CBD

UNEP

Convention on Biological Diversity

Distr.
GENERAL

UNEP/CBD/EBSA/WS/2014/3/4
22 May 2014

ORIGINAL: ENGLISH

MEDITERRANEAN REGIONAL WORKSHOP TO FACILITATE THE DESCRIPTION OF ECOLOGICALLY OR BIOLOGICALLY SIGNIFICANT MARINE AREAS
Málaga, 7 to 11 April 2014

# REPORT OF THE MEDITERRANEAN REGIONAL WORKSHOP TO FACILITATE THE DESCRIPTION OF ECOLOGICALLY OR BIOLOGICALLY SIGNIFICANT MARINE AREAS[1]

## INTRODUCTION

1. At its tenth meeting, the Conference of the Parties to the Convention on Biological Diversity requested the Executive Secretary to work with Parties and other Governments as well as competent organizations and regional initiatives, such as the Food and Agriculture Organization of the United Nations (FAO), regional seas conventions and action plans, and, where appropriate, regional fisheries management organizations (RFMOs) to organize, including the setting of terms of reference, a series of regional workshops, with a primary objective to facilitate the description of ecologically or biologically significant marine areas through the application of scientific criteria in annex I of decision IX/20 as well as other relevant compatible and complementary nationally and intergovernmentally agreed scientific criteria, as well as the scientific guidance on the identification of marine areas beyond national jurisdiction, which meet the scientific criteria in annex I to decision IX/20 (paragraph 36 of decision X/29).

2. In the same decision, the Conference of the Parties requested that the Executive Secretary make available the scientific and technical data, and information and results collated through the workshops referred to above to participating Parties, other Governments, intergovernmental agencies and the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) for their use according to their competencies.

3. Subsequently, the Conference of the Parties, at its eleventh meeting, requested the Executive Secretary to further collaborate with Parties, other Governments, competent organizations, and global and regional initiatives, such as the United Nations General Assembly Ad Hoc Working Group of the Whole on the Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socio-Economic Aspects, the International Maritime Organization, the Food and Agriculture Organization of the United Nations, regional seas conventions and action plans, and, where appropriate, regional fisheries management organizations, with regard to fisheries management, and also including the participation of indigenous and local communities, to facilitate the description of areas that meet the criteria for EBSAs through the organization of additional regional or subregional workshops for the remaining regions or subregions where Parties wish workshops to be held, and for the further description of the areas already described where new information becomes available (paragraph 12 of decision XI/17).

[1] The designations employed and the presentation of material in this note do not imply the expression of any opinion whatsoever on the part of the Secretariat concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

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4. The Conference of the Parties at its eleventh meeting also took note of the particular need for a regional workshop to be organized in the Mediterranean region in order to finalize the description of areas that meet the criteria for ecologically or biologically significant marine areas in time for its report to be considered by a meeting of the Subsidiary Body on Scientific, Technical and Technological Advice prior to the twelfth meeting of the Conference of the Parties (paragraph 11 of decision XI/17).

5. At the 18th Meeting of the Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention) and its Protocols, held in December 2013 in Istanbul, Turkey, the Contracting Parties adopted decision IG.21/5 (available at http://www.cbd.int/marine/doc/unep-depi-med-ig-21.5-en.pdf), "Identification and Conservation of sites of particular ecological interest in the Mediterranean", which requested the Secretariat of the Barcelona Convention/Mediterranean Action Plan (UNEP/MAP), with the assistance of the Regional Activity Centre for Specially Protected Areas (RAC/SPA), to cooperate with the Secretariat of the Convention on Biological Diversity in organizing during 2014 a Mediterranean regional workshop on EBSAs, in time for its report to be considered by the eighteenth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (June 2014) and the twelfth meeting of the Conference of the Parties to the Convention on Biological Diversity. Previously, the 17th Meeting of the Contracting Parties to the Barcelona Convention, held in February 2012 in Paris, had adopted decision IG.20/7 (available at http://195.97.36.231/acrobatfiles/12IG20_8_Eng.pdf), which requested the Secretariat of the Barcelona Convention/Mediterranean Action Plan (UNEP/MAP) to present the work carried out regarding the identification of EBSAs in the Mediterranean to the relevant processes under the Convention on Biological Diversity.

6. Pursuant to these requests and with financial support from the Government of Spain, the UNEP/MAP Mediterranean Trust Fund and the Government of Monaco through UNEP/MAP, the Secretariat of the Convention on Biological Diversity convened, in cooperation with the Secretariat of the Barcelona Convention/Mediterranean Action Plan (UNEP/MAP), with logistical and technical support provided by the International Union for Conservation of Nature (IUCN) Centre for Mediterranean Cooperation (IUCN-Med) and the Regional Activity Centre for Specially Protected Areas, the Mediterranean Regional Workshop to Facilitate the Description of Ecologically or Biologically Significant Marine Areas (EBSAs). This workshop was hosted by the Government of Spain and held from 7 to 11 April 2014, in Málaga, Spain.

7. With the financial support of the European Commission, the CBD Secretariat commissioned a technical team to support their scientific and technical preparation for the workshop. The results of this technical preparation were made available in the meeting document entitled "Data to Inform the CBD Mediterranean Regional Workshop to Facilitate the Description of Ecologically or Biologically Significant Marine Areas" (UNEP/CBD/EBSA/WS/2014/3/3).

8. The meeting was attended by experts from Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, European Union, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Tunisia, Turkey, the Secretariat to the Barcelona Convention/Mediterranean Action Plan (UNEP/MAP), the Secretariat of the Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS), Food and Agriculture Organization of the United Nations, Intergovernmental Oceanographic Commission-UNESCO, UNEP Mediterranean Action Plan Regional Activity Centre for Specially Protected Areas, IUCN Centre for Mediterranean Cooperation, Network of Managers of Marine Protected Areas in the Mediterranean (MedPAN), BirdLife International, Global Ocean Biodiversity Initiative, Oceana, World Wide Fund for Nature (WWF), Universitat Autonoma de Barcelona (Spain), University of Creta (Greece), University of Corsica (France), State Institute for Nature Protection (Croatia), and Duke University (Technical Support Team). The full list of participants is attached as annex I.

## ITEM 1. OPENING OF THE MEETING

9. Ms. Maria Luisa Silva Mejias, Executive Secretary and Coordinator, Barcelona Convention/Mediterranean Action Plan Secretariat (UNEP/MAP) welcomed the meeting participants, thanked the Government of Spain, the municipality of Málaga and IUCN for hosting this important event, and also acknowledged the technical work by RAC/SPA, Duke University and IUCN, as well as the financial contributions through the Mediterranean Trust Fund, the Government of Spain, the Government of Monaco and the European Commission. She underlined that the Mediterranean was a unique and complex marine and coastal ecosystem, the conservation and restoration of which required management of environmental problems in an integrated and cooperative manner through transboundary cooperation. She referred to the Barcelona Convention to which all Mediterranean Countries and the EU are Parties, which entered into force in 1978, making it the first of the Regional Sea Conventions concluded under and administered by UNEP. She stated that the Convention was operationalized through Protocols and programmes addressing different sources of pollution, biodiversity and coastal areas, and that it covered the whole Mediterranean with no distinction as to whether the waters were in the high seas, the exclusive economic zones (EEZ) or territorial waters, even extending its coverage to the freshwater limit in the case of watercourses. While the fluid nature of the sea maintained ecosystems and species in constant interconnection, requiring basin-wide policy measures, she added that these measures were to be taken through defined procedures by competent authorities and that this was not the subject of this workshop. She explained that the purpose of the workshop was, however, no less important as it aimed to generate the necessary assessment among the scientific community for describing the areas meeting the EBSA criteria in the Mediterranean based on the best available scientific knowledge. She outlined the significant amount of work that had taken place in the context of the Barcelona Convention, the Secretariat of the Convention on Biological Diversity and other organizations, which provided a sound and solid basis for the workshop discussions. She also noted the high level of expertise gathered in this workshop from the national scientific community, from government agencies as well as regional and global organizations, which would help in achieving the workshop objectives.

10. On behalf of the Executive Secretary of the Convention on Biological Diversity, Ms. Jihyun Lee (CBD Secretariat) welcomed participants and thanked them for taking part in this workshop, the ninth regional EBSA workshop convened by the Secretariat. She thanked the Government of Spain for hosting the workshop and for their kind financial support, together with financial support from the UNEP/MAP Mediterranean Trust Fund, the European Commission, and the Government of Monaco. She stressed that the Mediterranean hosted a wide range of unique and diverse marine life, and that marine biodiversity was a critical aspect of the historical and cultural heritage of the Mediterranean, contributing to the region's social well-being, economic development and environmental health. She emphasized that the conservation and sustainable use of marine biodiversity were essential to the achievement of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets. Recognizing increasing global attention on the urgent need to effectively protect and preserve marine biodiversity, including in the ongoing United Nations Open Working Group on Sustainable Development Goals, she outlined the critical role of the regional EBSA workshops in identifying ocean areas in need of special attention. She expressed her wish for the successful deliberations of the workshop.

11. Mr. Eduador Balguerias Guerra (Director, Spanish Oceanography Institute) delivered an opening statement, sharing his experiences in working for the Institute, which was now 100 years old. He discussed, in particular, the identification of marine and coastal areas in need of conservation and how, through scientific research, the Spanish Oceanography Institute had helped to identify a number of areas of great importance and facilitated the development of marine protected areas (MPAs) in these areas. He described how, throughout this process, researchers at the Institute had collaborated with several scientific institutions and environmental organizations, and that collaboration was the key to achieving the ultimate goal of conservation and sustainable development of the marine environment.

