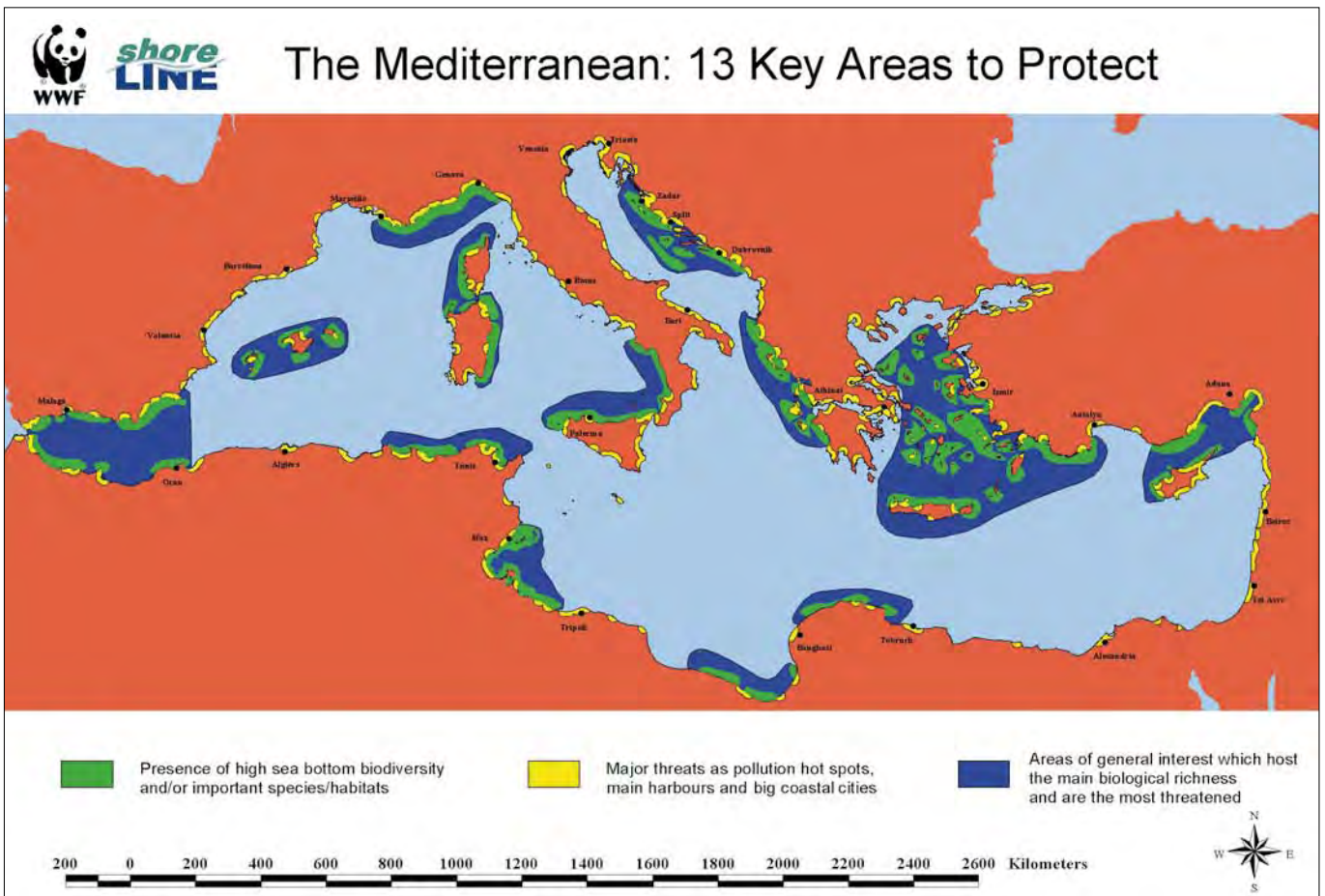


Coast of Bardia. © Google Earth.

Along the Libyan coast, 3 out of 12 important Mediterranean marine biodiversity hotspots have been identified (Fig. 5), namely the western coast from west Tripoli to include the whole Gulf of Gabes, the Gulf of Sirte area and the eastern (Cyrenica) coast. These areas are characterised by high marine and coastal biodiversity and are in need of immediate action to protect such important hotspots.

Fig. 5:

Three key high Mediterranean marine biodiversity hotspots identified in Libya (source: WWF Gap Analysis, 1998).



2.2. OCEANOGRAPHY

2.2.1. Currents

The Mediterranean Sea is lacking in high tidal movements, the general current speed is thus low compared with other seas and oceans. This leads to the fact that the waters of this sea need about 70 years to be renewed, which results in differences in salinity between the western and eastern Mediterranean (Fig. 6). The location of Libya in the central southern Mediterranean has made it a transitional phase between these two oceanographic regimes (Bukhsheem and Ettoumi, 2001). The currents in the central Mediterranean can be classified into three main types:

Permanent Atlantic surface current: (25-30 m depth in winter and up to 50 m depth in spring), slowing towards the east, and moving along the north African coasts, making its way to Libya through the Gulf of Gabes before dividing into two branches, one returning inside the Gulf of Gabes following a north-westerly counter flow, away from the coast, the other continuing eastwards (Zupanovic *et al.*, 1983).

Mid-water current: at a depth of 200-600 m, moving contrary to the surface current, east to west.

Deep-water current: in waters >1000 m deep, cold stable saline water, moving as its temperature or salinity changes.

A study of oceanographic parameters is a prerequisite for the establishment of marine protected areas, as it affects both spatial and temporal distribution of species and communities.

2.2.3. Salinity

Salinity measurements vary between the west and east, and are affected by several factors, among them the currents and temperature. Salinity in Libyan waters ranges from 37.8 to 38.5 PSU, to the 39.1 PSU of the Levantine intermediate waters, which flow westwards. More extreme salinity (and water temperature) can be measured in semi-closed lagoons and gulfs, such as the Farwa and Ain Zayana Lagoons and the Gulf of Bumba and Ain Ghazala.

2.3. CLIMATE AND HYDROLOGY

2.3.1. General climate conditions

Three main types of climatic types are present in Libya: the Mediterranean climate along the coastal area of Cyrenaica, followed by a belt of 50-100 km of steppe habitat which dominates the coastal zone of Libya, then a vast majority of the country which is desert, coming in direct contact with the Mediterranean waters at the Gulf of Sirte (Fig. 7).

In coastal areas, where 80 percent of the population lives, the dominant climatic system is Mediterranean, with warm summers and mild winters. Libyan and North African weather is generally influenced by two sources: the Mediterranean Sea to the north, and the expanse of desert to the south. When cooler air masses from the north meet up with hot desert air, lifting occurs, which can create rainfall. Deficiency in rainfall is reflected in an absence of permanent rivers or streams, and the twenty or so perennial lakes are brackish or salty. Desert winds or dry "Ghibli" can greatly reduce relative humidity. These winds can last five days, but seldom persist for more than one.

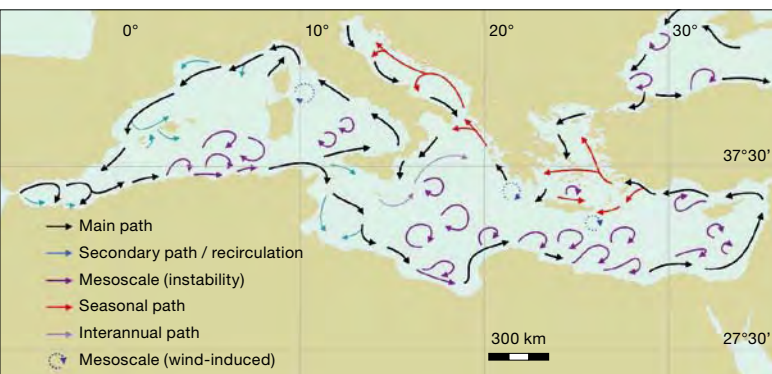


Fig. 6:

Circulation within the Mediterranean Sea (note: Atlantic current along North African coast, and returning circulations).

(From Millot and Taupier-Letage, 2005).

2.2.2. Waves:

Year-round directional wave distribution shows a majority flowing north and east, with 60% of waves in an east/north-east direction. Higher waves can reach 5 to 7 m in May (Snamprogetti, 2001). July is the calmest month and December the roughest in most of the western and central Libyan coast. In contrast, the coast of Cyrenaica (eastern region) can witness local northern winds in June-July-mid August, called Elmelthem (Miltemi in Greek), resulting from a high pressure system lying over the Balkans and Hungarian region and a relatively low pressure system over Turkey. This wind virtually puts a stop to any sailing during this period, when it can extend from 3 to 6 days.

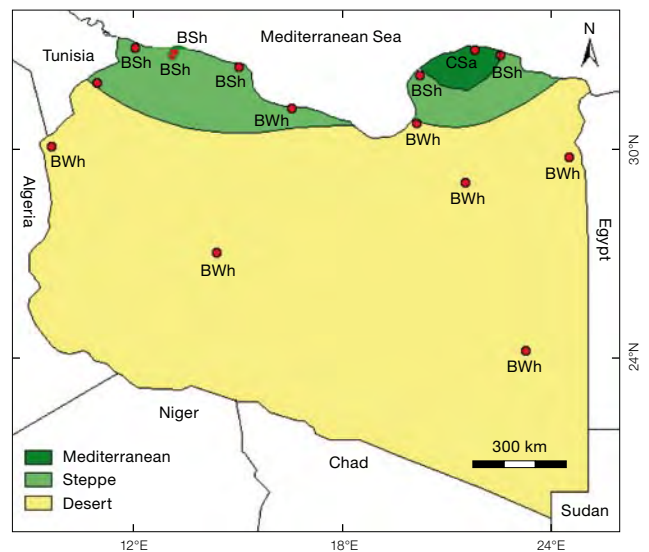


Fig. 7:

Climatic types in Libya

(after the Köppen and De Martonne climate classification schemes).

2.3.2. Temperature

The Libyan coast lies within the subtropical range, receiving a great amount of solar radiation all year around. This leads to high air temperatures, especially in summer. The mean temperature is 15-17 °C in February and 25-28 °C in summer (Bukhsheem and Ettoumi, 2001). Sea surface water temperature is strongly influenced by seasonal air temperature variations (Fig. 8). 29 °C on average in August, falling in January to 12.5 °C (Ramadan *et al.*, 1984).

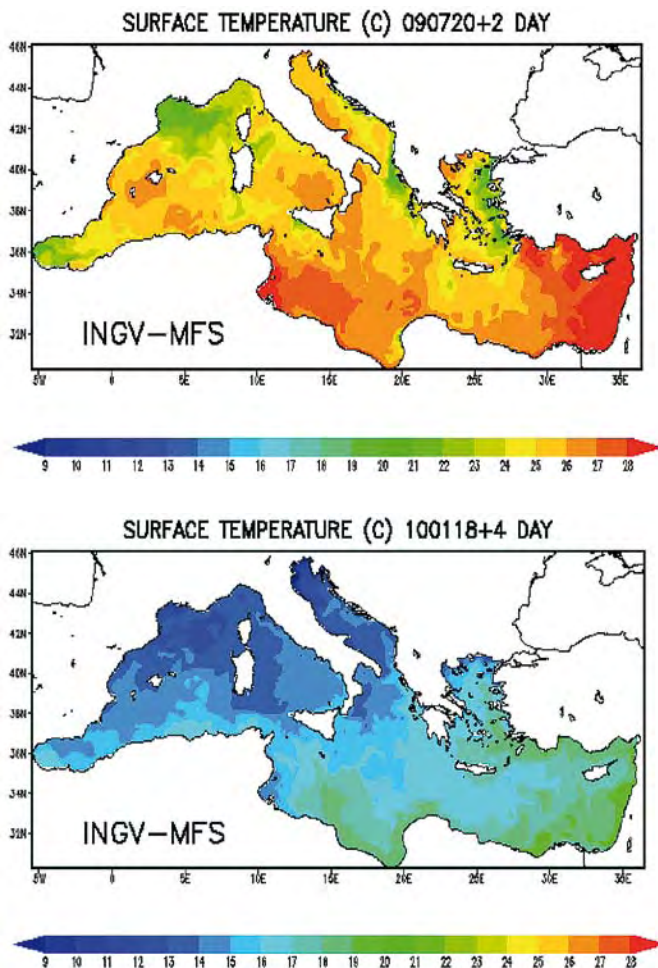


Fig. 8:
Sea surface temperature in the Mediterranean:
July 2009 (left) and January 2010 (right).
Source: Mediterranean Ocean Forecasting System
<http://gnoo.bo.ingv.it/mfs/>

2.3.3. Precipitation

Rainfall is scanty and visibility is 98% year-round due to the dry climate (Fig. 9). The weather is cooler in the highlands, and frosts occur at maximum elevations. In the desert interior, the climate features very hot summers and extreme diurnal temperature ranges. Less than 2% of the national territory receives enough rainfall for settled agriculture, the heaviest precipitation occurring in the Jabal al Akhdar zone of Cyrenaica, where annual rainfall of 400 to 600 millimetres is recorded. All other areas of the country receive less than 400 millimetres, and in the Sahara 50 millimetres or less occur. Rainfall is often erratic, and a pronounced drought may extend over two seasons. Average rainfall for the country is 26 millimetres (about 1 inch), and only seven percent of the country receives 100 millimetres (4 inches) or more annually.