12. Mr. Ainhoa Perez Puyol (Director of Marine Protection Division, Ministry of Environment, Spain) noted that marine biodiversity had been receiving increasing international attention in the last

several years, which was contributing to the gradual achievement of our common objectives of conservation of marine biodiversity and sustainable use. She highlighted that the protection of marine biodiversity was very important for Spain and the Mediterranean because it was an integral part of many human activities, such as fishing and tourism. She expressed her support for CBD's EBSA process in describing areas meeting the EBSA criteria in the region, and hoped that these descriptions would be submitted to the forthcoming twelfth meeting of the Conference of the Parties to the Convention on Biological Diversity, to be held in Korea. She indicated that Spain was making great efforts to protect marine biodiversity, highlighting that Spain had 268 marine and coastal protected areas, which made it the country with the second highest amount of protected area coverage in Europe. She acknowledged the scientific support of international organizations, which had been essential in the process of establishing marine protected areas.

13. Ms. Carmen Lloret (General Secretary, the Environment and Urban Planning Council, Regional Government of Andalusia) delivered an opening remark. Ms. Lloret mentioned that the province of Andalusia, in addition to its unique landscape, had a large amount of marine biodiversity providing an important source of environmental, economic and social potential. About 20 per cent of Andalusia's marine area was covered under marine protected areas, with the largest number of marine protected areas in the Mediterranean region. She highlighted that the Environment and Urban Planning Council supported the process of establishing marine protected areas through ensuring cooperation between Andalusia and Morocco in the Alboran Sea. She indicated that a key priority of Andalusia was to achieve quantitative expansion of the MPA coverage, while maintaining ecological connectivity of marine and coastal ecological features through MPAs.

14. Mr. Francisco de la Torre (Mayor of the City of Málaga) welcomed the participants and organizers of this workshop to the city of Málaga. Mr. de la Torre highlighted that the city of Málaga hosted the Centre for Mediterranean Cooperation of IUCN and FAO's project office, and collaborated with the Centre for Mediterranean Cooperation of IUCN to rescue endangered marine species. He also highlighted that the City helped disseminate awareness-raising materials regarding various interesting aspects of biodiversity in the Alboran Sea. He expressed that the sea was the source of life and that there was a critical need to prevent marine pollution from land-based and sea-based wastewater entering rivers and the sea, and to ensure fishing was done in sustainable manner. He thanked everyone for their efforts working on issues of great importance to us all. He emphasized that there was a critical need to prevent marine pollution by providing proper treatment of land-based and sea-based wastewater entering rivers and sea, and to ensure fishing was done in a sustainable manner in respect of marine biodiversity. He concluded that biodiversity conservation was essential for achieving sustainable economic development.

## ITEM 2. ELECTION OF THE CO-CHAIRS, ADOPTION OF THE AGENDA AND ORGANIZATION OF WORK

15. After a brief explanation by the CBD Secretariat on procedures for electing the workshop co-chairs, Mr. José Luis Rueda (Spain), offered by the hosting Government, and Mr. Moustafa Fouda (Egypt), proposed by an expert from Spain and seconded by an expert from Lebanon, were elected as the workshop co-chairs.

16. Participants were then invited to consider the provisional agenda (UNEP/CBD/EBSA/WS/2014/3/1) and the proposed organization of work as contained in annex II to the annotations to the provisional agenda (UNEP/CBD/EBSA/WS/2014/3/1/Add.1) and adopted them without any amendments.

17. The workshop was organized in plenary sessions and break-out group sessions. The co-chairs nominated the following rapporteurs for the plenary sessions, taking into consideration the expertise and experience of the workshop participants and in consultation with the CBD Secretariat and the Secretariat to the Barcelona Convention/MAP:

- Agenda item 3 (workshop background, scope and output): Mr. Atila Uras (Secretariat to the Barcelona Convention/MAP);
- Agenda item 4 (review of relevant scientific data/information/maps compiled and submitted for the workshop): Mr. Daniel Cebrian (RAC/SPA);
- Agenda item 5 (description of areas meeting the EBSA criteria through application of the scientific criteria and other relevant compatible and complementary nationally and intergovernmentally agreed scientific criteria): Break-out session group coordinators;
- Agenda item 6 (identification of gaps and needs for further elaboration in describing areas meeting EBSA criteria, including the need for the development of scientific capacity and future scientific collaboration): Mr. Alain Jeudy de Grissac (IUCN Centre for Mediterranean Cooperation).

## ITEM 3. WORKSHOP BACKGROUND, SCOPE AND OUTPUT

18. Ms. Jihyun Lee (CBD Secretariat) provided an overview of the CBD's EBSA process and highlighted the workshop objectives and expected outputs.

19. The workshop participants noted the following points regarding the guidance of the tenth and eleventh meetings of the Conference of the Parties on the regional workshop process as well as the potential contribution of scientific information produced by the workshops:

(a) That the Conference of the Parties to the Convention at its tenth meeting noted that the application of the scientific criteria in annex I of decision IX/20 for the identification of ecologically and biologically significant areas presents a tool which Parties and competent intergovernmental organizations may choose to use to progress towards the implementation of ecosystem approaches in relation to areas both within and beyond national jurisdiction, through the identification of areas and features of the marine environment that are important for conservation and sustainable use of marine and coastal biodiversity (paragraph 25 of decision X/29);

(b) The application of the EBSA criteria is a scientific and technical exercise, and the identification of EBSAs and the selection of conservation and management measures is a matter for States and competent intergovernmental organizations, in accordance with international law, including the United Nations Convention on the Law of the Sea (paragraph 26 of decision X/29);

(c) The EBSA description process is open-ended, and additional regional or subregional workshops may be organized when there is sufficient advancement in the availability of scientific information (paragraphs 9 and 12 of decision XI/17);

(d) Each workshop is tasked with describing areas meeting the scientific criteria for EBSAs or other relevant criteria based on best available scientific information. As such, experts at the workshops are not expected to discuss any management issues, including threats to the areas; and

(e) The EBSA description process facilitates scientific collaboration and information-sharing at national, subregional and regional levels.

20. Mr. Pat Halpin (Technical Support Team) provided a presentation on sharing global experiences on the application of EBSA criteria.

21. The workshop participants noted that there were four types of areas that could be described to meet the EBSA criteria, as observed from previous regional workshops on EBSAs, including:

(a) ***Spatially stable features whose positions are known and individually resolved on the maps.*** Examples include individual seamounts and feeding areas for sharks and seabirds. Such areas do not have to be used as important habitats all year round, nor does all the area have to be used every year. However, the feature(s) is entirely contained in the corresponding map polygons;

(b) ***Spatially stable features whose individual positions are known but a number of individual cases are being grouped.*** Examples include a group of coastal areas, seamounts or seabird breeding sites where the location of each is known but a single polygon on the map and corresponding description encompasses all the features of the group. The grouping may be done because there may be insufficient knowledge to evaluate each separately or the information is basically the same for all features of the group, so one description can be applied to all group features;

(c) ***Spatially stable features whose individual positions are not known.*** Examples include areas where coral or sponge concentrations are likely, based on, for example, modelling of suitable habitats, but information is insufficient to specify the locations of each individual concentration. Each such area may be represented by a single map polygon and description, but the entire area inside the polygon is *not* to be interpreted as filled with the feature(s) meeting the criteria. Narrative about these areas should stress the importance of getting better information on the spatial distribution of these features; and

(d) ***Features that are inherently not spatially fixed.*** The position of this feature moves seasonally and among years. The map polygon for such a feature should include the full range occupied by the front (or other feature) during a typical year. However, the description and its narrative should describe seasonal movement of the key feature(s). The text for description should also make very clear that at any given time, the ecological importance usually is highest wherever the feature is located at that time and often decreases as distance from the feature increases. It may even be the case that at any given time some parts of the total area contained in the polygon are ecologically little different from areas outside the polygon.

22. The workshop also noted the following regarding the application of the criteria:

(a) The EBSA criteria can be applied on all scales from global to local. Once a scale has been selected, however, the criteria are intended to be used to evaluate areas and ecosystem features in a context *relative to* other areas and features at the given scale;

(b) There are no thresholds that *must* be met; judgements are comparative to adjacent areas;

(c) Relative assessments are necessarily scale dependent. Relative significance of areas can be viewed from regional or large subregional scales;

(d) Areas may meet multiple criteria and that is important, but meeting just one criterion strongly also is important;

(e) Areas described to meet the EBSA criteria can range from relatively small sites to very extensive oceanographic features; and

(f) Areas described to meet the EBSA criteria can be overlapped or nested.

23. Ms. Maria Luisa Silva Mejias (Secretariat to the Barcelona Convention) delivered a presentation on significant areas in the Mediterranean within the context of Barcelona Convention/Mediterranean Action Plan.

24. The workshop noted the following points regarding the geographic scope of the workshop:

*i.* *According to the Barcelona Convention Article 1, "…the Mediterranean Sea Area shall mean the maritime waters of the Mediterranean Sea proper, including its gulfs and seas, bounded to the west by the meridian passing through Cape Spartel lighthouse, at the entrance of the Straits of Gibraltar, and to the east by the southern limits of the Straits of the Dardanelles between Mehmetcik and Kumkale lighthouses."*

*ii.* *Additionally, the area to which the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD Protocol, Article 2) also applies. It includes the seabed and its subsoil; the waters, the seabed and its subsoil on the landward side of the baseline from which the breadth of the territorial sea is measured*

*and extending, in the case of watercourses, up to the freshwater limit; and the terrestrial coastal areas designated by each of the Parties, including wetlands.*

25. The geographic scope of the workshop is illustrated in the map in annex V.

26. Mr. Daniel Cebrian (UNEP-MAP-RAC/SPA) delivered a presentation on existing efforts to describe areas meeting the EBSA criteria in the Mediterranean region.

27. The workshop participants noted the activities carried out by UNEP-MAP-RAC/SPA to define priority areas, including:

(a) Supporting countries in describing 33 Specially Protected Areas of Mediterranean Interest (SPAMIs), which were presented to the Contracting Parties to the Barcelona Convention;

(b) Collecting existing information on ecosystems of Mediterranean open seas, including the deep seas, using existing databases and expert opinions, assessment of subregions within the Mediterranean basin for the identification of ecologically or biologically significant marine areas (EBSAs);

(c) Study on fisheries management and vulnerable ecosystems in the Mediterranean open seas, including the deep seas, including:

(i) Geological features of the seabed (seamounts, mud volcanoes, dries, canyons, and hydrothermal vents);

(ii) Oceanographic features such as fronts and upwelling;

(iii) Ecological features of certain vulnerable habitats (e.g., coralligenous facies, white coral communities, etc.); and

(iv) Biogeographic features of commercial pelagic species and species subject to incidental capture or by-catch (spawning and nursery areas);

(d) Compilation of data on important areas for birds in the Mediterranean open seas; and

(e) Compilation of all the data in a Geographical Information System (GIS) developed for the Mediterranean open sea.

28. Ms. Tundi Spring Agardy (GOBI) delivered a presentation on initial integrated assessment of the Mediterranean in the context of the ecosystem approach roadmap.

29. Ms. Jessica Sanders (FAO/GFCM) delivered a presentation on vulnerable marine ecosystems (VMEs) and the General Fisheries Commission of the Mediterranean (GFCM).

30. Mr. Guiseppe Notarbartolo Di Sciara (GOBI) delivered a presentation on marine mammals in the Mediterranean region.

31. Mr. Ben Lascelles (BirdLife International) delivered a presentation on using seabird data to describe areas meeting EBSA criteria.

32. Mr. Alain Jeudy de Grissac (IUCN Centre for Mediterranean Cooperation) delivered a presentation on IUCN's studies in support of countries to identify sensitive ecological areas in the Mediterranean.

33. Summaries of the above presentations are provided in annex II.

## ITEM 4. REVIEW OF RELEVANT SCIENTIFIC DATA/INFORMATION/MAPS COMPILED AND SUBMITTED FOR THE WORKSHOP

34. For the consideration of this item, the workshop had before it two notes by the Executive Secretary: document UNEP/CBD/EBSA/WS/2014/3/3, "Data to Inform the CBD Mediterranean Regional Workshop to Facilitate the Description of Ecologically or Biologically Significant Marine Areas",

prepared in support of the workshop deliberations, and document UNEP/CBD/EBSA/WS/2014/3/2, containing a compilation of the submissions of scientific information to describe ecologically or biologically significant marine areas in the Mediterranean, submitted by Parties, other Governments and relevant organizations in response to the Secretariat's notification 2014-016 (Ref. no. SCBD/SAM/DC/JL/JA/JM/83100), dated 31 January 2014. The documents/references submitted prior to the workshop were made available for the information of workshop participants on the meeting website (http://www.cbd.int/doc/?meeting=EBSAWS-2014-03).

35. Mr. Pat Halpin provided a presentation on "Review of relevant scientific data/information/maps compiled to facilitate the description of EBSAs in the Mediterranean", based on document UNEP/CBD/EBSA/WS/2014/3/3. A summary of his presentation is provided in annex II.

36. Site-based submissions of scientific information on areas meeting EBSA criteria were presented by experts from Albania, Algeria, Bosnia and Herzegovina, Israel, Monaco, Spain, Greenpeace (through RAC/SPA), and Oceana. The information provided in these presentations was considered in the description of areas meeting the EBSA criteria by the break-out groups. Each presentation describing areas meeting the EBSA criteria provided an overview of the areas considered, the assessment of the area against the EBSA criteria, scientific data/information available as well as other relevant information.

## ITEM 5. DESCRIPTION OF AREAS MEETING EBSA CRITERIA THROUGH APPLICATION OF THE SCIENTIFIC CRITERIA AND OTHER RELEVANT COMPATIBLE AND COMPLEMENTARY NATIONALLY AND INTERGOVERNMENTALLY AGREED SCIENTIFIC CRITERIA

37. Building upon the theme presentations and site-based presentations provided in the previous agenda items and noting the existing work for the application of EBSA criteria in this region, the workshop participants exchanged their views on possible ways of organizing their work on assessing the scientific information compiled and submitted for the consideration of the workshop.

38. This workshop was mandated to evaluate areas regionally within the Mediterranean. However, the workshop agreed that the entire Mediterranean had important features that needed to be viewed on a global scale. This perspective is presented in annex III.

39. For effective review of available scientific information and assessment of potential areas meeting the EBSA criteria, the workshop participants were then split into four break-out groups, as follows:

- Subgroup on the eastern part of the Mediterranean;
- Subgroup on the western part of the Mediterranean;
- Subgroup on the central part of the Mediterranean; and
- Subgroup on the Adriatic Sea.

40. Experts on migratory species participated in and assisted all of the groups.

41. Participants were assisted by the technical support team, including GIS operators, who made hard/electronic copies of the maps available for the deliberations of the break-out groups and provided support for data analysis and interpretation as well as mapping of potential areas meeting the EBSA criteria.

42. During the break-out group discussions, participants, who were working on the description of areas meeting the EBSA criteria, drew approximate boundaries of areas meeting the EBSA criteria during the description process on a map provided by the technical support team to keep track of opportunities to extend or merge areas for EBSA description and to identify areas that had yet to be considered.

43. The results of the break-out groups were reported at the plenary for consideration. At the plenary session, workshop participants reviewed the description of areas meeting the EBSA criteria proposed by

the break-out group sessions, including the draft descriptions, using templates provided by the CBD Secretariat, and considered them for inclusion in the final list of areas meeting the EBSA criteria.

44. The workshop participants agreed on descriptions of 17 areas meeting EBSA criteria. They are listed in annex IV and described in its appendix. The map of described areas is contained in annex V.

## ITEM 6. IDENTIFICATION OF GAPS AND NEEDS FOR FURTHER ELABORATION IN DESCRIBING AREAS MEETING EBSA CRITERIA, INCLUDING THE NEED FOR THE DEVELOPMENT OF SCIENTIFIC CAPACITY AND FUTURE SCIENTIFIC COLLABORATION

45. Building on the workshop deliberations, the workshop participants were invited to identify, through the break-out group sessions and plenary discussion, gaps and needs for further elaboration in describing areas meeting the EBSA criteria, including the need to develop scientific capacity and future scientific collaboration.

46. The results of the plenary and subgroup discussions are compiled in annex VI.

## ITEM 7. OTHER MATTERS

47. No other matters were discussed.

## ITEM 8. ADOPTION OF THE REPORT

48. Participants considered and adopted the workshop report on the basis of a draft report prepared and presented by the co-chairs with some changes.

49. Participants agreed that any additional scientific information and scientific references would be provided to the CBD Secretariat by workshop participants within two weeks of the closing of the workshop in order to further refine the description of areas meeting EBSA criteria contained in annex IV and its appendix.

## ITEM 9. CLOSURE OF THE MEETING

50. In closing the workshop, Ms. Maria Luisa Silva Mejias, Executive Secretary and Coordinator, Barcelona Convention/Mediterranean Action Plan Secretariat (UNEP/MAP), congratulated the workshop participants for their hard work and excellent collaboration throughout the week. She expressed her great thanks to the Government of Spain for its generous financial support and warm hospitality in hosting the workshop. She highly commended the able leadership and dedication of the workshop co-chairs, which were instrumental for the successful workshop conclusion. Workshop co-chairs expressed their sincere thanks to the CBD Secretariat and the Barcelona Convention/UNEP-MAP Secretariat for the efficient and effective servicing of the workshop, the technical support team for their excellent scientific and technical support, and all the rapporteurs who contributed to the report preparation. All the workshop participants expressed their great thanks to IUCN Centre for Mediterranean Cooperation for its excellent logistical support and warm hospitality, and to RAC/SPA for its valuable scientific support.

51. The workshop was closed at 4.30 p.m. on Friday, 11 April 2014.

*Annex I*

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*Annex II*

## SUMMARY OF THEME PRESENTATIONS

**Agenda item 3**

***Scientific assessment of ecologically or biologically significant marine areas (EBSAs): Overview of the CBD Secretariat's work (by Jihyun Lee, CBD Secretariat)***

Ms. Lee introduced the process for describing ecologically or biologically significant marine areas (EBSAs), beginning with the adoption of the EBSA criteria at the ninth meeting of the Conference of the Parties to the Convention on Biological Diversity (COP 9) and the call by COP 10 for organizing a series of regional EBSA workshops. Ms. Lee explained that in accordance with the guidance provided by COP 11 the summary report of the first two EBSA workshops had already been submitted to the United Nations General Assembly (UNGA) and its relevant processes. She informed that the results of subsequent workshops, including the present one, would be submitted to the forthcoming eighteenth meeting of the CBD's Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA 18) and the twelfth meeting of the Conference of the Parties. She briefed the meeting on the eight regional workshops that had been held thus far, which had involved a total of 101 countries and 96 regional and international organizations, pointing out that thus far, these workshops had described 190 areas meeting the EBSA criteria. She then highlighted the potential benefits of the EBSA process in further strengthening the region's existing efforts toward marine biodiversity conservation goals, by facilitating scientific collaboration and increasing awareness.

***Past experience from EBSA regional workshops (by Pat Halpin, Technical Support Team)***

Mr. Halpin reviewed the seven criteria adopted by the Conference of the Parties at its ninth meeting (decision IX/20) for the evaluation of ecologically or biologically significant areas. Mr. Halpin first introduced the definition of each criterion, provided some context for their application at the regional workshop, as well as some guidance on their use, as contained in annex I to that decision. He also described four types of areas meeting the EBSA criteria (e.g., fixed and dynamic features of EBSAs). He then summarized some of the lessons that have been learned about the application of the criteria, based on experience with their use in other CBD workshops, in particular addressing the questions of scale, aggregation/clustering, and overlapping and nested EBSAs, among others. He stressed that the criteria were designed to be applied individually with regard to their relative significance within the region under consideration.