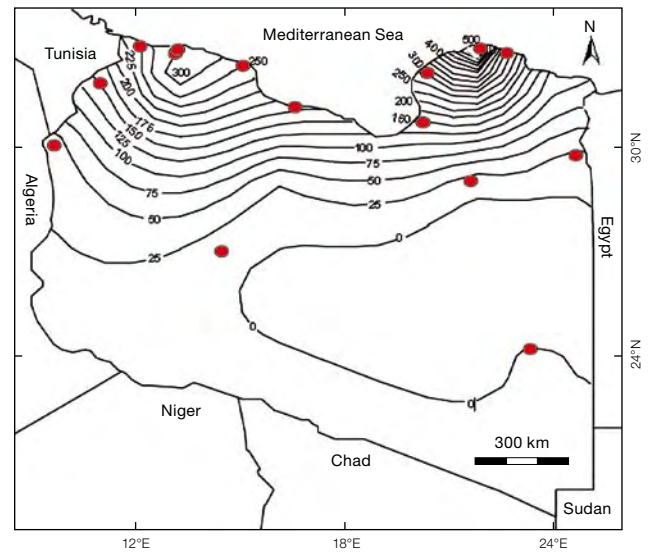


Fig. 9:
Distribution of mean annual precipitation (mm) in Libya,
1946- 2000.

2.4. MAIN BIODIVERSITY ELEMENTS IN THE MARINE AND COASTAL ENVIRONMENT OF LIBYA

The coastal strip and the adjacent marine waters provide high economic, biological, historical, social and ecological values and services to the communities that inhabit such environments. Detecting the most important eco-biological elements for conservation purposes is a vital step towards the proper management and sustainable utilisation of these areas.

Litter of *Posidonia* washed up by the tide
between Ain Ghazala and Tobruk.

© RDG / RAC-SPA.



Habitat type	Habitat description	Distribution within Libya
I. SUPRALITTORAL		
I. 2. SANDS		
I. 2. 1. Biocenosis of supralittoral sands	Area corresponding to the upper beach which is only humidified by the sea during storms.	Most sandy beaches west of Tripoli, till Zowara, the majority of coasts between Misuratah and Deryanah (north Benghazi), and scattered sites along Cyrenaica till Tobruk.
II. MEDIOLITTORAL		
II.1. MUDDS, SANDY MUDDS AND SANDS		
II.1.1. Biocenosis of muddy sands and muds	Habitat present in the estuaries and deltas of major coastal rivers.	Present mainly on margins of wadi mouths of Turghat, Ain Wadi Kaam and Maseed in the west; in the central region (gulf of Sirte) at active wadis and in Cyrenaica (East) in Wadi Alkhalij and most of Jabal Akhdar valleys and springs with muddy soil (e.g. Ain Ezzarga).
II.3. STONES AND PEBBLES		
II.3.1. Biocenosis of mediolittoral coarse detritic bottoms	Mid-beach with stones and pebbles, with a vertical extension that is usually slight.	Beaches of northern Benghazi, SE Misuratah and west of Tobruk (e.g. Ain Ghazala).
II.3.1.1. Facies with banks of dead leaves of <i>Posidonia oceanica</i> and other phanerogams	Accumulation of plant debris made up mostly of dead <i>Posidonia oceanica</i> leaves and/or leaves of other phanerogams.	Most of the sandy beaches such as those west of Sirte, south of Benghazi, SE Misuratah, Tajoura.
II.4. HARD BEDS AND ROCKS		
II.4.1. Biocenosis of the upper mediolittoral rock II.4.2. Biocenosis of lower mediolittoral rock II.4.1.3. Association with <i>Nemalion helminthoides</i> and <i>Rissoella verruculosa</i>	A rocky area located at sea level, dampened by both spray and the tops of the waves. A horizon present in the bottom part of the upper mediolittoral rock, between 10 and 50 centimetres above the average level of the sea, where there is strong wave action.	Coastal marine area of Cyrenaica (Tolmitah till the Egyptian border), as well as on the islands of Garah (Gulf of Sirte), Sussa (Apollonia) and little rocky formations in front of Tripoli, Dema, and west of Misuratah, and Benjawad. Marine caves and creeks off the Cyrenaica coast between Tolmitah and Sussa, Garah island, and in other sites near Tripoli and Misuratah.



Vermeted trottoir near Ain Ghazala. © MF / RAC-SPA.

III. INFRALITTORAL		
III.1. SANDY MUDDS, SANDS, GRAVELS AND ROCK IN EURYHALINE AND EURYTHERMAL ENVIRONMENT		
III.1. 1. Euryhaline and eurythermal biocenosis.	Stretches of fine sand, muddy sand and mud in relatively closed-off areas up to a few metres deep.	Lagoons (e.g. Farwa, Ain Zayana, Ain Ghazala).
III.2. FINE SANDS WITH MORE OR LESS MUD		
III.2.2. Biocenosis of well-sorted fine sands. III.2.3. Biocenosis of superficial muddy sands in sheltered waters.	Stretches of fine sand at depths of between 2 and 25 metres that can present facies with epiflora.	Some parts of lagoons mentioned above, some open sea stretches that are deeper with softer sands and epiphytes, along the coast and especially on the continental shelf west of Libya.
III.3. COARSE SANDS WITH MORE OR LESS MUD		
III.3.1. Biocenosis of coarse sands and fine gravels mixed by the waves.	A habitat located in protected coves, in a sheltered environment. Beaches with coarse sand and gravels in small wave-beaten coves.	Ain Ghazala, Gulf of Bumba, Gulf of Burdya and Gulf of Tobruk (all in Cyrenaica), Farwa lagoon (west). Gulf of Ras Hilal; several small coves and valley heights in Cyrenaica.
III.5. <i>Posidonia oceanica</i> meadow.		
III.5.1. <i>Posidonia oceanica</i> meadows.	The <i>Posidonia oceanica</i> meadow represents over one quarter of the photophilous biotopes of the Mediterranean infralittoral	In the majority of infralittoral and some mediolittoral zones of Libyan waters. Mainly on the open sea but also within or at mouths of lagoons (Farwa) and at Ain Al Ghazala (as rare Macro atolls of 0.5-2m). Also around islands (Garah) and within the Gulfs (Bumba, Ras Hilal and others).
III.6. HARD BEDS AND ROCKS		
III.6.1. Biocenosis of infralittoral algae.	Present from 0-40 m. The biocenosis of photophilous algae is extremely rich and of great complexity, due to the strong physical gradients existing at its level. 35 subtypes have been identified in the Mediterranean.	Along the rocky bottoms in open seas in the Tripoli area, west of Misuratah, along many areas of the Gulf of Sirte and largely most of Cyrenaica in open waters.



Gulf of Sirte. © RDG / RAC-SPA.

IV – CIRCALITTORAL		
IV.2. SANDS		
IV.2.2. Biocenosis of the coastal detritic bottom.	Stretches of heterogeneous sediment at depths of between 30 and 100 metres (margins that vary according to geographical sector) which may present facies with epiflora and epifauna.	The gulf of Sirte (in areas with low currents) and on the open sea.
IV.3. HARD BEDS AND ROCKS		
IV.3.1. Coralligenous biocenosis.	Abundance of large erect invertebrates. This habitat is located mainly at a depth of 30 to 90 meters and forms landscapes of great aesthetic value.	Open sea, especially Cyrenaica open waters.
IV.3.2. Semi-dark caves.	The front parts of caves, overhangs and steep rock faces, where the light is greatly dimmed, populated by many sessile invertebrate species, and constituting landscapes of great aesthetic value.	Open sea and areas between Sussa and Derna where the continental shelf is narrow and vertical bottoms attain > 200 m with underwater caves and stretches with the presence of red coral.
V – BATHYAL		
V.1. MUDS		
V.1.1. Biocenosis of bathyal muds.	Vast stretches of clayey mud, usually compact, yellowish or bluish grey, relatively substantial, continuing at depths of over 150-250 metres.	Information not available, need for specific survey equipment and capacity.

3. Pressures and threats to the marine and coastal environment and biodiversity

3.1. OVERFISHING

"Practice of catching so many adult fish that not enough remain to breed and replenish the population" (Udy Bell, 2004).

This is a major problem for the Mediterranean. Libya was considered for decades as an area where fishing activity was lower as compared to neighbouring countries. In 2000, Libyan production reached its highest capacity (via national fisheries, but also due to illegal fishing in Libyan waters by other nations). Fig. 4 shows a remarkable drop in production after the year 2000. Many species became rarer on the local market, and were replaced by other invasive species, which indicate an overharvest in some sectors of Libyan waters, due to a concentrated fishing effort.

Some flagship species are drawing international attention in the Mediterranean, such as bluefin tuna and swordfish: they may face extinction in coming years, if industrial fishing continues to follow its present trend.

The reason why bluefin tuna is on the edge of extinction is that the size of mature fishes has more than halved since the 1990's. The average size of tuna caught off the coast of Libya, for example, has dropped from 124 kg in 2001 to only 65 kg in 2009 (WWF, 2010).

The expansion of industrial fishing may lead to several negative consequences on artisanal fisheries which sustain thousands of job sites for Libyans, as well as accelerate the exhaustive exploitation of the country's marine resources in just a few years in an unsustainable way. The signing of a partnership with the EU is expected in 2010 or 2011. Apart from the benefits that would accrue to the Libyan economy, this fishing partnership should, in particular, take into consideration the slow recovery of Libyan fisheries and the need to make no-take zones along the coast a priority. It should also help in co-financing the network of MPAs off the Libyan coastline.



Xiphias gladius. Fishing port of Tripoli.
© RDG / RAC-SPA.



Fishing port of Tripoli. The Mediterranean subpopulation of spiny dogfish *Squalus acanthias* is classified as endangered on the IUCN Red List.
© RDG / RAC-SPA.



Fig. 10:

- A) Fishmonger's shop with Bluespotted cornetfish, *Fistularia commersonii*. Tripoli. © RDG / RAC-SPA.
- B) *Siganus luridus*, © RDG / RAC-SPA.
- C) *Stephanolepis diaspros*, © MF / RAC-SPA.
- D) *Lagocephalus sceleratus*, © MF / RAC-SPA.
- E) *Pinctada radiata*, © MF / RAC-SPA.



3.2. INVASIVE SPECIES

The introduction of alien species into the marine environment, naturally, intentionally or by accident, is thought to be the most important threat for marine biodiversity.

According to the Mediterranean Action Plan on invasive species (RAC/SPA, 2005), the main known vectors of species introduction into the Mediterranean Sea are:

- Entry of Red Sea organisms through the Suez Canal.
- Shipping (ballast water, anchoring and sediments, fouling).
- Aquaculture (both marine and brackish water).
- Trade in live marine organisms (e.g. aquarium activities, fishing bait) and scientific research.



In Libya, the list of alien fish has exceeded 28 species (BenAbdalla, personal communications). Recently, Shakman and Kinzelbach (2008) reported 17 lessepsian fish species, 4 of them new records for Libya. Little updated information is available about other invasive species (invertebrates, algae... etc), which need to be a priority for scientific research in the coming years (Fig. 10).





Caulerpa racemosa meadow, Tripoli. © RDG / RAC-SPA.

3.3. HABITAT ALTERATION, POLLUTION AND LAND USE

Alteration on land would have serious consequences for the marine environment. Development on sandy or rocky beaches, without proper Environment Impact Assessments (EIA, as required by Law 15-2003), can have long-term impacts on the marine environment, its biodiversity and natural resources. Regardless of the general pristine condition of the Libyan coast, pollution sources may disturb the marine environment and biodiversity, in particular the dumping of untreated sewage, waste (in wadis or along the seafront) or petrochemical products, pumping and pouring of sea-water for desalination, cooling systems used by oil refineries and power stations.

3.4. LACK OF AWARENESS OF CONSERVATION PRIORITIES

In Libya, decision-makers are aware in general of environmental issues. However, conservation issues are still not gaining sufficient attention at governmental planning level, except for individual small-sized pilot projects conducted under EGA supervision, such as the Conservation of Medicinal Plants Project (with the IUCN; 1997-2003), the Libyan Sea Turtle Program (since 2005) and reforestation campaigns organised each autumn to build green belts around cities and towns.

In 2007 a national project to establish a management system in existing protected areas and national parks was initiated by the EGA in partnership with the UNDP. This is a keystone project for updating the management system and training rangers in protected areas on a scientific basis. The project will end in 2011 and will hopefully create a concrete basis for the protection of nature in Libya.



Fishing port of Tripoli. © RDG / RAC-SPA.