***Identifying significant areas in the Mediterranean: Decisions of the Contracting Parties to the Barcelona Convention (by Maria Luisa Silva Mejias, UNEP-MAP)***

Maria Luisa Silva Mejias presented decisions of the Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention) amended in 1995, which were relevant for the meeting. She stated that the geographical scope of the Barcelona Convention is defined in its Article 1 as follows "the Mediterranean Sea Area means the maritime waters of the Mediterranean Sea proper, including its gulfs and seas, bounded to the west by the meridian passing through Cape Spartel lighthouse, at the entrance of the Straits of Gibraltar, and to the east by the southern limits of the Straits of the Dardanelles between Mehmetcik and Kumkale lighthouses." The geographical scope is further detailed by Article 2 of the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD Protocol), which states that the area to which it applies includes the seabed and its subsoil; the waters, the seabed and its subsoil on the landward side of the baseline from which the breadth of the territorial sea is measured and extending, in the case of watercourses, up to the freshwater limit; and the terrestrial coastal areas designated by each of the Parties, including wetlands. She further referred to Articles 10 and 13 of the Barcelona Convention, which respectively refer to the need to take all appropriate measures to protect and preserve biological diversity, rare or fragile ecosystems, as well as species of wild fauna and flora which are rare, depleted,

threatened or endangered and their habitats; and to the importance of scientific and technical cooperation. The SPA/BD Protocol also includes specific provisions for the Parties to take necessary measures to protect, preserve and manage, in a sustainable and environmentally sound way, areas of natural and cultural value; and threatened or endangered species, flora and fauna; to cooperate the conservation and sustainable use of biological diversity; and to identify and compile inventories of important components of biological diversity. In addition, she explained the Protocol also considers the objectives, criteria and procedures to identify Specially Protected Areas of Mediterranean Importance (SPAMI) in the region, which provide a baseline for description of EBSAs, and are sites which represent important components of biological diversity in the Mediterranean; contain ecosystems specific to the Mediterranean area or the habitats of endangered species; and are of special interest in the scientific, aesthetic, cultural or educational aspects. Finally, she made reference to the two specific decisions on EBSAs adopted by Contracting Parties to the Barcelona Convention in COP17 and COP18 (Decision IG.20/7 and Decision IG.21/5.

***Efforts for describing areas meeting the EBSA criteria in the Mediterranean region (by Daniel Cebrian, RAC/SPA)***

Mr. Cebrian explained the existing efforts on describing areas meeting the EBSA criteria in the Mediterranean region. UNEP-MAP-RAC/SPA has supported countries for a number of years in describing and presenting 33 Specially Protected Areas of Mediterranean Importance (SPAMIs) to the Contracting Parties to the Barcelona Convention but that only one, the Pelagos Sanctuary in the Ligurian Sea, included the pelagic domain. The important biological and geomorphological features beyond the coastal trench include marine species (cetaceans, seabirds, elasmobranchs, deep-sea corals), deep-sea habitats, seamounts, canyons, cold seeps, mud volcanoes and nursery grounds. UNEP-MAP-RAC/SPA has been compiling data and publishing reports on biodiversity in the open seas since 2008. Through this work, UNEP-MAP-RAC/SPA has collected information on ecosystems of the Mediterranean, including the deep seas (using existing databases and expert opinions), assessed subregions within the Mediterranean basin, and compiled data on important areas for birds in the Mediterranean open seas. It has also carried out studies on fisheries management and vulnerable ecosystems in the Mediterranean open seas including on: (i) deep seas; (ii) geological features of the seabed (seamounts, mud volcanoes, dries, canyons, hydrothermal vents); (iii) oceanographic features such as fronts and upwellings; (iv) ecological features of certain vulnerable habitats (coralligenous facies, white coral communities, etc.); and (v) biogeographic features of commercial pelagic species and species subject to incidental capture or by-catch (spawning and nursery areas). UNEP-MAP-RAC/SPA compiled all of the data in a Geographical Information System (GIS) developed for the Mediterranean. The information emanating from these efforts has supported the efforts of Mediterranean countries in describing areas meeting the EBSA criteria, and was made available to the workshop participants to refine and formalize.

***The ecosystem approach in the Mediterranean: initial integrated assessment (by Tundi Agardy, Global Ocean Biodiversity Initiative)***

Ms. Agardy presented the initial integrated assessment to provide context for the workshop discussions, by illustrating another region-wide approach to assessing biodiversity, environmental state, and pressures. The assessment draws attention to data gaps at the regional level and supports the ecosystem approach to which the Parties to the Barcelona Convention agreed at their 2008 COP in Almeria, Spain, as a way to set the stage for a coordinated approach to monitoring and management, and to achieve its three strategic goals: (i) to protect, allow recovery, and where practicable, restore the structure and function of marine and coastal ecosystems – thus also protecting marine biodiversity; (ii) to reduce pollution in the marine and coastal environment; and (iii) to preserve, enhance, and restore a balance between human activities and natural resources in marine and coastal areas, and reduce their vulnerability to risks.

Ms. Agardy noted that the initial assessment was meant as a stocktaking exercise, and identified knowledge gaps. In the assessment, the Mediterranean was divided into four subregions. National reporting was combined with scientific literature and a study was undertaken by Blue Plan that attempted

to assess ecosystem services. She highlighted that the four regions differ in physical features, patterns of biodiversity, and pressures/threats. She also highlighted that there is significant variability within subregions, pointing to the need to look at certain factors at a finer scale. She outlined some limitations of the initial integrated assessment, including the fact that much of the data are not georeferenced and could therefore not be mapped. Another is the fact that the initial assessment was a preliminary baseline, hindering the ability to determine trends in environmental change, biodiversity and natural resources, or degradation (pressures/impacts). Nonetheless, she stressed that the Assessment did influence Mediterranean State of the Environment reporting, providing an integrated regional view of environmental status and issues. In conclusion, she outlined that the ecosystem approach and the articulation of ecological objectives (with specified indicators and targets) will allow Mediterranean countries to use assessments to highlight key geographical areas (for biodiversity or pressures or both), and allow the articulation of trends for predicting future conditions.

***Vulnerable marine ecosystems (VMEs) and the General Fisheries Commission of the Mediterranean (GFCM) (by Jessica Sanders, FAO)***

Ms. Sanders discussed the work of the FAO on Vulnerable Marine Ecosystems (VMEs) and complementarities with the work on EBSAs, as well as relevant efforts of the General Fisheries Commission of the Mediterranean (GFCM). She provided background on the Vulnerable Marine Ecosystem criteria, which are a central part of the FAO International Guidelines for the Management of Deep-sea Fisheries in the High Seas. Adopted in August 2008, these guidelines aim to facilitate and encourage the efforts of States and Regional Fisheries Management Organizations/Agreements towards sustainable use of marine living resources, and the prevention of significant adverse impacts on deep-sea VMEs. She outlined the strong complementarities between the VME criteria and the EBSA criteria. She also pointed out some key differences in the application of these two set of criteria. The VME criteria are designed to be used specifically in the context of fisheries management, for the deep seas and are assessed directly in response to potential threats. The VME criteria are also different, in that they are embedded in a management process, while the application of EBSA criteria is a scientific and technical exercise without prescriptive management implications. The similarities between the scientific and technical knowledge required for both the EBSA and VME processes has led to increased collaboration between the FAO and the CBD Secretariat on deep sea issues. EBSA and VME regional workshops have been held back-to-back where possible to facilitate exchange of knowledge and expertise between the two processes. This work, as well as the existing suite of FAO projects in the Mediterranean, such as CopeMed II, MedSudMed, AdriaMed, and the Med LME project, which provide a robust set of data and information and platforms through which to cooperate on biodiversity issues.

She also highlighted the work of the General Fisheries Commission of the Mediterranean (GFCM), which is the Regional Fisheries Management Organization with the competency to adopt binding decisions relating to the conservation of marine fisheries resources and the preservation of marine ecosystems and sensitive habitats in the Mediterranean. She discussed the designation of four Fisheries Restricted Areas (FRAs) in the Mediterranean, in which towed dredges and bottom trawl nets and designated trawl activities are prohibited.

***Areas of special importance for Mediterranean marine mammals (by Giuseppe Notarbartolo Di Sciara, Global Ocean Biodiversity Initiative)***

In his presentation, Mr. Notarbartolo Di Sciara discussed general status and trends of marine mammals in the region, noting that marine mammals are represented in the Mediterranean by two taxa: cetaceans and pinnipeds. He noted that, based on IUCN Red List assessments, all of the species under these two taxa in the Mediterranean can be classified as either “vulnerable”, “endangered”, or “critically endangered”, with the exception of 3 species that are data deficient. This means that there are no species that are in a non-threatened condition (i.e., “near threatened” or “least concern”). Cetaceans are represented by populations of fin whales, sperm whales, Cuvier’s beaked whales, orcas, long-finned pilot whales, Risso’s dolphins, rough-toothed dolphins, common bottlenose dolphins, striped dolphins, short-beaked common

dolphins, and Black Sea harbour porpoises. Reproductive groups of the only pinniped, the "critically endangered" Mediterranean monk seal, are limited to sites in the eastern Mediterranean. However, occasional sightings throughout most of the region indicate the potential ability of the seal to recolonize former habitat, if adequately protected. He stressed that although knowledge has been significantly improved in this area in the past 2-3 decades, much information relevant to conservation, such as movements of certain species with the Mediterranean, is still unavailable. Quantitative ecological information, however, is being progressively acquired through an increasing number of projects applying line-transect surveys, long-term observations of discrete population supported by photo-identification techniques, telemetry, and spatial modelling.

***Using seabird data to describe EBSAs (by Ben Lascelles, BirdLife International)***

Ben Lascelles highlighted the presence of BirdLife International in the region, explaining that BirdLife has 18 partners working in the Mediterranean, some being very active in marine research (e.g., Spain, France, Malta, and Greece) and developing new science to support seabird conservation, while others currently lacking the capacity to engage fully in marine issues. He described BirdLife's Important Bird Area (IBA) programme, which uses standardized criteria and thresholds to define key sites for nature conservation and has been underway for more than 30 years. He explained comprehensive IBA inventories of the key sites for seabird conservation that have been completed for a number of countries in the Mediterranean over the last few years. Many of these inventories have combined multiple data sources on seabird distribution (e.g. tracking, at-sea surveys, habitat suitability models, foraging predictions, coastal counts etc.) to identify sites that meet IBA criteria and thresholds. Information on the IBAs in the Mediterranean was made available for the workshop discussions. He also discussed the "Tracking Ocean Wanderers: the global seabird tracking database," which is managed by BirdLife on behalf of the seabird research community. Twenty seabird tracking data sets were made available by research institutes and analyzed to support the workshop discussions.

***Sensitive ecological areas in the Mediterranean emerging from recent IUCN studies (by Alain Jeudy de Grissac, IUCN)***

Mr. Jeudy de Grissac discussed the relevant work of the IUCN Centre for Mediterranean Cooperation (IUCN-Med) and outlined how, in the last 12 years, IUCN-Med has been working to develop an open cooperation process with all countries in the region and with all international and regional instruments (such as the Barcelona Convention, ACCOBAMS, GFCM and MedWet-the Mediterranean Wetlands Initiative) and organizations (such as WWF, MedPAN, Oceana). He highlighted the numerous reports that IUCN-Med prepared on the marine environment and in particular at the regional level on governance, maritime transport, fisheries and aquaculture, pelagic habitats, seamounts, canyons, seagrasses, Red List of species, and forthcoming reports on habitats and ecosystems. He also highlighted that IUCN-Med focused its activities on non-European Mediterranean countries, with financial support of the European Commission, in order to assist them in reducing the growing data gaps. He described progress that has been made as a result of activities in North Africa, the Eastern Mediterranean (Lebanon and Turkey) and the Eastern Adriatic (Albania, Montenegro, Bosnia and Herzegovina, and Montenegro). He pointed out that there are significant knowledge gaps and research in non-European countries, which is directly related to the lack of research capacity, facilities or infrastructures or equipment, and that strong support is necessary to address these gaps.

**Agenda item 4**

***Review of scientific information compiled for the workshop (by Pat Halpin, Technical Support Team)***

This presentation reviewed the compilation of scientific data and information prepared for the workshop. The baseline data layers developed for this workshop closely follow the data types prepared for previous EBSA workshops, to provide consistency between regional efforts, along with many data specific to the Mediterranean region. More than 75 data layers were prepared for this workshop. The presentation covered three general types of data: (1) biogeographic data, (2) biological data, and (3) physical data. The

biogeographic data focused on major biogeographic classification systems (GOODS, MEOW and LMEs). The biological data portion of the presentation covered a variety of data sources to include data and statistical indices compiled by the Ocean Biogeographic Information System (OBIS). The physical data layers included bathymetric and physical substrate data, oceanographic features, and remotely sensed data. Specific information on the data layers is provided in detail in the data report provided for the workshop as document UNEP/CBD/EBSA/WS/2014/3/3.

*Annex III*

## ECOLOGICAL OR BIOLOGICAL SIGNIFICANCE OF THE MEDITERRANEAN IN A GLOBAL CONTEXT

*The Mediterranean Basin has been the cradle of world civilization. The Mediterranean Sea is a symbol of creativity ... [It] has always been an environment that has bred people who have made remarkable contributions to the development of history in philosophy, art, music, literature, science and technology. (United Nations, 2013)*

1. The Mediterranean comprises a vast set of functionally interconnected coastal and marine ecosystems that deliver valuable benefits to all of its inhabitants; it includes brackish water lagoons, estuaries, or transitional areas; coastal plains; wetlands; rocky shores and nearshore coastal areas; seagrass meadows; coralligenous communities; frontal systems and upwellings; seamounts; and pelagic systems (UNEP/MAP, 2012b).

2. The Mediterranean occupies a basin of almost 2.6 million $km^2$. The coastline is 46,000 km long, and the basin itself about 3,800 km from east to west and 900 km from north to south at its maximum between France and Algeria. The average water depth is approximately 1,500 m with a maximum depth of 5,121 m off the coast of south-western Greece. The shallowest part of the Mediterranean Sea is the northern Adriatic, where the average depth does not exceed 50 m. The Mediterranean Sea can be divided into two sub-basins, the Western and the Eastern Mediterranean, which in turn are composed of a series of varied small basins (Amblas et al., 2004). The Mediterranean drainage basin extends over an area of more than 5 million $km^2$. The estimated residence time of Mediterranean waters is quite high, around 50–100 years (Millot and Taupier-Letage, 2005), which has important implications for the cycling and eventual export of contaminants.

3. Marine and coastal biodiversity in the Mediterranean is high by all measures. The basin supports some of the richest fauna and flora in the world and has an extraordinary diversity of habitats. It is recognized as one the world's 25 top biodiversity hotspots, defined as areas with rich biodiversity, a large number of endemic species (species unique to the region), and critical levels of habitat loss. There are an estimated 15,000–20,000 marine species in the Mediterranean: approximately 8,000–17,000 macroscopic fauna, over 1,300 plant species, and 2,500 species from other taxonomic groups (Coll et al., 2010). This represents 4–18% of the world's known marine species, depending on the taxonomic group (from 4.1% of the bony fishes to 18.4% of the marine mammals), in an area covering less than 1% of the world's ocean surface area and less than 0.3% of its volume (UNEP/MAP, 2012a; Bianchi and Morri, 2000).

4. The level of endemism in the Mediterranean is high compared with other seas and oceans, including the Atlantic Ocean. Of Mediterranean marine species, 50–77% are Atlantic species (found also in the Atlantic Ocean), 3–10% are pan-tropical species from the world's warm seas, and 5% are Lessepsian species (species that have entered the Mediterranean from the Red Sea). The remaining 20–30% are endemic species: that is, species native only to the Mediterranean Sea (UNEP/MAP, 2012a).

5. The percentage of endemism is very high for sessile or sedentary groups, including ascidians (50.4%), sponges (42.4%), hydroids (27.1%), and echinoderms (24.3%). Endemism is also considerable for the other groups, such as decapod crustaceans (13.2%) and fish (10.9%) (UNEP/MAP, 2012a).

6. Based on available data, species diversity in the Mediterranean tends to increase from east to west with 43% of known species occurring in the Eastern Mediterranean, 49% in the Adriatic, and 87% in the western Mediterranean (UNEP/MAP, 2012a). The western Mediterranean also has more endemic species than other regions of the sea. In addition, its proximity to the Atlantic Ocean and its seasonal frontal and upwelling systems provide nutrients. The western basin also supports the greatest diversity of marine mammals, sea turtles, and seabirds of the Mediterranean (UNEP/MAP, 2012a, ACCOBAMS, 1996). The south-east corner of the Mediterranean, the Levantine basin, is the most biologically impoverished area. While there is an ecological basis for lower diversity in the eastern Mediterranean, this area has also not been as well studied as other parts of the sea (UNEP/MAP, 2012a).

7. Species distribution also varies according to depth, with most flora and fauna being concentrated in shallow waters up to 50 m in depth. Although this zone accounts for only 5% of Mediterranean waters, 90% of the known benthic plant species are found here, as are roughly 75% of the fish species (UNEP-MAP-RAC/SPA, 2010). The high seas of the Mediterranean also support a great variety of marine life in areas of high productivity (gyres, upwellings, and fronts) (UNEP-MAP/RAC/SPA, 2010).

8. The total population of the Mediterranean countries grew from 276 million in 1970 to 412 million in 2000 (a 1.35% increase per year) and to 466 million in 2010. The population is predicted to reach 529 million by 2025. Four countries account for about 60% of the total population: Turkey (81 million), Egypt (72 million), France (62 million), and Italy (60 million) (Plan Bleu computations based on UNDESA 2011). Overall, more than half the population lives in countries on the southern shores of the Mediterranean, and this proportion is expected to grow to three-quarters by 2025 (UNEP/MAP/MED POL, 2005). The population of the Mediterranean region is concentrated near the coasts. More than a third of the population lives in coastal administrative entities totalling less than 12% of the surface area of the Mediterranean countries. The population of the coastal areas of the Mediterranean grew from 95 million in 1979 to 143 million in 2000, and could reach 174 million by 2025 (UN/MAP/BP/RAC, 2005).

9. Despite compelling evidence of the importance of services delivered by Mediterranean coastal and marine systems, the Mediterranean ecosystem continues to be degraded (UNEP/MAP 2012a). The pressures and impacts, which vary in severity from region to region, include coastal development and sprawl, driven by urbanization and tourism development leading to habitat loss and degradation, and erosion/shoreline destabilization; overfishing and by-catch, affecting community structure, ecological processes, and the delivery of ecosystem services; destructive fishing, including bottom trawling and other fishing methods that result in benthic disturbance; contamination of sediments and biota caused by pollution, primarily from urbanization and industry, but also from antifoulants and atmospheric inputs of hazardous compounds; nutrient over-enrichment, sometimes leading to eutrophication and hypoxia, but more regularly to ecological imbalances (reduced water quality and growth of algae); disturbance and pollution caused by maritime industries, including fisheries, shipping, energy, aquaculture, and desalination (operational as well as accident-related); spread of invasive species, in many cases mediated by climate change; and degradation of transitional or estuarine areas, which serve as critical nursery areas for commercial fisheries and also support unique assemblages of species.

10. Climate change is beginning to impact the Mediterranean. Recent long-term temperature records has demonstrated a warming trend of about 1°C in 30 years in the north-western Mediterranean and a rise in the frequency of extreme events (RAC/SPA, 2008). During the 20th and early 21st centuries, the sea's shallow waters have already warmed by almost 1°C since the 1980s. The temperature of intermediate waters, that is, those extending below the upper layer from depths of 200 m down to 600 m, has also risen. The rise in sea level in the Mediterranean, which was lower than in the rest of the world in the late 20th century (from the mid-1960s to the mid-1990s) due to anomalous atmospheric pressures, has regained pace since then and seems to be accelerating at a similar rate to that observed throughout the world's oceans (IUCN, 2013).

11. Improving conditions in some areas has become apparent in the last decade. There have been improvements in water quality in many areas, thanks to strategic efforts to reduce pollutant loading, and declining inputs of hazardous substances such as DDT and heavy metals. Nevertheless, new issues are emerging that warrant attention, such as desalination and its negative effects; aquaculture, including grow-out operations for bluefin tuna; and cumulative risks due to reduced access and availability of space for multiple uses.