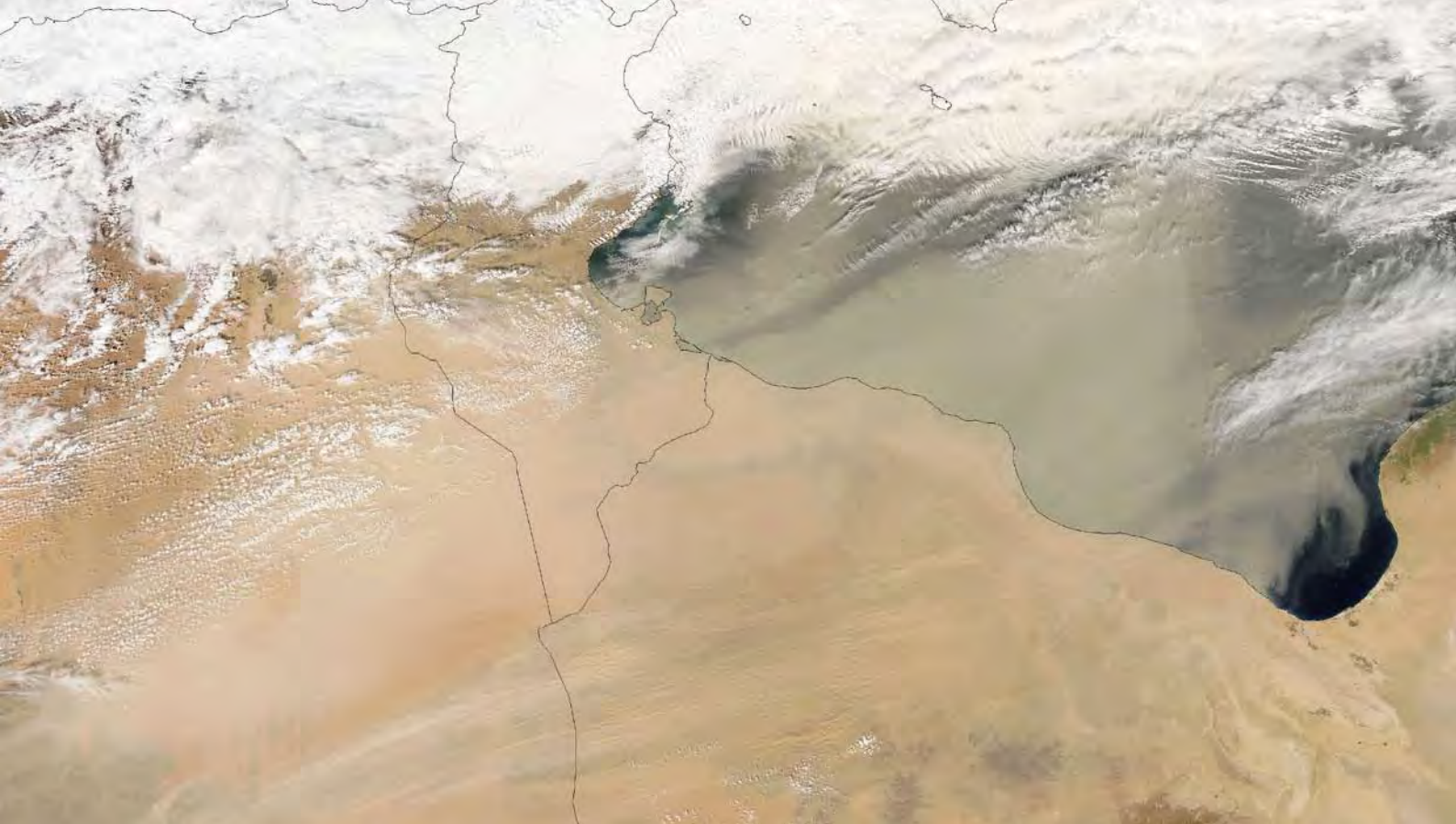


Fig. 12. Satellite image (MODIS) of massive sandstorm covering most of Libya and the Central Mediterranean. © NASA www.visibleearth.nasa.gov

3.5. CLIMATE CHANGE

It is clear that the effects of climate change on habitats already threatened by other pressures can accelerate the rhythm of deterioration of those habitats. No study to date has been launched in Libya on the effects of climate change on biodiversity, except a very recent on-going study on the effect of rising temperatures on the sex ratio of loggerhead sea turtles, conducted by the Libyan Sea Turtle Program in cooperation with Sfax University of Tunisia (details can be found at: <http://libstp.rac-spa.org/index.php/en/programmes-a-projects/sex-ratio>).

Studies on general trends of climatic changes within Libya have mainly been conducted by research students abroad (e.g. Elfenadi, 2004, El-Tantawi, 2005), but the taking into account of the results by the Libyan administration has not been considered as a priority.

3.6. DROUGHT AND DESERTIFICATION

Desertification in Libya is caused by both climatic and anthropogenic factors (El-Tantawi, 2005). Evidence shows that certain arid, semi-arid, and dry sub humid areas have experienced decreasing precipitation, negatively affecting soil fertility and the production of agriculture, livestock, forest and rangeland (McCarthy *et al.*, 2001).

Fragile land and a lack of sufficient precipitation can be added to the destruction of topsoil; though over-grazing and over-cultivation are the major causes of this type of land degradation (El-Tantawi, 2005). In all North African countries, over-grazing is the main cause of soil degradation, followed by over-cultivation, deforestation and over-exploitation of land (see Fig. 11, Middleton and Thomas, 1994).

Libya was aware of the problem of desertification, as a national committee on combating desertification was formed in 2004, with the participation of numerous national entities including EGA and representatives from agriculture, farmers' organisations and cooperatives, under the leadership of the General People's Committee for Agriculture and Animal Wealth. Programs were set up to stop dunes moving towards the north of the country from the vast desert area in the south, forestation campaigns are organised each year, with students, farmers and volunteers. However, the rate of changing land use (from forest to farmland, then from farmland to building sites) as in cities like Tripoli, in a continuous trend towards development, has led them to be now on the fringe of a pre-desert zone, resulting from clearance of thousands of forested areas. Due to the removal of this green belt, dust storms have become daily events in spring and summer in most parts of northern Libya and, in fact, most of the region (Fig. 12).

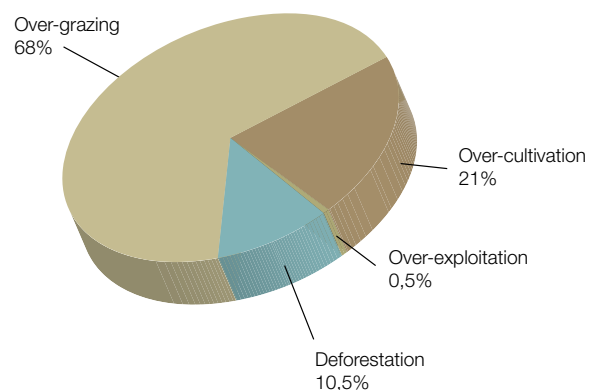


Fig. 11. Causes of Desertification in North African countries.

4. Legal and institutional aspects related to biodiversity and marine and coastal conservation in Libya

Libyan legislation has set up several legal frameworks to conserve biodiversity, directly and in many occasions indirectly, via the regulation of human activities that may alter the status of the country's biodiversity. Hereafter are listed the main legal texts related to coastal and marine biodiversity, divided into national legislation and the adoption of relevant regional and international conventions and treaties.

4.1. RELEVANT NATIONAL LEGISLATION

— Law No. 14 of 1989 is the basic legislation concerning the regulation of the use and conservation of marine wealth. It deals with the type of equipment, both local and imported, allowed for marine fishing, the sizes of fish/species and other marine organisms allowed to be caught, and issues relating to the supervision and control of the industry regarding safety issues.

— Secretariat of Marine Wealth (SMW) Decision No. 71 of 1990, which elaborates the provisions of Law No. 14 and the procedures governing its application, SMW Decision No. 80 of 1991, which provides technical explanations and specifications for the implementation of Law No. 14.

— SMW Decision No. 95 of 1993, which prohibits the use of monofilament nets and No. 11 hooks for fishing.

— SMW Decision No. 97 of 1993, relating to prohibitions on trawling in specific areas during the July and August spawning period for certain species. This decision was replaced by the General People's Committee Decision No. 271 of 2004 which defines those areas in which trawl fishing is banned. In brief, this decision prohibits trawlers from fishing in the defined areas during the months of May, June, July, and specifies the areas within which the trawlers are permitted to fish other than these areas.

— Sea turtle protection is included in the decree issued by the Secretariat of Agriculture No. 453/1993 stating that "All species of turtles and tortoises are protected by law in Libya" furthermore stating that "Any use of these species or its products (skin, eggs, flesh) is banned by law in Libya" and that "Any violation of these articles will be prosecuted within the legal system according to Hunting Law No.28 of 1968".

— SMW Decision No. 98 of 1993 regarding the staff of fishery administrations in municipalities and regions and authorizing them to act as legal officers.

— Law No. 15 of 2003, which replaced Law No. 7 of 1982, concerning environmental protection. In this Law, Chapter 3h contains 21 articles, comprehensively covering marine fisheries and marine wealth conservation, identifying the means and procedures necessary for the protection of fish stock, and banning the dumping of oils and other pollutants from vessels into the sea and the discharge of land-based sewage and industrial water into the marine environment. It also prohibits the use of explosives, radioactive and other poisonous substances for fishing, and bans dredging for sponges. It also provides for the demarcation of marine reservations for the preservation of threatened marine organisms.

— The General People's Committee Decision No. 37 of 2005, which declares a protected fishing zone along the Libyan coastline, prohibiting all methods of fishing in the declared permitted zones without advance permission issued by an official authority to be determined by the GPC.



Fishing village of Garabulli. © RDG / RAC-SPA.

4.2. INTERNATIONAL AND REGIONAL CONVENTIONS

Libya has ratified several regional and international conventions dealing with marine and coastal conservation. Many activities for marine conservation in Libya were introduced and still function within the framework of national implementation of those conventions. The following table summarizes Libya's position towards these conventions.

Convention	Adoption	Ratification
The Convention on Wetlands of International Importance, especially as Waterfowl Habitat (RAMSAR)	1971	2000
The World Heritage Convention	1972	1978
The Convention on International Trade in Endangered Species of Wild Fauna and Flora	1973	2003
The African Convention on the Conservation of Nature and Natural Resources (Algiers Convention)	1968	1969
Barcelona Convention for Protection against Pollution in the Mediterranean Sea	1976	1979
The Convention on the Conservation of Migratory Species of Wild Animals (CMS)	1979	2002
Specially Protected Areas and Biodiversity Protocol (1995) and its Annexes (amendment)	1995	1995
The Convention on Biological Diversity	1992	2001
The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS)	2001	2002

4.3. GAPS ANALYSIS

FOR THE PROPER SELECTION OF SITES

The following are potential causes of the underdeveloped situation of nature conservation in Libya and its effects on the selection of sites of conservation interest:

4.3.1 Delay in adopting a National Strategy on Biodiversity Conservation and Action Plan (as of 2008)

A national strategy on biodiversity accompanied by an effective action plan is the main stepping-stone to proper conservation for any country. The strategy includes an analysis of the present situation in terms of biodiversity, the definition of objectives and aims, and the development of an action plan for protecting biodiversity and defining ways in which to use natural resources sustainably. Libya has been a Party to the Convention on Biological Diversity since its declaration in Rio de Janeiro in 1992. However, the development of implementation of this crucial convention has been slow. This situation resulted from several reasons, amongst them:

- Inadequacy of trained personnel at TCEP and EGA, the main authority.
- Lack of decision-makers' awareness of the importance of such a framework for the future of nature conservation in Libya.
- Lack of proper communication with the Convention Secretariat.
- Absence of Libya from most CBD meetings and COPs due to routine and bureaucracy.

In 2002, an attempt to compile a draft national strategy was accomplished by the EGA but the draft submitted for adoption by the General People's Congress was not approved. In 2009, the EGA organised a national workshop to discuss contents and ways of developing a national biodiversity strategy; the report is still to be prepared.

The issues indicated above together with the absence of a national biodiversity strategy and action plan may lead to many other consequences, as listed below.

4.3.2. Inadequate legal frameworks on conservation issues

Regardless of Libya's adoption of several international and regional conservation-oriented agreements, conventions and protocols, the national legislation system comes to a halt after adopting those agreements, failing to pursue adequate implementation in the form of a properly integrated national conservation legal system.

There is still no list of protected species or habitats in Libya nor any updating of the regulations on hunting and fishing activities (hunting was banned by law in 1998 but is still widely practiced illegally in many parts of the country).

4.3.3. Lack of a comprehensive national study on the status of biodiversity

One of the early steps in the adoption of a biodiversity strategy and action plan is to conduct a nationwide study on the status of biodiversity. Even today, distribution studies and maps for many species are out of date: furthermore, the list of fauna and flora is incomplete. Although threats towards biodiversity are largely known, relative quantification has not been clearly identified. Efforts made by the EGA and MBRC in recent years have contributed to clarify some of the mysteries of Libyan biodiversity, even though based on short term surveys and field observations.



Posidonia oceanica meadows along sandy and rocky coast in western Tripoli. © RDG / RAC-SPA.

4.3.4. Coordination between national authorities

The role of conserving biodiversity in Libya is largely assumed by the public sector (government agencies, research institutes and universities). However, when it comes to the duties of the governmental institutes responsible, a lack of coordination and conflicting responsibilities are common, due to an overlap of mandates between institutes when they were first created by law (or decree). The weak role of universities is also a limiting factor, with very limited research or active involvement in national conservation work. The majority of NGOs are environmental in general and very few are specialized in conservation work, with very restricted activities or effect due to administrative limitations and lack of funding.

4.3.5. Governance of the protected areas sector

The traditional founder of national parks and protected areas (on land at least) in the Mediterranean region has been the Agriculture sector. In Libya, the Secretariat of Agriculture was the sole entity responsible for day-to-day management of protected areas and national parks, via the technical committee for wildlife: 12 of these conservation sites were declared between 1978 and 1992. Decentralisation of protected area supervision and the appointment of local provinces (Shabiyat) to supervise protected areas and national parks, without proper preparation for such responsibilities, gave former private land owners the chance to reclaim substantial parts of these areas, with the absence of clear legal texts allowing local courts in many cases to reissue land ownership documents for these locals (as in the the case of Kouf National Park). Due to the same legal shortcomings, the EGA and other national

institutes had no way of protecting such areas, except flaunting the country's moral commitment to the convention. Recently, the General People's Committee has issued a decree returning national governance of these areas to the national authority responsible for agricultural development, which is a step in the right direction: however, many of these sites are in urgent need of a proper management plan in addition to trained human resources, in order to sustain infrastructure developments.

4.3.6. Lack of criteria for the selection of sites of conservation interest

The selection of already declared protected areas and national parks mainly concerned the protection of green areas (natural or afforested areas), except in the case of Kouf National Park and, partially, Hisha reserve, where systematic studies have been undertaken by specialised teams. It is therefore difficult to convince national stakeholders to select new sites in the absence of agreed national criteria and a clear definition of the process whereby protected areas or sites are declared of conservation interest. The criteria part should be partly covered by this undertaking.

Right:
Micro-atoll of *Posidonia*, Ain Ghazala.
© MF / RAC-SPA.

5. Conservation of the marine and coastal environment in Libya: present situation and future challenges

This section examines the existing and planned network of protected marine and coastal areas in Libya. Then, from the discussion on criteria for the identification of sites of conservation interest to be used by different organisations at regional and international levels, a list of criteria to be applied to the Libyan marine and coastal environment has been proposed. These criteria have allowed experts to propose 24 sites that are presented one by one with their main characteristics.

5.1. LIBYAN SITES ALREADY DECLARED AT NATIONAL OR INTERNATIONAL LEVEL AS PROTECTED AREAS OR AREAS OF CONSERVATION INTEREST

Four sites have been designated or are in the process of designation:

- Farwa lagoon and island (only the lagoon part was declared recently by the Marine Biology Research Centre of Tajurah – MBRC to be protected)
- Aïn Ghazalah (under processing by the EGA and MBRC)
- Hisha nature reserve (under the governance of the Agriculture Authority management)
- Kouf National Park (currently lacks proper management, funds and personnel)



5.2. CRITERIA FOR THE IDENTIFICATION OF SITES OF CONSERVATION INTEREST IN THE MARINE AND COASTAL ENVIRONMENT OF LIBYA

The criteria for the selection of sites of conservation interest in the marine and coastal zone of Libya should be elaborated taking into account the existing criteria defined at regional and international levels and the specific characteristics of the marine environment in Libya. To be applicable by government institutions or NGOs, these criteria should also take into account the legal and institutional frameworks that govern nature conservation in Libya and the relevant socio-economic contexts.

5.2.1. Proposed principles for elaboration of the criteria

The following three principles are considered as essential for the success of the process:

- Harmonisation of the criteria with the relevant regional and global initiatives.
- Good coverage of the specific characteristics and ecological features of the Libyan coast.
- Feasibility of the identification and selection of sites for building a coherent and representative network of marine and coastal protected areas, keeping in mind that data is scarce for some sites, but that the information available allows for a preliminary selection to be confirmed at a later point during field research.

5.2.2. Relevant initiatives for inventorying/listing of natural sites of interest

To ensure a satisfactory level of harmonisation with relevant regional and global initiatives, criteria developed within the framework of the CBD should be considered, as well as criteria for the selection of:

- Specially Protected Areas of Mediterranean Importance (SPAMI).
- French ZNIEFF (Zones Naturelles d'Intérêt Ecologique Faunistique et Floristique).
- World Heritage sites.
- Important Bird Areas (IBAs) promoted by Bird Life International.



Micro-atoll of *Posidonia* off Ain Ghazala lagoon. © RDG / RAC-SPA.

CBD criteria include: uniqueness or rarity, special importance for life history stages of the species, importance of threatened species and habitats, vulnerability, fragility, sensitivity, low recovery, biological productivity, biological diversity, naturalness.

SPAMI criteria include:

- Regional value, evaluated according to: uniqueness, natural representation, diversity (of species, communities, habitats or ecosystems), naturalness, cultural representation, presence of habitats that are critical to endangered, threatened or endemic species.
- Scientific, educational or aesthetic interest.
- The existence of threats likely to impair the ecological, biological, aesthetic or cultural value of the area.

The criteria for selection of ZNIEFF include: vulnerability, natural heritage value, rarity, aesthetic value, economic value and the speed of regeneration.

Many of the criteria used for the selection of sites to be included in the UNESCO World Heritage List are not relevant to natural sites. To be included in the List, a natural site should:

- Be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment, especially when it has become vulnerable under the impact of irreversible change.
- Contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

- Be outstanding examples representing major stages in the earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features.
- Be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals.
- Contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

Criteria used for the selection of IBAs focus on the importance of the area for threatened (bird) species. An IBA should therefore:

- Contain significant numbers of one or more globally threatened species.
- Be one of a set of sites that together hold a suite of restricted-range species or biome-restricted species.
- Have exceptionally large numbers of migratory or congregatory species.

In the context of the Libyan coast, the criteria for IBAs are particularly important as recent studies have confirmed the existence of sites of high importance for the conservation of globally threatened bird species.



Ardea cinerea on a *Posidonia* micro-atoll, Ain Ghazala. © RDG / RAC-SPA.

5.2.3. Proposed criteria for the Libyan coast

Following discussions regarding criteria, the experts have agreed on Priority 1 criteria which are essential for the country, and Priority 2 criteria for which data will be needed for further evaluation of the interest of the site and the importance of pressures and threats.

Based on existing information and the knowledge of the experts, 24 sites have been proposed. They are described one by one in the following section.

Priority 1 criteria are:

- Uniqueness or rarity.
- Special importance for life history stages of the species concerned: fish nursery areas, coastal lagoons.
- Importance for threatened or endangered species and habitats: the main species to be considered are:
 - Turtles (nesting sites, trawling areas with high concentration of turtles).
 - Monk seal.
 - Cartilaginous fish species.
 - Bird species (areas fulfilling IBA criteria).
- Naturalness.
- Existence of threats likely to impair the ecological, biological, aesthetic or cultural value of the area.

Priority 2 criteria are:

- Vulnerability, fragility, sensitivity.
- Low recovery, biological productivity, biological diversity.

6. Identified sites of conservation interest to consider for the Libyan network of Marine and Coastal Protected Areas

6.1. THE 24 PROPOSED SITES

The 24 proposed sites are spread along the entire coast of Libya, identifying sites or species of interest for conservation, the purpose of this project: but also, once created, supporting the development of specific activities such as education, awareness-raising and sustainable tourism.

The experts have been able to gather information on these sites, and in coming years it will be possible to develop research and provide more details on Libya's marine and coastal biodiversity.

6.2. OPPORTUNITY FOR TRANS-BOUNDARY CONSERVATION SITES

In addition, the experts have been able to propose two options for transboundary conservation, one with Tunisia and one with Egypt, allowing for exchanges of experience and the sharing of data, management expertise and tools for conservation. Southern countries are aware that conservation of the marine and coastal environment is not only a national concern, but also a regional or subregional concern, since the transfer of species, but also of impacts, pollution or invasive species does not stop at national frontiers.

6.2.1 Assaloum area

Marine and coastal boundaries between Libya and Egypt are characterised by low human population density and lower levels of anthropogenic disturbance. The coastal area from Burdiyah to Salloum features a high to medium elevated coastline, with sandstone cliffs and marine caves, intersected with wadi mouths where short pristine sandy beaches can be found. Seagrass meadows are quite immense, providing a productive habitat for several rare marine species such as fin whales, green turtles and even monk seals which have been sighted in this area.

This area is also important for monitoring the passage of lessipian Red Sea marine species, as the north-west coast from Egypt to Libya is one of two main entrances for alien Red Sea species. The site is also important as a secondary flyway for thousands of birds each autumn and spring: many birds cross the desert or join the river Nile flyway via this area.

Local traditions (of Bedouins) have some impact, however, on marine and coastal biodiversity, such as unregulated wildlife hunting, blast fishing and illegal trade in wild species. In 2007, the

Egyptian government launched a project with the IUCN at Assaloum to boost nature conservation through a public awareness program and the establishment of a marine protected area in Salum that was declared in 2010. Joining this project will integrate the Libyan side of the area and contribute to a first trans-boundary conservation project in the region.

6.2.2 Abukammash-Farwa-Beban area

The Farwa lagoon and Abukammash area comprises the Libyan stretch of the Gulf of Gabes, an area known for its high fishery productivity, but also its vulnerability to pollution and other man-made threats to the marine and coastal environment.

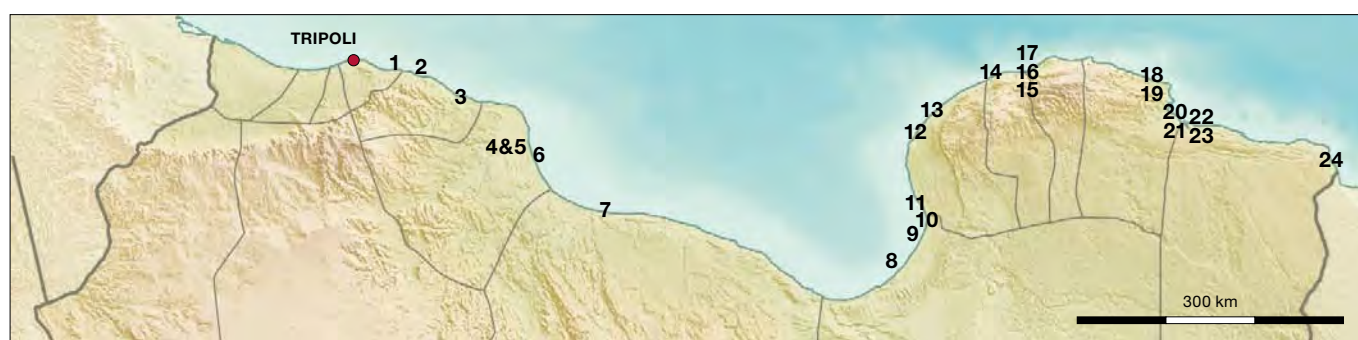
In fact, Farwa might be the most important coastal and marine site in western Libya, in terms of its high marine and coastal biodiversity resulting from years of surveys and studies in this area. The same applies to Biban lagoon (Bahiret El Biban) in Tunisia, a few kilometres from the Libyan border. This region is characterised by exceptional importance in terms of fish and artisanal fisheries, aquaculture, sea birds, seagrass meadows, land/seascape features and, above all, as one of the few regions in the Mediterranean to experience active tidal movements.

A project of a trans-boundary protected area between Tunisia and Libya would enhance the exchange of experience and collaboration between the two countries, and serve as a model of south-south cooperation.

6.3. OTHER OPPORTUNITIES

At the end of the process, it was also noted that current marine knowledge is mainly related to the nearshore marine environment and that specific deep sea features could be considered, based on future research programs. In this respect, it appears evident that the submarine canyon parallel to the coast along the Cyrenaic promontory is an important feature in the movement of deep sea waters and species in the south-eastern part of the Mediterranean. It could in particular facilitate the migration of species coming from the Red Sea through the Suez Canal to the coast of Libya and especially the southern part of the Gulf of Sirte.