12. The main regulatory instrument aimed at the protection of the Mediterranean marine and coastal environment is the "Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean" (i.e., the Barcelona Convention) which entered into force in 2004, replacing the 1976 "Convention for the Protection of the Mediterranean Sea Against Pollution". It is the first Regional Sea

Agreement concluded under and administered by UNEP. The Convention has 7 protocols for the prevention of pollution by dumping from ships and aircraft or incineration at sea; and by transboundary movements of hazardous wastes and their disposal; combating pollution in cases of emergency; protection against pollution from land-based sources and activities, as well as exploration and exploitation of the continental shelf and the seabed and its subsoil; specially protected areas and biological diversity; and integrated coastal zone management. Today, all 21 countries surrounding the Mediterranean Sea, as well as the European Union, are parties to the Convention.

13. In summary, when considering the EBSA process, the Mediterranean marine and coastal areas have significant importance for the following reasons, *inter alia*:

(a) They comprise a vast set of coastal and marine ecosystems that deliver valuable benefits to all its coastal inhabitants;

(b) They are recognized as one the world's 25 top biodiversity hotspots, defined as areas with rich biodiversity, a large number of endemic species (species unique to the region), and critical levels of habitat loss;

(c) Rapid urban sprawl is noteworthy, where the region's population is concentrated near the coasts and more than a third live in coastal administrative entities totalling less than 12% of the surface area of the Mediterranean countries, which brings various threats and impacts to the coast and the sea;

(d) The Mediterranean Sea is a good example of a region where particular and specific responses to global changes have been observed. Its relatively small size, high biodiversity, temperate climate and semi-enclosed nature make it a place where the effects of climate change will be exacerbated. Its semi-enclosed nature prevents rapid water exchange and therefore makes it more sensitive to temperature and pH variations. Together with the high degree of pressure exerted by densely populated coastal areas, this makes the Mediterranean Sea an especially vulnerable place (IUCN, 2013); and

(e) The region meets almost all of the EBSA criteria: uniqueness, naturalness, vulnerability, fragility and sensitivity, which can be found at many scales throughout the Mediterranean.

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*Annex IV*

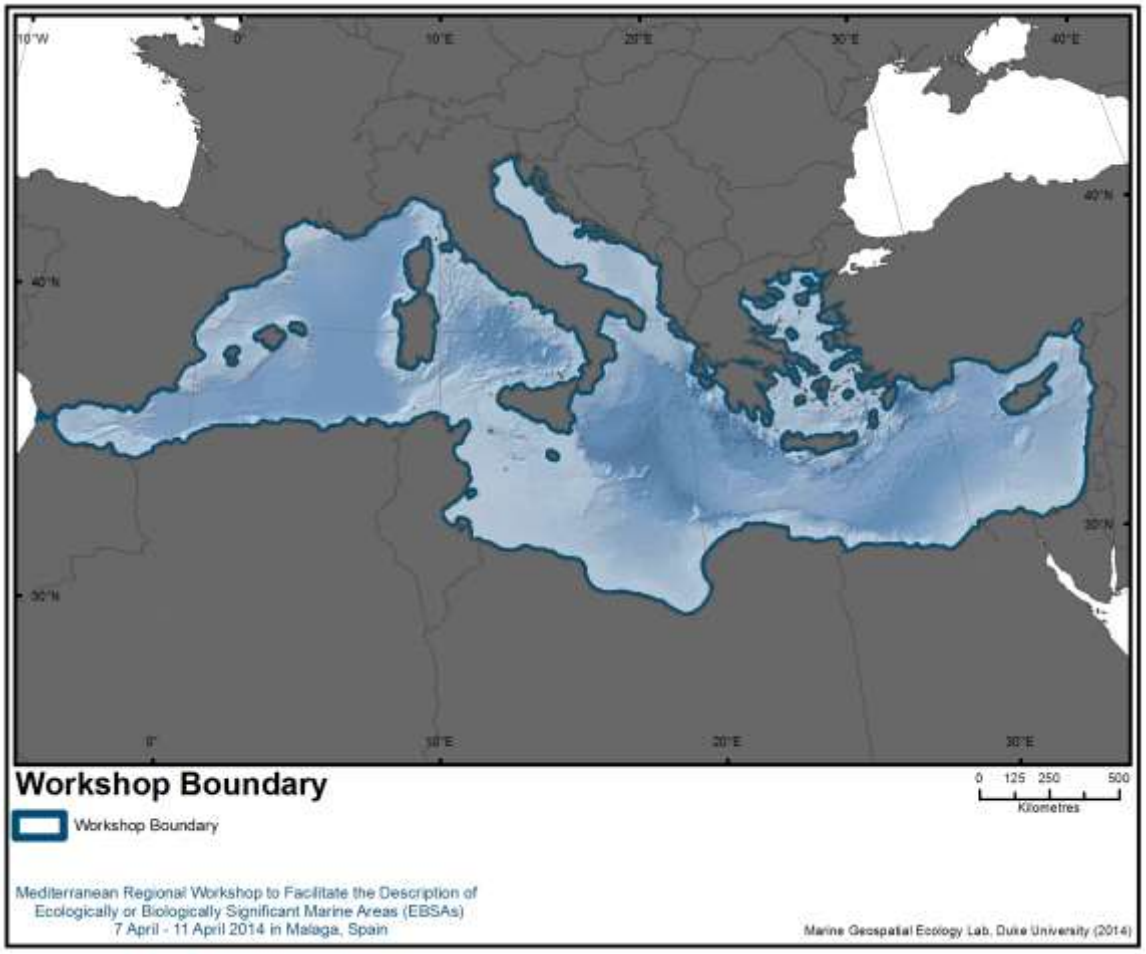
**DESCRIPTION OF AREAS MEETING THE EBSA CRITERIA IN THE MEDITERRANEAN AS AGREED BY THE WORKSHOP PLENARY**

| Number | Areas meeting the EBSA criteria<br><br>(See the detailed description of compiled EBSAs in appendix to annex IV)[2] |
|---|---|
| 1 | Northern Adriatic |
| 2 | Jabuka/Pomo Pit |
| 3 | South Adriatic Ionian Strait |
| 4 | Algero Tunisian Margin |
| 5 | Alboran Sea and Connected Areas |
| 6 | North-Western Mediterranean Pelagic Ecosystems |
| 7 | North-Western Mediterranean Benthic Ecosystems |
| 8 | Sicilian Channel |
| 9 | Le Golfe de Gabès |
| 10 | Gulf of Sirte |
| 11 | Nile Delta Fan |
| 12 | East Levantine Canyons Area (ELCA) |
| 13 | North-East Levantine Sea |
| 14 | Akamas and Chrysochou Bay |
| 15 | Hellenic Trench |
| 16 | Central Aegean Sea |
| 17 | North Aegean |

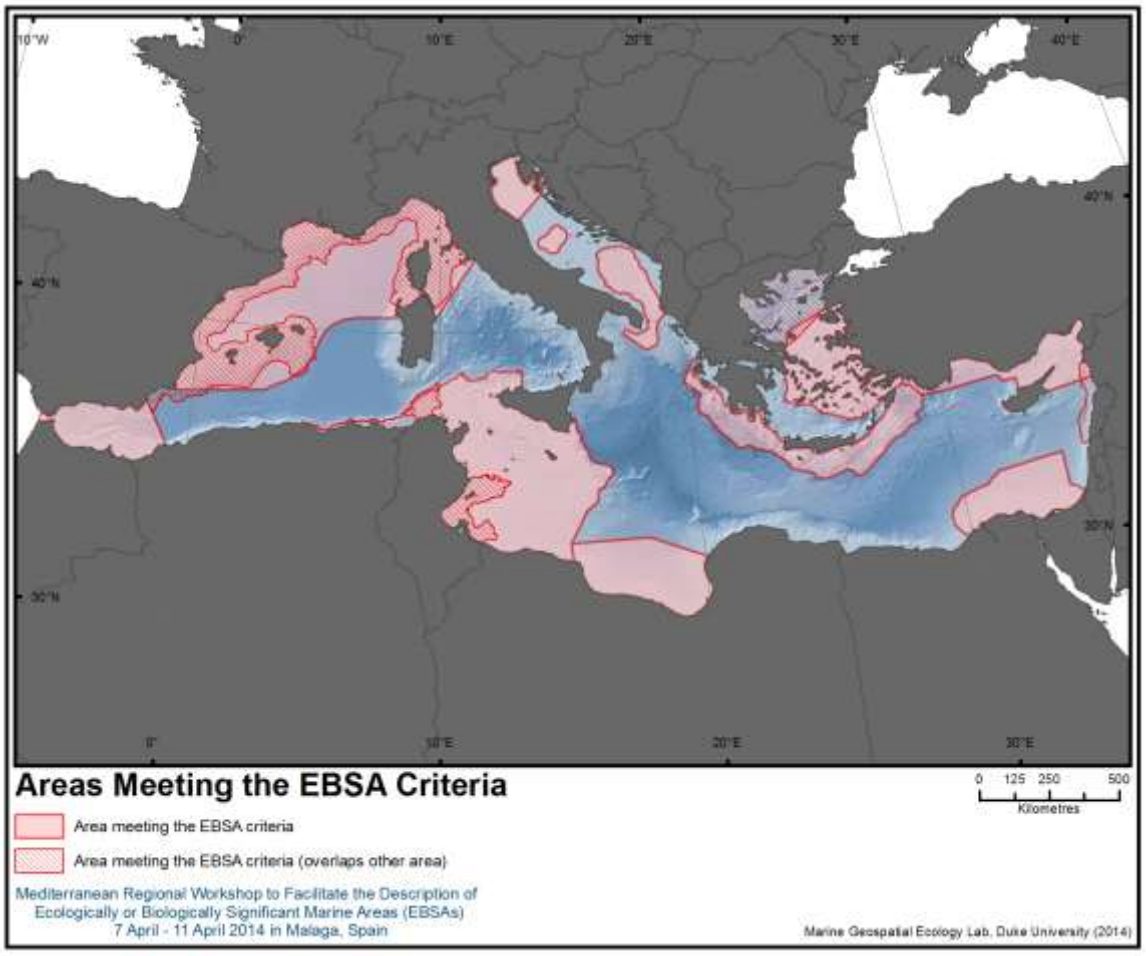
[2] The appendix to annex IV appears at the end of this document.