**6.4. IDENTIFIED SITES OF CONSERVATION INTEREST
TO INCLUDE IN THE LIBYAN NETWORK OF MARINE AND COASTAL
PROTECTED AREAS**



- | | | | |
|----|--|----|------------------------------------|
| 1 | Wadi Maseed | 13 | Ain Zayanah |
| 2 | Wadi Turghat | 14 | Tolmitah-Ugla rocky coast |
| 3 | Ain Wadi Kaam | 15 | Kouf Beaches |
| 4 | Sebkhet Qaser Ahmed-Taourgha Complex | 16 | Sebkhet Ain Azzarga |
| 5 | Ain Taourgha | 17 | Sebkhet Ain Shakika (Ain Eshgaiga) |
| 6 | Sandy beaches and waters of Al Araar-Bouerat lahsoun | 18 | Wadi Khalij |
| 7 | Al-Thalateen Beach | 19 | Wadi Hamassah |
| 8 | Sandy beaches of Bishr, Ajdabiya and Zwaitina | 20 | Gulf of Bumba |
| 9 | Garah Island | 21 | Abulfrais Beach |
| 10 | Shat Elbadine | 22 | North beaches of Ain Al Ghazalah |
| 11 | Al-Mtefla Beach | 23 | Beaches of Gurdaba |
| 12 | Sebkhet Jeliana-Benghazi | 24 | Gulf of Burdiya (Bardiyah) |

1. WADI MASEED



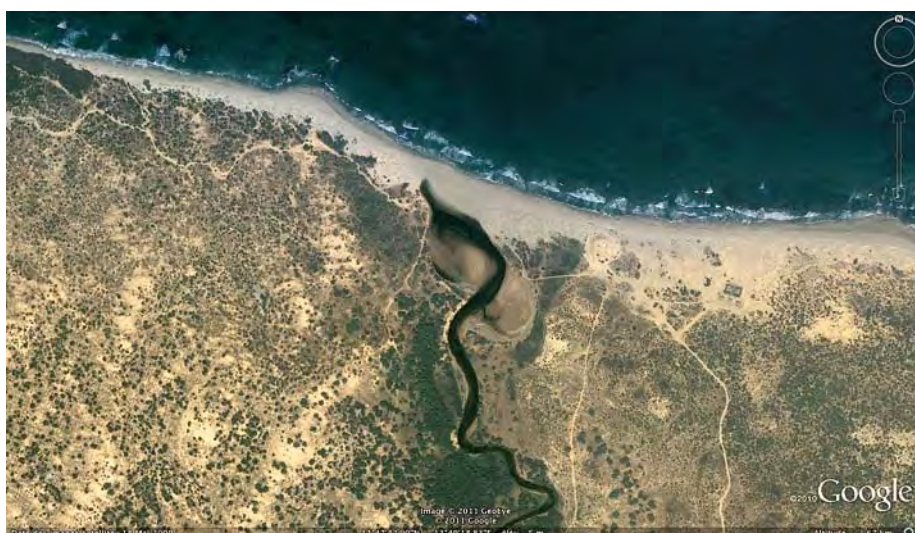
Site name	Wadi Maseed
Region (Shabiya)	Tripoli
Location	32° 47' N – 13° 42' E
Quality and importance	<p>Spring fed in origin, the Wadi Maseed flows through continental sand dunes (with reforestation using <i>Acacia</i>, <i>Eucalyptus</i> and other alien species). Occasionally, after heavy rain the sand bar is cut and the wadi is connected to the sea. River water is fresh, quite deep in places, with reedy vegetation (<i>Typha</i>, <i>Juncus</i>, <i>Phragmites</i>). There is a relatively small area of open water and fringing vegetation of about 100 hectares at the mouth of the river limited by the sandbar, a beach and a rocky outcrop offshore. Extensive beds of <i>Posidonia oceanica</i> are present offshore.</p> <p>Karabulli as a whole is listed as an Important Bird Area (IBA) by BirdLife International because it meets criterion A3 for three biome-restricted species of the Mediterranean North Africa biome (<i>Alectoris barbara</i>, <i>Sylvia melanocephala</i> and <i>Sylvia conspicillata</i>), and one species of the Sahara-Sindian biome (<i>Turdoides fulvus</i>).</p> <p>Wadi Maseed is a wintering site for several MAP seabird species.</p>
Conservation Status	Unfinished tourist units at the head of beach spoil the scenic and landscape values; appalling quantities of rubbish are scattered indiscriminately inland in the dune area. This site is a popular destination for family excursions and picnics and could become an excellent location for facilities such as a visitor centre and information panels, for raising public awareness and for guided visits. The alien introduced species should be removed progressively as native plants take over on the dunes.
Vulnerability	Agriculture, wastewater pollution (at the high area of the river), wild fires, solid waste pollution, unregulated use.
Designation	The Wadi Maseed crosses the Garabulli National Park, established in 1992 and covering an area of some 15,000 hectares. The inland extension is seven kilometres but the conservation status is not presently enforced.
Habitat types	
SPA/BD protocol:	Coastal wetlands (estuaries); dunes, sandy beaches, rocky beaches.
Ramsar:	Coastal/Marine F ("Estuarine waters, permanent estuaries and deltas"), partly Marine/Coastal E ("beaches of fine or coarse sand"). M -- Permanent rivers/streams/creeks.
Criteria applicable	
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
ZNIEFF:	Aesthetic value, natural heritage value, economic value.
Criteria for the Libyan coast	
Priority 1	— Special importance for life history stages of the species: fish nursery areas. — Naturalness.



2. WADI TURGHAT



Site name	Wadi Turghat
Region (Shabiya)	Tripoli
Location	32° 47' N – 13° 49' E
Quality and importance	Wadi Turghat presents a similar range of habitats and species as for the Wadi Maseed. The area is slightly larger in size, range and numbers of waterbirds. The river mouth in the dunes includes fairly abundant fringing freshwater vegetation, not generally reaching the sea because of a sandbar at the mouth. The area is considered as a very important stopover for trans-Saharan migrants, especially passerines, particularly on a northward passage in spring.
Conservation Status	The area requires control of alien vegetation and regulation of human uses. The site could be an excellent location for information, public awareness and education facilities and for providing services such as guided tours.
Vulnerability	Apparently no specific threats, but the vast amount of solid waste in the water and on the rims needs some specific measures, locally and upstream.
Designation	Turghat forms the eastern boundary of the Karabulli (Algharabolli) National Park.
Habitat types	
SPA/BD protocol:	Coastal wetlands (estuaries); also dunes, sandy beaches, rocky beaches.
Ramsar:	Coastal/Marine F ("Estuarine waters, permanent estuaries and deltas"), partly Marine/Coastal E ("beaches of fine or coarse sand"). M -- Permanent rivers/streams/creeks.
Criteria applicable	
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
ZNIEFF:	Aesthetic value, natural heritage value.
Criteria for the Libyan coast	
Priority 1	— Special importance for life history stages of the species: fish nursery areas. — Naturalness.



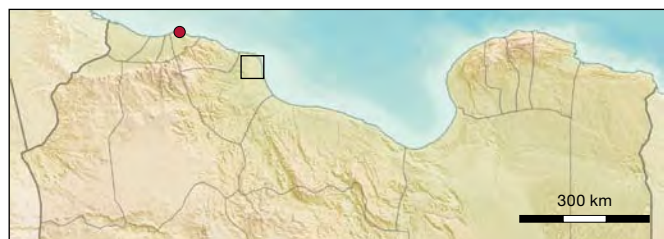
3. AIN WADI KAAM



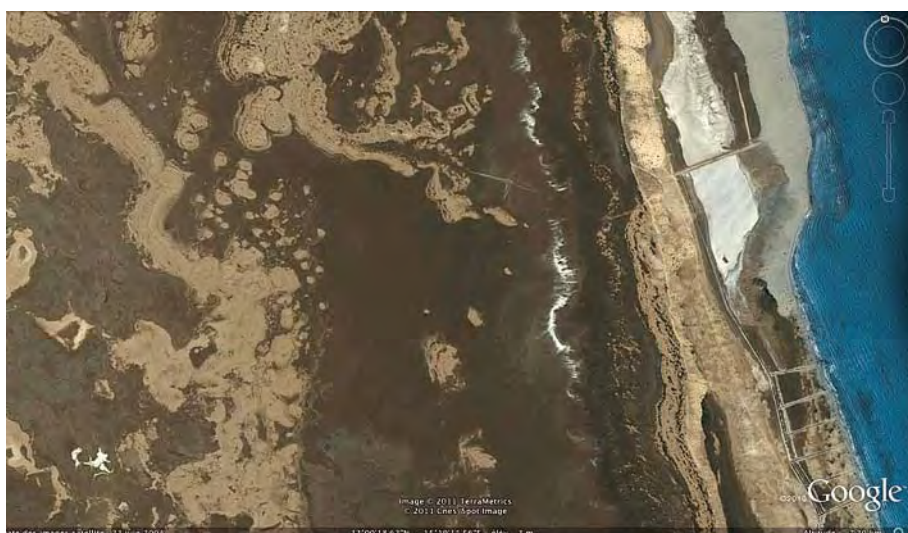
Site name	Ain Wadi Kaam
Region (Shabiya)	Almergeb (Khoms)
Location	32° 31' N – 14° 26' E
Quality and importance	<p>Starting as a freshwater spring (Ain), it constitutes a river in the Kaam valley (Wadi Kaam) and an estuary at the river mouth. The area is an aquaculture site for freshwater fishes, using tanks on land. Part of the water is used for irrigation of numerous small fields on both banks.</p> <p>This is an important spot for resident fauna and a stop-over point for migratory birds, cited in literature as one of the most famous Tripolitanian sites for ornithology.</p> <p>The wetland vegetation is important, and the fauna includes numerous reptiles and amphibians (frogs and toads).</p> <p>The area is representative of a coastal wetland site, with human use for farming.</p> <p>The marine part in front of the estuary includes large <i>Posidonia oceanica</i> meadows, and is an important feeding-wintering area for marine turtles.</p>
Conservation Status	The area is a place of considerable human activity, mainly traditional agriculture, but the general conservation status is good and attractive for visitors (picnic sites, public awareness) and schools (natural history research).
Vulnerability	Water management could be a problem if the agricultural activities are expanded. The presence of large amounts of anthropogenic wastes is a problem to be tackled.
Designation	No protection measures to date.
Habitat types	
SPA/BD protocol:	Coastal wetlands (estuaries); also dunes, sandy beaches, rocky beaches.
Ramsar:	Coastal/Marine F ("Estuarine waters, permanent estuaries and deltas"), partly Marine/Coastal E ("beaches of fine or coarse sand"). M -- Permanent rivers/streams/creeks.
Criteria applicable	
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
ZNIEFF:	Aesthetic value, natural heritage value, economic value.
Criteria for the Libyan coast	
Priority 1	<ul style="list-style-type: none"> — Special importance for life history stages of the species: fish nursery areas. — Naturalness.



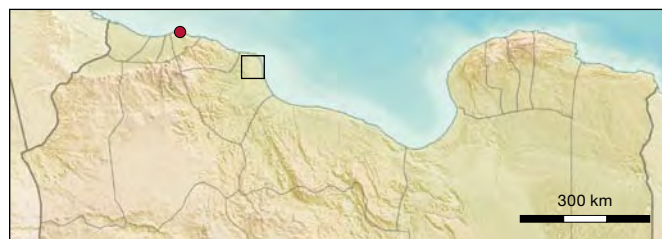
4. SEBKHET QASER AHMED-TAOURGHA COMPLEX



Site name	Sebkhet Qaser Ahmed-Taourgha Complex
Region (Shabiya)	Misuratah
Location	32° 00' N – 15° 19' E
Quality and importance	The northern part of the huge Sebkha system extends south and south-west to Hisha, through Taourgha and Um Elazaam. The proximity of the Mediterranean coast makes it important for wintering waterbirds, especially gulls and waders. Parts of Sebkhet Taourgha are important wintering sites for common cranes.
Conservation Status	In near-natural condition except for the threat of dumping solid waste by the nearby city of Qaser Ahmed.
Vulnerability	Urban waste, dumping, drought.
Designation	No designation at the present stage.
Habitat types	
SPA/BD protocol:	Salt marshes, salt steppes, salt scrub.
Ramsar:	Ss -- Seasonal/intermittent saline/brackish/alkaline marshes/pools.
Criteria applicable	
SPAMI:	Scientific, educational or aesthetic interest. The existence of threats likely to impair the ecological, biological, aesthetic or cultural value of the area.
CBD:	Importance of threatened species and habitats, vulnerability, fragility, sensitivity, low recovery.
ZNIEFF:	Economic value, vulnerability.
Ramsar:	Criteria 2, 3.
Criteria for the Libyan coast	
Priority 1	— Importance for threatened or endangered species and habitats: gull species wintering site. — Naturalness. — Existence of threats likely to impair the ecological, biological, aesthetic or cultural value of the area (dumping).
Priority 2	Vulnerability, fragility, sensitivity.



5. AIN TAOURGHA



Site name	Ain Taourgha
Region (Shabiya)	Misuratah
Location	32° 01' N – 15° 07' E
Quality and importance	This natural freshwater spring is the central point of a small oasis and surrounded by extensive salt marshes. The site is of major interest both culturally and in terms of biological diversity. The fauna includes several freshwater fish species, reptiles and amphibians in need of further surveys. Some waterfowl species are present all year around.
Conservation Status	The traditional management of the spring and oasis is still functional, but partially neglected due to the population moving to the nearby town of Taourgha. Traditional modes of life and associated water management could be reinstated.
Vulnerability	The area's cultural heritage is neglected and the wetland is threatened locally by drought or misuse such as fires and clearance. It is important to note the presence in this area of infectious diseases like Schistosomiasis and Leishmaniasis.
Designation	Proposed for PA status, not yet declared.
Habitat types	
SPA/BD protocol:	Salt marshes.
Ramsar:	M -- Permanent rivers/streams/creeks. R -- Seasonal/intermittent saline/brackish/alkaline lakes and flats. Y -- Freshwater springs; oases. 9 -- Canals and drainage channels, ditches.
Criteria applicable	
SPAMI:	— Site of Mediterranean importance for waterbird species. — Site of Mediterranean importance for seagrass communities.
Birdlife IBA:	A declared IBA since 1992.
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
ZNIEFF:	Aesthetic value, natural heritage value, economic value.
Ramsar:	Criteria 2, 4, 6.
Criteria for the Libyan coast	
Priority 1	— Uniqueness or rarity (wetland habitats fed by the largest freshwater spring in Libya, 2.4 cubic meters/second) — Importance for threatened or endangered species and habitats: wintering birds (crane, falcons, glossy ibis, flamingos) — Naturalness



6. SANDY BEACHES AND WATERS OF AL ARAAR-BOUERAT LAHSOUN



Site name	Sandy beaches and waters of Al Araar-Bouerat lahsoun
Region (Shabiya)	Misuratah (Gulf of Sirte, western side)
Location	31° 53' N – 15° 23' E (central point)
Quality and importance	<p>The area covers 70 km of sandy/partially rocky beaches from the town of Qaser Ahmed to Bouerat lahsoun, located on the western headland of the Gulf of Sirte, to be considered with the sea and adjacent Sebkhass on the land side.</p> <p>The beaches are the most important marine turtle nesting sites in western Libya. The area is also one of few landing sites for cartilaginous fisheries in Libya (February to April), using specific gillnets (Kellabia). Shore birds are abundant in summer, the sebkhass (such as Taourgha, Hisha and Um lazaam) behind the sandy beach dunes are too far to be estimated in terms of waterbirds, due to the vast surface area and inaccessibility in many of its parts.</p>
Conservation Status	In near-natural condition
Vulnerability	Predation by foxes and some poaching represent the main threats.
Designation	No protection known, except partial protection of sea turtle nests in summer.
Habitat types	
SPA/BD protocol:	Dunes, sandy beaches, rocky beaches; hard bottoms; sands.
Ramsar:	<p>B -- Marine subtidal aquatic beds.</p> <p>E -- Sand, shingle or pebble shores.</p> <p>Ss -- Seasonal/intermittent saline/brackish/alkaline marshes/pools.</p>
Criteria applicable	
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
Criteria for the Libyan coast	
Priority 1	Importance for threatened or endangered species and habitats: nesting and wintering of loggerhead sea turtles.
Priority 1	Vulnerability, fragility, sensitivity: to oil pollution.



7. AL-THALATEEN BEACH



Site name	Al-Thalateen beach
Region (Shabiya)	Sirte (Gulf of Sirte)
Location	31° 13' N – 16° 16' E
Quality and importance	This sandy beach is 5 km long and 100-200 m wide. The middle area of this beach is used by local inhabitants for recreational bathing, especially on weekends. A small landing site with a few boats is also present. The western edge of the site is the place of human activities of the nearby village (i.e. bathing, grazing and some waste disposal). This beach is one of the important nesting sites for loggerhead turtles at national level. The site is used for local picnics in summer.
Conservation Status	In near-natural condition, with increased amounts of urban solid waste drifting by the sea and left by bathers on site.
Vulnerability	Unregulated visits, the potential threat of the nearby power station.
Designation	Proposed for MPA status, not yet declared.
Habitat types	
SPA/BD protocol:	Dunes, sandy beaches, rocky beaches; hard bottoms; sands; marine vegetation beds.
Ramsar:	B -- Marine subtidal aquatic beds. E -- Sand, shingle or pebble shores. Ss -- Seasonal/intermittent saline/brackish/alkaline marshes/pools.
Criteria applicable	
SPAMI:	— Site of Mediterranean importance for sea turtle species. — Site of Mediterranean importance for seagrass communities.
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
Ramsar:	Criteria 2, 4, 6.
Criteria for the Libyan coast	
Priority 1	— Importance for threatened or endangered species and habitats: loggerhead sea turtles, cartilaginous fish nursery and fishing area. Historically a site with monk seal presence. — Existence of threats likely to impair the ecological, biological, aesthetic or cultural value of the area: driving on sandy beaches.
Priority 2	Vulnerability, fragility, sensitivity: to oil pollution (passage of tankers and future offshore drilling).



8. SANDY BEACHES OF BISHR, AJDABIYA AND ZWUITINA



Site name	Sandy beaches of Bishr, Ajdabiya and Zwuitina
Region (Shabiya)	Al Wahat (ex Ajdabiyah, Gulf of Sirte, eastern side)
Location	From 30° 15' N – 19° 11' E to 30° 57' N – 20° 07' E
Quality and importance	This area covers about 100 km of sandy beaches with rocky areas, comprising most of the south-eastern sector of the Gulf of Sirte, and including the southernmost point of the Mediterranean Sea. This area is highly understudied but the information available indicates excellent habitats for nesting loggerhead sea turtles, the passage of some migrant birds and historic distribution beaches for monk seals. The area is also believed to be an important nursery for cartilaginous fishes, and may play a role in the establishment of populations of fishes from Lessepsian migration, due to the expected higher temperature in comparison with other areas in the north. Also, the beaches of Bishr and Agayla are famous for stranding debris brought by a circular current in the central Mediterranean, which may play a role in fish distribution at this location.
Conservation Status	In near-natural condition.
Vulnerability	Blast fishing, sea turtle egg poaching, hunting and trapping of migrant birds.
Designation	No designation known, except Garah Islands group (located offshore of this area, a candidate as a marine protected area, see next data sheet).
Habitat types	
SPA/BD protocol:	— Dunes, sandy beaches, rocky beaches; hard bottoms; sands; marine vegetation beds.
Ramsar:	B -- Marine subtidal aquatic beds. E -- Sand, shingle or pebble shores. Ss -- Seasonal/intermittent saline/brackish/alkaline marshes/pools.
Criteria applicable	
SPAMI:	— Site of Mediterranean importance for sea turtle species. — Site of Mediterranean importance for seagrass communities.
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
Ramsar:	Criteria 2, 4, 6.
Criteria for the Libyan coast	
Priority 1	Importance for threatened or endangered species and habitats: loggerhead sea turtles. Historically a site with monk seal presence.
Priority 2	Vulnerability, fragility, sensitivity: to oil pollution (passage of tankers and future offshore drilling; thermal pollution from power turbines.



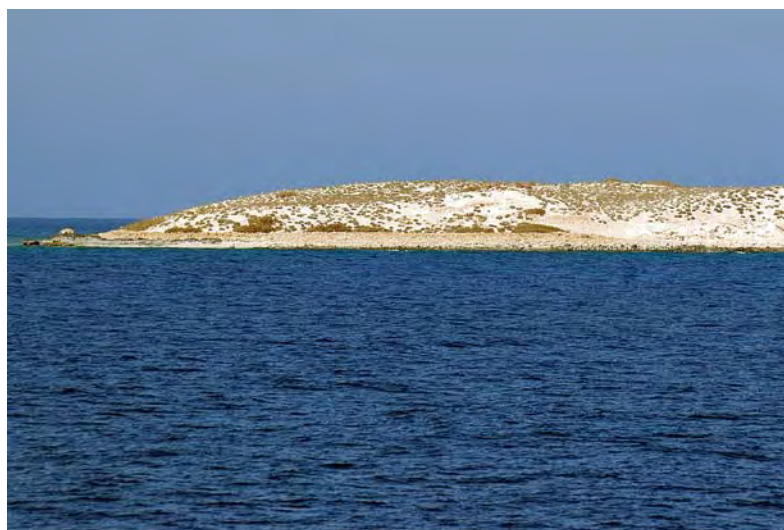
9. GARAH ISLANDS GROUP



Site name	Garah Islands group
Region (Shabiya)	Al Wahat (ex Ajdabiyah)
Location	30° 46' N – 19° 57' E (central group)
Quality and importance	Small sandstone islands in the north-eastern part of the Gulf of Sirte, maximum 8 m above sea level, with low sandstone cliffs or gentle slopes surrounding modest hills with scattered rocks and low halophytic vegetation (mainly <i>Suaeda</i> and <i>Arthrocnenum</i>) growing on sandy substrate. A few taller <i>Balanites</i> bushes are present. The main island has a surface area of about 5 hectares. The most important breeding site for Lesser crested tern <i>Sterna bengalensis emigrata</i> . The Mediterranean monk seal has been recorded on the site and in surrounding waters.
Conservation Status	In natural condition, however some solid wastes drifted to the island by sea and a few visitors.
Vulnerability	Oil pollution risk from nearby Zouitina terminal and passing tankers. Blast fishing.
Designation	Proposed for MPA status, not yet declared.
Habitat types	
SPA/BD protocol:	Marine cliffs, rocky coasts; marine vegetation beds; hard bottoms.
Ramsar:	D -- Rocky marine shores.
Criteria applicable	
SPAMI:	— Site of Mediterranean importance for MAP seabird species. — Site of Mediterranean importance for seagrass communities.
ZNIEFF:	Aesthetic value, natural heritage value, economic value.
Ramsar:	Criteria 2, 4, 6.
Criteria for the Libyan coast	
Priority 1	— Special importance for life history stages of the species: sea bird colony site (Lesser crested tern, Mediterranean Shag), feeding of and nesting of sea turtles (nesting on near mainland). — Importance for threatened or endangered species and habitats: sea birds, monk seals (sighted). — Naturalness
Priority 2	— Vulnerability, fragility, sensitivity: large group visits, oil spills, and habitat with consequent degradation of physical properties.

Garah island is a *Sterna bengalensis* hot spot.

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10. SHAT ELBADINE



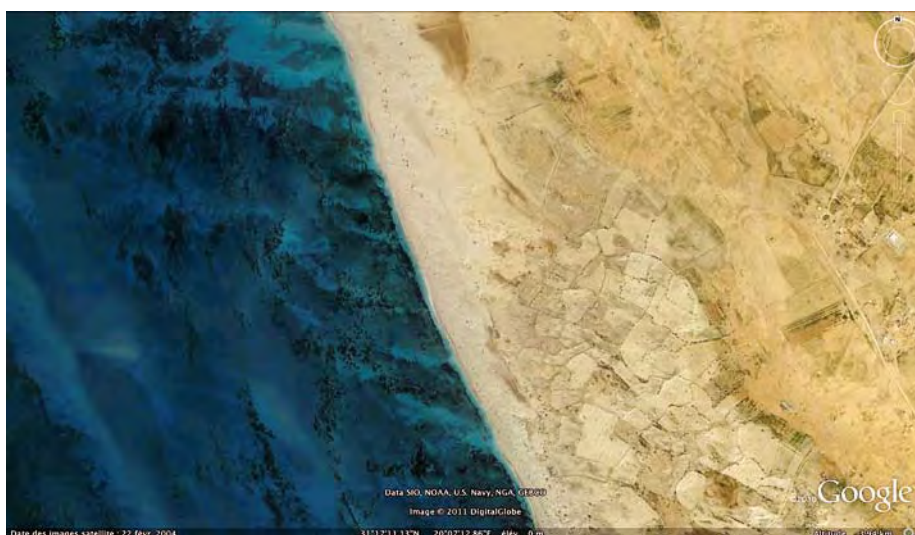
Site name	Shat Elbadine
Region (Shabiya)	Al Wahat (ex Ajdabiyah)
Location	31°12' N – 20°09' E
Quality and importance	This small salty/brackish sebkhet, covering 20 or 30 hectares, is located behind the coastal dunes, about 100 km south of Benghazi on the eastern coast of the Gulf of Sirte, with a beach and plantations of palms. The sandy beach is one of the important loggerhead nesting sites in eastern Libya.
Conservation Status	In near-natural condition, except for minor urban pollution from bathers.
Vulnerability	Sea turtle egg poaching, driving vehicles on sandy beaches which destroys nests and wild flora on the dunes.
Designation	No designation known, except its seasonal importance for nesting loggerhead sea turtles, when nest protection measures are taken.
Habitat types	
SPA/BD protocol:	Dunes, sandy beaches, rocky beaches; hard bottoms; sands; marine vegetation beds.
Ramsar:	B -- Marine subtidal aquatic beds. E -- Sand, shingle or pebble shores. Ss -- Seasonal/intermittent saline/brackish/alkaline marshes/pools.
Criteria applicable	
SPAMI:	— Site of Mediterranean importance for sea turtle species. — Site of Mediterranean importance for sea-grass communities.
CBD:	Importance of threatened species and habitats, vulnerability, fragility, sensitivity, low recovery.
Ramsar:	Criteria 2, 4, 6.
Criteria for the Libyan coast	
Priority 1	— Importance for threatened or endangered species and habitats: loggerhead sea turtles — Existence of threats likely to impair the ecological, biological, aesthetic or cultural value of the area: turtle egg poaching, blast fishing, driving on sandy beaches.