*Annex V*

**MAP OF WORKSHOP'S GEOGRAPHIC SCOPE AND AREAS MEETING THE EBSA CRITERIA IN THE MEDITERRANEAN AS AGREED BY THE WORKSHOP PLENARY**




Map 1. Geographic scope of the workshop.




Map 2. Areas meeting the EBSA criteria in the Mediterranean.

*Annex VI*

## SUMMARY OF THE WORKSHOP DISCUSSION ON IDENTIFICATION OF GAPS AND NEEDS FOR FURTHER ELABORATION IN DESCRIBING ECOLOGICALLY OR BIOLOGICALLY SIGNIFICANT MARINE AREAS, INCLUDING THE NEED FOR THE DEVELOPMENT OF SCIENTIFIC CAPACITY AS WELL AS FUTURE SCIENTIFIC COLLABORATION

1. Although the workshop benefitted from the participation of a wide range of experts in the region and from previous efforts conducted through the framework of the Barcelona Convention to describe important areas in the Mediterranean, the data presented and discussed at this workshop did not comprise an exhaustive treatment of all data from the Mediterranean region.[3]

2. Participants recognized that there could be different scientific approaches for describing areas meeting the EBSA criteria, given the variability of available data for certain areas. Therefore, different approaches were used in the respective break-out groups.

3. Nevertheless, since the process of describing areas meeting the EBSA criteria is an open and ongoing process, participants agreed that a priority list of areas/species in need of additional research could serve useful to the ongoing process. Priorities for further elaboration would include the use of data from fisheries, additional information about coastal and deep-sea habitats, in particular in the Southern and Eastern Mediterranean, in future efforts to describe areas meeting the EBSA criteria.

4. The workshop discussed constraints in undertaking the description of areas meeting the EBSA criteria, including

(a) The need for additional guidance to further elaborate the application of the EBSA criteria, and clarification in consistently interpreting and applying the EBSA criteria (e.g., cases where an area or habitat may not be vulnerable, but the species utilizing it are; how to represent features that occur on different scales, such as foraging and migration compared to aggregations of corals or seamounts; possible confusion between groups in the interpretation of the terms of "naturalness" and "vulnerability");

(b) The need for specific guidance on how to jointly take into account the seabed and the water column in the description of areas meeting the EBSA. For marine birds and sea turtles, the breeding sites on land should not be included within the descriptions of areas meeting the EBSA criteria, but feeding and movement in marine areas around them could be;

(c) The need for consideration of areas not described during the workshop due to the lack of data, noting that this does not suggest lack of importance, but that the scientific basis is not yet strong enough, and that a preliminary list of these sites could be added and briefly described;

(d) The difficulty in precisely defining the limit of areas to include a patchwork of elements, according to the quantity or quality of the information;

(e) The need to identify connectivity corridors between different areas;

(f) The need for common indicators for future monitoring of the proposed area meeting the EBSA criteria; and

(g) Concerns that sufficient information was not available for certain sub-regions or basins considered by the different break-out groups.

5. For the Mediterranean region, the gaps and needs identified at this meeting were subdivided into the following categories.

[3] The expert from Malta did not agree with other workshop participants regarding scientific information for certain biodiversity included in the EBSA description for the areas in the vicinity of Malta.

**Status and improvement of EBSA description in the Mediterranean**

6. The participants, after describing the areas meeting the EBSA criteria, considered that other sites could have also been described, but were lacking sufficient scientific evidence and could be described as meeting the EBSA criteria when research has been improved.

7. The provisional list of these sites proposed by the experts is as follow:

(a) The coastal and deep waters of the eastern part of Libya and of the western part of Egypt. This area includes coastal seagrass meadows, and is known for the presence of the Mediterranean monk seal[4] and marine turtles, seabirds, and coralligenous formations. In the deep waters, the Egypto-Libyan trench and seamount, which extends for roughly 1000 km and is connected to the coast by multiple canyons, could play an important role in the circulation of waters in the eastern Mediterranean basin, in the migration of species from the Suez Canal to the Gulf of Sirte and act as a feeding ground for cetaceans. In 2009, the north-western area of this zone has been identified as a spawning area for bluefin tuna;[5]

(b) The Eratosthenes seamount peak, which lies at a depth of 690 m and rises 2000 m above the surrounding seafloor and is a part of the Eratosthenes Abyssal Plain. It is one of the largest features on the Eastern Mediterranean seafloor (120 x 80 km). It influences the regional currents and is the centre of an eddy. A short description has been provided (see Box 1);

(c) The Anaximenes and Anaximander ridges rise from 2500 to 700 m depth. These ridges are linked with several mud volcanoes hosting a recently found new species of lamellibrachiid vestimentiferan (*Lamellibrachia anaximandri*) and many other organisms[6] including a new mollusc community associated with a cold seep.[7] Their particular geomorphology and size make them an important place which potentially supports high biodiversity. However, the biological information on deep-water benthic communities is very scarce.

**Box 1. Eratosthenes seamount for consideration by future workshops (provided by the expert from Cyprus)**

The Eratosthenes Seamount, which is the largest submarine geologic feature in the Eastern Mediterranean, rises over 2 km above the abyssal plain, and its flat summit reaches a minimum depth of roughly 690 m. The Eratosthenes Seamount has been designated as a Fisheries Restricted Area (FRA) under the GFCM Recommendation GFCM/2006/3, in order to protect the deep-sea sensitive habitat found on the seamount.

Due to the limited available scientific data on the biodiversity of the Eratosthenes Seamount, this workshop did not proceed with describing this area against the EBSA criteria. The scientific information that exists in relation to the biodiversity of the Eratosthenes Seamount is mainly confined to one study.[8] Based on the study by Galil & Zibrowius (1998) on Eratosthenes biodiversity, a variety of organisms, typical of Mediterranean deep-sea fauna, were reported. Among the species identified, two species of

[4] UNEP-MAP (2013). Report of the 18th Ordinary Meeting of the Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and its Protocols. Annex I: Regional Strategy for the conservation of Mediterranean Monk Seal. Pages 115-148.

[5] Druon, J.N. (2009). Environmental analysis of Bluefin Tuna: Identifying its preferred habitat in the Mediterranean Sea. European Commission, Joint Research Centre, Institute for the Protection and Security of the Citizen (EUR 23790 EN – 2009). 22 pages.

[6] Olu-Le Roy, K., Sibuet, M., Fiala-Médioni, A., Gofas, S., Salas, C., Mariotti, A., Foucher, J., and J. Woodside (2004). Cold seep communities in the deep eastern Mediterranean Sea: composition, symbiosis and spatial distribution on mud volcanoes. *Deep-Sea Res I* 51: 1915–1936.

[7] Salas C. & Woodside J. (2002) *Lucinoma kazani* n. sp. (Mollusca: bivalvia): evidence of a living benthic community associated with a cold seep in the eastern mediterranean sea. *Deep-Sea Res I* 49: 991–1005.

[8] Galil, B., and H. Zibrowius. (1998) First Benthos Samples from Eratosthenes Seamount, Eastern Mediterranean, *Senckenbergiana maritime*, 28(4-6): 111-121.

coral, the *Caryophyllia calveri* and *Desmophyllum cristagalli*, which consist of few individual polyps, were included.

Cyprus has set as a priority the undertaking of a research study on the deep-sea ecosystems, with a particular emphasis on Eratosthenes Seamount. For this purpose, Cyprus has included a relevant proposal in the new Operational Programme for Fisheries which is co-funded by the European Maritime and Fisheries Fund (EMFF) for the period of 2014-2020. The study is expected to provide Cyprus, as well as the scientific community in general, with additional and valuable information on the biodiversity of the seamount, filling the existing information gap.

**Improvement of research**

9. During the meeting, experts were consulted on the need to improve scientific research and scientific data in the Mediterranean. Topics such as taxonomy, benthic and pelagic species diversity, cetology, marine endemism, invasive species, deep-sea habitats, benthic habitats (especially biogenic habitats), turtles, species ecology, abundance and seasonality, marine birds (see Box 2), seamounts connectivity, the roles and functions of canyons, hydrodynamics, geology and geomorphology, physical and chemical parameters, and coralligenous ecosystems were noted during the workshop discussions.

**Box 2. Note on gaps concerning marine birds (provided by BirdLife International)**

Some countries lack seabird expertise with regards to the latest survey, monitoring and analysis techniques. Capacity building in this regard is needed in Algeria, Malta, Montenegro, Tunisia, Libya and Turkey.

Locations of seabird breeding sites are generally well known, although some gaps may remain, particularly for the burrow nesting *Procellaiform* species that come ashore to colonies at night. Key areas that require further survey or enhanced monitoring include Rechgoun (Algeria); Lastovo archipelago and Kvarner (Croatia); Ada Bojana (Montenegro); Gulf of Bumba (Libya), La Galite, Zembra and Zembretta (Tunisia); and the Northern Aegean.

Knowledge of seabird distribution in the marine environment remains incomplete for a number of countries. In general, European countries have conducted more extensive research on seabirds, while North African countries remain data poor, particularly with regard to at-sea distribution and abundance.

Seabird tracking studies continue to provide important new information. Additional tracking data sets were requested but not received for this workshop, relating to Yelkouan shearwater (in France and Greece), Scopoli's shearwater (in France and Greece), and Balearic shearwater (in Spain), as well as Audouin's Gull (in Spain and Greece), and European shag (in Slovenia and Greece). Compilation and analysis of these data sets may help add additional justification for existing sites as well as identify new sites. Further tracking studies are needed in Croatia, the Tyrrhenian Sea, Libya, the Slovenian Sea and Tunisia.