11. AL-MTEFLA BEACH



Site name	Al-Mtefla beach
Region (Shabiya)	Benghazi
Location	31° 17' N – 20° 07' E
Quality and importance	This low-lying sandy beach is located 100 km south of Benghazi. It extends over 4.5 km of coastline with moderate plant cover of mixed sand dunes and salt marsh vegetation.
Conservation Status	In near-natural condition, with increased amounts of urban solid waste drifting to the sea and left by visitors on site.
Vulnerability	Predation of turtle nests by foxes and some poaching represent the main threats.
Designation	No protection known, except partial protection of sea turtle nests in summer.
Habitat types	
SPA/BD protocol:	Dunes, sandy beaches, rocky beaches; hard bottoms; sands.
Ramsar:	B -- Marine subtidal aquatic beds. E -- Sand, shingle or pebble shores. Ss -- Seasonal/intermittent saline/brackish/alkaline marshes/pools.
Criteria applicable	
SPAMI:	Site of Mediterranean importance for sea turtle species.
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
Ramsar:	Criteria 2, 4, 6.
Criteria for the Libyan coast	
Priority 1	Importance for threatened or endangered species and habitats: loggerhead sea turtles.
Priority 2	Vulnerability, fragility, sensitivity: to oil pollution.



12. SEBKHET JELIANA-BENGHAZI



Site name	Sebkhet Jeliana-Benghazi
Region (Shabiya)	Benghazi
Location	32° 05' N – 20° 03' E
Quality and importance	<p>This flooded sebkha at the centre of Benghazi, currently covering 200 hectares, was used in the early 1900's for salt production. It receives water from a connection to the inner harbour (23 July Lake) and from sewage water effluents, which increase the productivity of the water but pose environmental and health concerns.</p> <p>The site includes a small islet hosting the third Mediterranean colony of lesser crested tern <i>Sterna bengalensis</i>.</p> <p>Recently (summer 2010) the site was considered for a development project that could affect the quality of wading habitat unless a precautionary approach is considered and an EIA conducted.</p> <p>The site is the most important (unprotected) waterbird site nationally, attracting birds all year around and hosting 30% of Libya's wintering waterbirds.</p>
Conservation Status	Despite the severe ecological status of the site, it presents tremendous opportunities for raising public awareness. However, it should be designated as an urban park, keeping the bird habitats in optimum condition.
Vulnerability	Development and pollution.
Designation	No known designation.
Habitat types	
SPA/BD protocol:	Coastal wetlands (lagoons, estuaries, deltas, salt pans); salt marshes.
Ramsar:	Sp -- Permanent saline/brackish/alkaline marshes/pools.
Criteria applicable	
SPAMI:	<ul style="list-style-type: none"> — Regional value, evaluated in terms of: wintering bird populations, threatened or endemic species (summer breeding of lesser crested terns). — Scientific, educational or aesthetic interest. — The existence of threats likely to impair the ecological, biological, aesthetic or cultural value of the area.
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
ZNIEFF:	Vulnerability, natural heritage value, aesthetic value.
Ramsar:	Criteria 2, 3, 4.
Criteria for the Libyan coast	
Priority 1	<ul style="list-style-type: none"> — Special importance for life history stages of the species: fish nursery areas, coastal lagoons — Importance for threatened or endangered species and habitats: lesser crested tern, great flamingos, and some other waterbirds. — Existence of threats likely to impair the ecological, biological, aesthetic or cultural value of the area.
Priority 2	— Vulnerability, fragility, sensitivity.



13. AIN ZAYANAH



Site name	Ain Zayanah
Region (Shabiya)	Benghazi
Location	32° 12' N – 20° 09' E
Quality and importance	This typical coastal sebkha, bordering an oval-shaped cove, is fed by freshwater springs at the east end mixed with seawater entering from the west. The site covers about 500 hectares, with man-made banks partially in the southern part. The vegetation is dominated by <i>Arthrocnemum</i> , with some macrophytes (<i>Ruppia</i>) and a palm grove growing on the eastern side of the lagoon mouth. The adjacent sea coast is popular for summer tourism. This site is part of the Benghazi Important Bird Area (IBA), as a wintering site for waterbirds and a fish nursery site.
Conservation Status	Conservation status still favourable, however the site is under planning to establish a mass tourism complex.
Vulnerability	Development, overgrazing, urban waste disposal to the north of the site. Close proximity of heavy industry.
Designation	Not protected presently. No protection measures in place.
Habitat types	
SPA/BD protocol:	Coastal wetlands (estuaries); also dunes, sandy beaches, rocky beaches.
Ramsar:	Coastal/Marine F ("Estuarine waters, permanent estuaries and deltas"), partly Marine/Coastal E ("beaches of fine or coarse sand").
Criteria applicable	
SAPBIO:	The site is proposed as a Marine Nature Reserve under the RAC/SPA SAP-BIO plan.
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
ZNIEFF:	Aesthetic value, natural heritage value, economic value.
Criteria for the Libyan coast	
Priority 1	— Special importance for life history stages of the species: fish nursery areas — Importance for threatened or endangered species and habitats: birds



14. TOLMITAH-UGLA ROCKY COAST



Site name	Tolmitah-Ugla rocky coast
Region (Shabiya)	Al Marj
Location	From 32° 42' N – 20° 56' E to 32° 46' N – 21° 19' E
Quality and importance	This medium to high elevated limestone rocky coast, in direct contact to woodland of Jabal Al Akhdar, intersects with numerous wadis cutting through high cliffs. The site extends for more than 80 km along the coast, with small bays with sandy beaches and a high density of turtle nests each year. The site is famous for the sightings of monk seals, as several underwater or coastal marine caves were identified as suitable habitats for them. The site also has a historic-archaeological importance as the Greek city of Tolmitah is located on its western border, with several wrecks, underwater scenery and artefacts.
Conservation Status	In near-natural condition, with limited human disturbance.
Vulnerability	The following major threats are identified: — Blast fishing (spread at sea and from high cliff on the coastline). — The construction of a new road between Tolmitah and Qaser Libya that will provide vehicle access to this inaccessible part of the coastline, threatening its natural formations and closing wadi mouths. The road works have been suspended several times but are still going on. — Development of tourist facilities and urban construction.
Designation	The eastern end (near Ugla) is the northwestern border of the Kouf National Park. The remaining area is not designated.
Habitat types	
SPA/BD protocol:	Dunes, sandy beaches, rocky beaches; hard bottoms; sands; marine vegetation beds.
Ramsar:	B -- Marine subtidal aquatic beds. E -- Sand, shingle or pebble shores. Ss -- Seasonal/intermittent saline/brackish/alkaline marshes/pools.
Criteria applicable	
SPAMI:	— SPAMI for sea turtle nesting. — SPAMI for monk seals.
CBD:	Importance of threatened species and habitats, vulnerability, fragility, sensitivity, low recovery.
Ramsar:	NA
Criteria for the Libyan coast	
Priority 1	Importance for threatened or endangered species and habitats: loggerhead sea turtles and monk seal (needs further investigation).



15. KOUF BEACHES



Site name	Kouf Beaches
Region (Shabiya)	Al Marj
Location	32° 47' N – 21° 23' E
Quality and importance	The limestone formations of the Green Mountain meet up with a succession of small bays (from 600 m to 4 km wide) including short sandy beaches. The beaches are important marine turtle nesting sites and monk seal have been sighted in the area. Inland, the Green Mountain hills and woodland offers high biodiversity with typical Mediterranean fauna and flora.
Conservation Status	In near-natural condition, even though the site has been used for sand extraction for building purposes in recent years.
Vulnerability	Sand extraction, weakness of regulation enforcement within EL Kouf National Park, hunting, unregulated agriculture and unauthorised buildings.
Designation	Used to be the northern border of Kouf National Park, with the marine area, but its management has been weakened with the transfer of responsibilities from national to local administration.
Habitat types	
SPA/BD protocol:	Dunes, sandy beaches, rocky beaches; hard bottoms; sands; marine vegetation beds.
Ramsar:	B -- Marine subtidal aquatic beds. E -- Sand, shingle or pebble shores. Ss -- Seasonal/intermittent saline/brackish/alkaline marshes/pools.
Criteria applicable	
SPAMI:	— Site of Mediterranean importance for sea turtle species. — Site of Mediterranean importance for seagrass communities. — Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
Ramsar:	Criteria 2, 4, 6.
Criteria for the Libyan coast	
Priority 1	— Importance for threatened or endangered species and habitats: loggerhead sea turtles. Historically site with monk seal presence. — Existence of threats likely to impair the ecological, biological, aesthetic value of the area: illegal hunting and trapping; blast fishing; sea turtle egg poaching.



16. SEBKHET AIN AZZARGA (ELZARGA)



Site name	Sebkhet Ain Azzarga (Elzarga)
Region (Shabiya)	Al Jabal Al Akhdar, Kouf
Location	32° 48' N – 21° 27' E
Quality and importance	This coastal lagoon is located within the former borders of Kouf National Park. Covering a few hundred hectares, it is fed partly by incursions of sea water through channels, partly by springs probably of karstic origin. Situated in the coastal plain below the limestone plateau of the Jabal Akhdar, this lagoon is unusual as surrounded by limestone formations rather than sand dunes. It retains humidity all year round, but salinity increases in summer. Vegetation on the inland side includes an extensive fringe of <i>Tamarix</i> with more freshwater-loving plants such as <i>Juncus</i> , <i>Phragmites</i> and <i>Ruppia</i> . Fauna includes waterfowl, amphibians, fishes and gastropods.
Conservation Status	Ramsar site, near-natural condition. The site is used by the local community for recreation, grazing and hunting. Previously part of El Kouf National Park, need to reconfirm its protection status.
Vulnerability	Hunting and unregulated visits.
Designation	Part of El Kouf National Park, but protection is not enforced at present.
Habitat types	
SPA/BD protocol:	Coastal wetlands (estuaries); also dunes, sandy beaches, rocky beaches, salt marshes.
Ramsar:	R -- Seasonal/intermittent saline/brackish/alkaline lakes and flats.
Criteria applicable	
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
ZNIEFF:	Aesthetic value, natural heritage value, economic value.
Criteria for the Libyan coast	
Priority 1	<ul style="list-style-type: none"> — Special importance for life history stages of the species: fish nursery areas. — Importance for threatened or endangered species and habitats: birds. — Naturalness.



17. SEBKHET AIN SHAKIKA (AIN ESHGAIGA)



Site name	Sebkhet Ain Shakika (Ain Eshgaiga)
Region (Shabiya)	Al Jabal Al Akhdar, Kouf
Location	32° 49' N – 21° 29' E
Quality and importance	This coastal lagoon, near Ain Zarga, was considered as part of the National Park of El Kouf. It is a permanent large lagoon but with shallow waters, fed by incursions of sea water and springs from Jabal Akhdar, surrounded by sand dunes and limestone formations and covered by well-preserved typical vegetation. The vegetation on the inland side includes an extensive <i>Tamarix</i> wood growing on flooded soil, and relatively large <i>Juncus</i> groves. The fauna includes waterfowl, amphibians, fishes and gastropods.
Conservation Status	This is a Ramsar site, in near-natural condition. Only disturbances are overgrazing, and limited agriculture, but some locals claim land ownership.
Vulnerability	Hunting and unregulated visits with picnic waste.
Designation	At the same time part of El Kouf National Park, left without management and Ramsar site.
Habitat types	
SPA/BD protocol:	Coastal wetlands (estuaries); also dunes, sandy beaches, rocky beaches, salt marshes.
Ramsar:	R -- Seasonal/intermittent saline/brackish/alkaline lakes and flats.
Criteria applicable	
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
ZNIEFF:	Aesthetic value, natural heritage value.
Criteria for the Libyan coast	
Priority 1	<ul style="list-style-type: none"> — Special importance for life history stages of the species: fish nursery areas. — Importance for threatened or endangered species and habitats: birds. — Naturalness.



18. WADI KHALIJ



Site name	Wadi Khalij
Region (Shabiya)	Derna
Location	32° 39' N – 22° 54' E
Quality and importance	Steep hills surround this wadi, developing in an estuarine lagoon extending for about one kilometre from the sandbar barrier at the wadi mouth. Water is brackish and shallow (1-2 m) and contains mullets and eels. A fringe band of reeds and bushes provides important habitat and shelter for a large variety of local birds and seasonal migrants. Sandy beaches in front are widely used by locals for bathing and picnics in summer, and a small part is used as a landing site for a few boats.
Conservation Status	The area is subject to important human activity, but is still in good condition. Public use should be regulated and there is a need for solid waste management. Also of concern: the importance of sand extraction in the area.
Vulnerability	Massive illegal sand extractions, solid urban waste, blast fishing on the sea side.
Designation	Not presently protected. No protection measures.
Habitat types	
SPA/BD protocol:	Coastal wetlands (estuaries); also dunes, sandy beaches, rocky beaches.
Ramsar:	Coastal/Marine F (Estuarine waters, permanent estuaries and deltas), partly Marine/Coastal E (beaches of fine or coarse sand). M -- Permanent rivers/streams/creeks.
Criteria applicable	
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
ZNIEFF:	Aesthetic value, natural heritage value, economic value.
Criteria for the Libyan coast	
Priority 1	— Special importance for life history stages of the species: fish nursery areas. — Naturalness. — Existence of threats likely to impair the ecological, biological, aesthetic or cultural value of the area.



19. WADI HAMASSAH



Site name	Wadi Hamassah
Region (Shabiya)	Derna
Location	32° 39' N – 23° 00' E
Quality and importance	This lagoon at the wadi mouth extends a long way inland. The complex of water and vegetation creates a scenic landscape and offers a crucial wetland habitat for a variety of local and migrant birds. The edges of the wadi mouth provide shelter from northerly and easterly waves and wind. Artisanal fishers use the wadi mouth in all seasons as a safe haven and as a craft servicing point. Local shepherds use the wadi as a shelter in summer and some tourist activities take place on the beaches.
Conservation Status	Conservation status still favourable.
Vulnerability	Blast fishing and hunting cause a problem for the marine area.
Designation	Not protected presently. No protection measures.
Habitat types	
SPA/BD protocol:	Coastal wetlands (estuaries); also dunes, sandy beaches, rocky beaches.
Ramsar:	Coastal/Marine F (Estuarine waters, permanent estuaries and deltas), partly Marine/Coastal E (beaches of fine or coarse sand). M -- Permanent rivers/streams/creeks.
Criteria applicable	
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
ZNIEFF:	Aesthetic value, natural heritage value, economic value.
Criteria for the Libyan coast	
Priority 1	<ul style="list-style-type: none"> — Special importance for life history stages of the species: fish nursery areas. — Naturalness. — Existence of threats likely to impair the ecological, biological, aesthetic or cultural value of the area.



20. GULF OF BUMBA



Site name	Gulf of Bumba
Region (Shabiya)	Derna
Location	32° 20' N – 23° 09' E
Quality and importance	This marine area with shallow waters is rich in marine vegetation (<i>Cymodocea</i> and micro-atolls and meadows of <i>Posidonia</i>), with freshwater input from Ain Tememi and other wadis. Within the Gulf, three small islands are present: Fteha, Misrata and Barda. They are all uninhabited and in good natural condition, being important sites for seabirds. The Gulf of Bumba plays an important role as feeding and wintering grounds for both loggerhead and green turtles but also as a nesting site for loggerhead turtles and potentially a feeding area for monk seals (sightings). In addition, it is a good fish nursery site and passage route for migratory water birds and birds of preys (falcons). A small artisanal fishing community is based in Temimi (boat numbers 15-20).
Conservation Status	In natural condition, except for some sewage interaction with Ain Temimi, this leads to the Gulf of Bumba on the southern side.
Vulnerability	Migratory bird hunting (poaching), fishing in shallow waters, dynamite fishing.
Designation	Proposed for MPA status, file submitted but not yet declared.
Habitat types	
SPA/BD protocol:	Marine vegetation beds; soft bottoms; sandy beaches.
Ramsar:	A -- Permanent shallow marine waters in most cases less than six metres deep at low tide. B -- Marine subtidal aquatic beds. D -- Rocky marine shores, on Barda island. E -- Sand, shingle or pebble shores.
Criteria applicable	
SPAMI:	— Site of Mediterranean importance for MAP seabird species. — Site of Mediterranean importance for seagrass communities.
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
ZNIEFF:	Aesthetic value, natural heritage value, economic value.
Ramsar:	Criteria 2, 4, 6.
Criteria for the Libyan coast	
Priority 1	— Special importance for life history stages of the species: seabird colony site (lesser crested tern, Mediterranean Shag), posidonia. Feeding, wintering and nesting of sea turtles (see above). — Importance for threatened or endangered species and habitats: seabirds, monk seal, posidonia special structure (macroatolls). — Naturalness — Vulnerability, fragility, sensitivity: large group visits, oil spills, and physical habitat properties: consequent degradation.

Rocky seabed of Barda island.
Gulf of Bumba.
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21. ABULFRAIS BEACH



Site name	Abulfrais beach
Region (Shabiya)	Gulf of Bumba, Derna
Location	32° 16' N – 23° 13' E
Quality and importance	This sandy beach is short but features a high density of sea turtle nesting. The nearby sabkhas and the delta of Wadi Temimi are important sites for waterbirds and birds of prey.
Conservation Status	Recently (since 2008), intensive sand extraction has impaired the long-known natural condition of the site.
Vulnerability	Sand extraction, nest poaching and urban pollution.
Designation	Known since 1990's surveys as Libya's main marine turtle nesting site, with no official conservation measures to date.
Habitat types	
SPA/BD protocol:	Dunes, sandy beaches; sands.
Ramsar:	B -- Marine subtidal aquatic beds. E -- Sand, shingle or pebble shores.
Criteria applicable	
SPAMI:	Site of Mediterranean importance for sea turtle species.
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
Ramsar:	Criteria 2, 4, 6.
Criteria for the Libyan coast	
Priority 1	— Importance for threatened or endangered species and habitats: nesting and wintering of logger-head sea turtles.
Priority 2	— Vulnerability, fragility, sensitivity: tar balls and risk of oil pollution from ballast water from passing oil tankers.



22. BEACHES NORTH OF AIN AL GHAZALAH



Site name	Beaches north of Ain Al Ghazalah
Region (Shabiya)	Al Butnan, Tobruk
Location	From 32° 12' N – 23° 20' E to 32° 12' N – 23° 21' E
Quality and importance	<p>This area includes alternation of short sandy and sandy/pebble beaches, generally about 1 km long each, intersected by a rocky low to medium elevated coast. The area is well conserved thanks to limited human access. It is an important site for sea turtle nesting, with high natural predation by foxes. The marine waters are shallow with important seagrass meadows and diverse fish communities.</p> <p>It is an important passage for migratory birds from Europe to Africa. Nearby, Ain Ghazala is one of the target hunting (illegal) sites for migratory birds, including trapping of birds of prey for falconry, which is very common among the local population.</p>
Conservation Status	In near-natural condition, with minor pollution of tar balls.
Vulnerability	Oil pollution, hunting.
Designation	No known designation.
Habitat types	
SPA/BD protocol:	Dunes, sandy beaches, rocky beaches; hard bottoms; sands; marine vegetation beds.
Ramsar:	<p>B -- Marine subtidal aquatic beds.</p> <p>E -- Sand, shingle or pebble shores.</p> <p>Ss -- Seasonal/intermittent saline/brackish/alkaline marshes/pools.</p>
Criteria applicable	
SPAMI:	<p>— Site of Mediterranean importance for sea turtle species.</p> <p>— Site of Mediterranean importance for seagrass communities.</p>
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
ZNIEFF:	Aesthetic value, natural heritage value, economic value.
Ramsar:	Criteria 2, 4, 6.
Criteria for the Libyan coast	
Priority 1	<p>— Importance for threatened or endangered species and habitats: loggerhead sea turtles.</p> <p>— Existence of threats likely to impair the ecological, biological, aesthetic value of the area: illegal hunting and trapping; blast fishing, sea turtle egg poaching.</p>



23. BEACHES OF GURDABA



Site name	Beaches of Gurdaba
Region (Shabiya)	Al Butnan, west of Tobruk
Location	32° 10' N – 23° 27' E
Quality and importance	This natural high sand dune, facing the sea with low-lying sandy beaches, extends for a few kilometres on the west side of Tobruk. It is an important site for sea turtle nesting and the sand dune vegetation presents a high diversity.
Conservation Status	In near-natural condition.
Vulnerability	Sand extraction, sea turtle egg poaching and natural fox predation, illegal hunting and trapping of birds.
Designation	No known designation.
Habitat types	
SPA/BD protocol:	Dunes, sandy beaches, rocky beaches; hard bottoms; sands; marine vegetation beds.
Ramsar:	B -- Marine subtidal aquatic beds. E -- Sand, shingle or pebble shores. Ss -- Seasonal/intermittent saline/brackish/alkaline marshes/pools.
Criteria applicable	
SPAMI:	— Site of Mediterranean importance for sea turtle species. — Site of Mediterranean importance for seagrass communities.
CBD:	Importance for life history stages of the species, importance of threatened species and habitats, fragile habitat, low recovery.
Ramsar:	Criteria 2, 4, 6.
Criteria for the Libyan coast	
Priority 1	Importance for threatened or endangered species and habitats: loggerhead sea turtles.
Priority 2	Vulnerability, fragility, sensitivity: to oil pollution (passage of tankers and future offshore drilling); thermal pollution from power turbines



24. GULF OF BURDIYA (BARDIYAH)



Site name	Gulf of Burdiya (Bardiyah)
Region (Shabiya)	Al Butnan
Location	31° 45' N – 25° 05' E
Quality and importance	<p>The Gulf of Burdiya contains a natural sheltered harbor, with pier space. As the bay is exposed to east and northeast influences, the sea bottom is silty due to natural protection and flooding from coastal wadis. The deep waters (more than 35 m) are close to the shore. The site is important as a post-nesting stop for green and loggerhead turtles. It is a potential site for monk seals, even if no assessment has been conducted, due to the presence of the Greek seal population, 300 km north. The sea bottom is covered by an important bed of seagrass.</p> <p>The Wadi of Bardiyah that pours into the Gulf seems important for passing water birds and other bird species. Further surveys are needed, to quantify the specific importance of the site.</p> <p>The site is also of historic importance (World Wars I, II).</p>
Conservation Status	In natural condition, although threatened by recent development and as a planned tourist destination.
Vulnerability	Bird hunting and trapping, development.
Designation	No conservation designation or measures.
Habitat types	
SPA/BD protocol:	Dunes, sandy beaches, rocky beaches; hard bottoms; sands; seagrass beds.
Ramsar:	D -- Rocky marine shores, beneath nearby coastal cliffs. E -- Sand, shingle or pebble shores. M -- Permanent rivers/streams/creeks.
Criteria applicable	
SPAMI:	Not known, potential monk seal feeding site.
ZNIEFF:	Aesthetic value, natural heritage value, economic value.
Ramsar:	Criteria 2, 4, 6.
Criteria for the Libyan coast	
Priority 1	<ul style="list-style-type: none"> — Special importance for life history stages of the species: seabird colony site (loggerhead and green turtles), — Importance for threatened or endangered species and habitats: seabirds, monk seal, — Naturalness
Priority 2	Vulnerability, fragility, sensitivity: development, tourism, oil spills, and physical habitat properties: consequent degradation.





Dry wadi between Tripoli and Misratah.
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Conclusion

This report is a step towards the proper selection of sites of conservation interest in Libya, towards identifying and developing a well-managed network of national marine and coastal protected areas. From the findings of this report the following conclusions can be drawn:

- The criteria used in this report were selected to be applicable to Libya's ecological characteristics and administrative structure.
- Many of the proposed sites could be nominated in the future as Specially Protected Areas of Mediterranean Importance (SPAMI), others could also be considered as Ramsar Sites.
- It is necessary for Libya to set up short-term and long-term goals within a well-prepared National Biodiversity Strategy and Action Plan, based on consultations with all national stakeholders, including the private sector and NGOs.
- A National Biodiversity Study should be initiated to compile all information related to the status of biodiversity in Libya, and to fulfil the country's commitments towards international conventions. The associated biodiversity database could be based on this study.
- There is an urgent need to update the legal and institutional framework of conservation in Libya, with more emphasis on marine and coastal protected area selection, funding and governance, national red-listing of protected species, trade in wildlife regulations, enforcing the regulations and other related issues. It is necessary to maintain national responsibilities for marine and coastal protected areas, delegating management to regional and local authorities only when they have been trained for this purpose.
- The staff responsible for nature conservation in the EGA and research staff in other relevant authorities (research institutes, universities) should receive more training, as human resources development appears to be a limiting factor for success in the area of conservation efforts.
- More work should be dedicated to south-south cooperation in joint projects and activities, which would have a positive impact on the conservation movement in North African countries. Activities should also include NGOs and the private sector.

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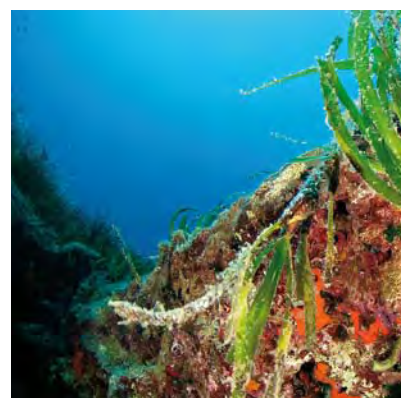
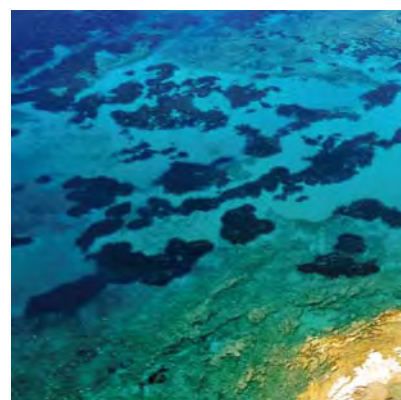
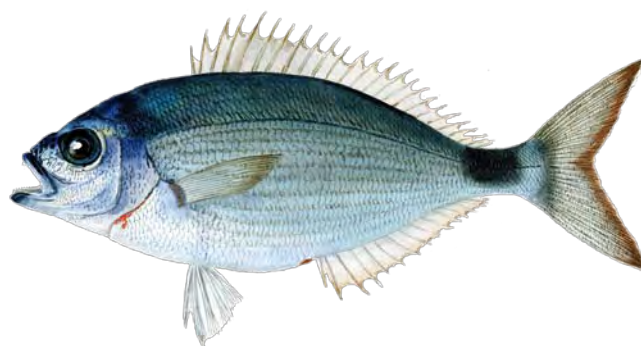
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