At-sea surveys (from boats and planes) have been conducted in a number of countries within the Mediterranean. While these surveys have been used to inform national processes, they have never been formally brought together at an ocean basin scale to better understand distribution and abundance as well as effort and key gaps. Known gaps for at-sea surveys include the areas between continental France and Corsica, in Italian waters, in western Libya, and in Tunisian waters.

Several species of seabirds are listed as priorities in the EU Birds Directive Annexes, the Barcelona Convention, and the African-Eurasian Waterbirds Agreement. Mediterranean endemic subspecies in particular warrant further study through the use of tracking and at-sea surveys, including the European storm petrel (*Hydrobates pelagicus melitensis*), European shag (*Phalacrocorax aristotelis desmarestii*) and lesser crested tern (*Sterna bengalensis emigrate*).

More analyses are needed to develop predictive distribution and abundance models that can help better

explain and predict temporal and dynamic changes.

Attempts should be made to integrate work on multiple megafauna taxa (e.g., seabirds, monk seal, turtles, cetaceans) into coherent analyses, as these species could be used as indicators to monitor changes in the marine environment.

**Collection and dissemination of scientific information**

10. In general, the workshop agreed that countries or scientists need to be encouraged to better share scientific information. It was also recognized as important to promote information-sharing by government agencies, policymakers, industry, and local stakeholders. Overall, it is necessary to consolidate a collaborative culture in the context of regional marine science.

11. In light of the significant amount of data collected for this meeting and previous related meetings, it is important to develop a Mediterranean data repository (geoportal) or a regional scientific data sharing programme. This could be useful for refining the process of EBSA description in the future and supporting monitoring of the status of EBSAs in the future.

**Scientific capacity-building**

12. Most of the Mediterranean countries have developed research activities concerning the marine environment, which at least address issues related to fisheries. However, most of them have not yet developed programmes for mapping and recording habitats, ecosystems and species. These types of research activities are generally focused on nearshore areas.

13. Priorities for scientific capacity-building include capacity-building for research on coastal habitats and species such as seagrass meadows, coralligenous formations, maërl formations vermetid/algal platforms, especially in the southern and eastern Mediterranean. Based on field data, many countries require increased capacity for mapping and transferring information in GIS systems and for developing models based on collected data.

14. Thus, there exists an opportunity for capacity-building at regional levels, which should be promoted for the offshore areas, deep-sea oceanographic exploration, open sea biology, oceanographic and methods and tools for geographic data analysis.

15. Further expertise is required in taxonomy, which has been a particular constraint in biodiversity studies. Although advances in genetic tools could help resolve some taxonomic issues, there is a need for qualified and trained taxonomists. Capacity to sample the deep sea (e.g., research vessels, modern sampling equipment) and to apply new technological approaches is needed and could fill some of the data/knowledge gaps identified above. Some international or regional organizations have training programmes designed to increase capacity, especially for early career scientists. These opportunities should be explored as a mechanism to improve our understanding of the marine ecosystems of the Mediterranean.

16. Some experts quoted more specifically the limited capacity in terms of technical expertise, in particular in the domain of taxonomy, hydrology, benthic environment, hard substrates, caves and areas deeper than 200 m (where additional equipment and training was necessary), and in particular seamounts and canyons.

17. Other gaps include hydrodynamics and geomorphological information, with some areas generally understudied, even if important information has been collected by petroleum companies. For example, there were very limited data provided for the deep seabed, notably the abyssal plain, trenches, canyons, escarpments and seamounts. Participants noted that knowledge of deep-water biota is generally poor (e.g., diversity patterns, community structure, and distribution of deep fauna) and less comprehensive than that of the overlaying pelagic system. Increasing research and sampling effort is needed for all the areas described as meeting the EBSA criteria and other areas considered in the workshop.

18. Participants also discussed significant gaps in knowledge regarding many species in the region, especially endangered species to be included in regional red lists.

**Scientific collaboration**

19. Workshop participants stressed the importance of scientific collaboration in coastal areas and offshore areas. They stressed that the thematic areas covered within cooperation programs have to serve the national interest and not simply expand programs developed by the donor countries.

20. Monitoring and conservation action plans for many marine groups are well-developed at the regional level and sometimes at the national level, but are generally implemented within territorial waters. Collaboration is needed among countries in order to better collate data and harmonize approaches.

21. Participants identified potential opportunities for collaboration in international and regional research cruise efforts that could contribute robust observations to improve understanding and characterization of the diversity of deep-sea species and habitats.

*Appendix to annex IV*

## DESCRIPTION OF AREAS MEETING THE EBSA CRITERIA IN THE MEDITERRANEANREGION AS AGREED BY THE WORKSHOP PLENARY

### Area No. 1: Northern Adriatic

**Abstract**

The area is located in the northern part of the North Adriatic Sea Basin, with an average depth of 35 m and is strongly influenced by the Po river plume. It includes mobile sandy bottoms, seagrass meadows, hard bottom associations and unique rocky outcrops called "trezze" and "tegnue". The area is important for several threatened species. It hosts a population of the highest density of bottlenose dolphin (*Tursiops truncatus*) in the Mediterranean, it is one of the most important feeding grounds in the Mediterranean of the loggerhead turtle (*Caretta caretta*) and it is a nursery area for a number of vulnerable species (blue shark (*Prionace glauca)*, sandbar shark (*Carcharinus plumbeus)*, anchovies (*Engraulis encrasicolus)*, etc.). The area hosts a strong diversity of benthic and pelagic habitats due to an important gradient of environmental factors from its western portion to its eastern coasts. It is also one of the most productive areas in the Mediterranean Sea.

**Introduction**

The area described (figure 1) is in the Northern Adriatic, which is one of the most productive areas in the Mediterranean and is home to a number of rare and endangered habitat types and species. Based on available data, the Northern Adriatic meets several criteria that qualify the area as ecologically and biologically significant area.

**Location**

Part of the Northern Adriatic Basin, off the coasts of Italy, Slovenia and Croatia. The area is roughly delimited by the 9 m isobaths, encompassing the area above the straight line linking Ancona (Conero) and the island of Ilovik.

**Feature description of the area**

The northern Adriatic is shallow, with an average depth of 35 m and is strongly influenced by the Po river plume, with low salinity, low water temperature in the winter, high productivity and a large tidal amplitude. The area has a high diversity of environmental conditions that is supports a large amount of biodiversity (Ott, 1992). It has been recognized as a region of high marine production at several trophic level from phytoplankton to fish (Fonda Umani, 1996). Numerous studies describe the distribution and abundance of marine fauna and flora of the Adriatic Sea. This is the only area in the Mediterranean Sea where rocky outcrops called "trezze" and "tegnue" can be found is in the Northern Adriatic area. The ecological role played by these outcrops in the Northern Adriatic is extraordinary because they are the only hard substrates in the area offering shelter and reproduction sites for a number of fish and invertebrate species, including stocks under stress due to severe fishing pressure (Casellato et al., 2007). The area contains seagrass beds, including *Posidonia oceanica*, *Cymodocea nodosa*, *Zostera marina* and *Z. noltii* (Zavodnik and Jaklin, 1990; Turk, 2000; Lipej et al., 2006; Turk and Lipej, 2006). Moreover, it is also a strategic area for the conservation of marine vertebrates, sheltering important seabird populations (Baccetti et al., 2002).The area also includes important populations of endangered marine mammals and is a feeding area for loggerhead turtles (*Caretta caretta*) (RAC/SPA, 2014a; Fortuna et al., 2014). According to UNEP (2011) the Cres-Lošinj Archipelago (Kvarnerić area), which is part of this area, is the habitat of a resident population of bottlenose dolphin (*Tursiops truncatus*) (Jones et al., 2011). The Cres-Lošinj archipelago area was proclaimed as potential Natura 2000 site in Croatia.

The area is very important for the Mediterranean shags (*Phalacrocorax aristotelis desmarestii*) subspecies. From the 1980s onwards, this subspecies has regularly visited the Northern Adriatic in the summer and autumn, following post-breeding movements from Croatian breeding colonies (Sponza et al. 2010). Large aggregations of shags forage in the area in late summer and autumn with average counts of 2,000−4,000 individuals (with high of 10,000) which is more than half the entire breeding population in the Adriatic (Cosolo et al, 2012). This area is also important for common tern (*Sterna hirundo)* that nests on little islands in the North Adriatic area (Rendić and Sušić, 2003), and the most northern natural population of Griffon Vultures (*Gyps fulvus*) in the Mediterranean (Pavoković and Sušić, 2006; Le Gouar et al., 2008,)

**Feature condition and future outlook of the area**

The northern Adriatic is the one of the most studied area in the Mediterranean. There is available scientific data available on range of species and habitats, ranging from megafauna distribution to benthic communities characterization, including also fishery data. Anthropogenic pressures are very high in the region, although biodiversity still remains high.

Particular vulnerabilities are linked to high human population density and intensive level of fisheries. Recently the most notable direct impact comes from seismic activities and oil and gas exploration and exploitation. The northern Adriatic Port Authority intends to increase marine traffic in this area by over 200% in the coming years with major expansion in the four member ports of Venice, Trieste, Koper and Rijeka. Changes to precipitation or to ice melt due to climate change could potentially alter the oceanographic condition over the entire Adriatic Sea. Changes in precipitation quantity over the catchment feeding rivers and the coastal aquifers would influence also the availability of fresh water resources and inputs of freshwater to the marine environment. Increased air temperatures are expected to influence the process of stratification in enclosed areas such as Kastela Bay. In the case of water temperature changes it is expected that species currently found in warmer, more southern latitudes might shift northwards and by that influence the abundance of species and the composition of animal and plant communities (UNEP, 1992).

Research programs/projects taking place in the area:

- ADRIAMED: Scientific cooperation to support responsible fisheries in the Adriatic Sea (Albania, Croatia, Montenegro, Slovenia, Italy). This project has been ongoing since 1999 this project with funding from MIPAAF and EC- DGMARE (http://www.faoadriamed.org/);
- DEVOTES: Development of strategic indicators and innovative tools for understanding marine biodiversity and assessing Good Environmental Status (GES) in terms of contribution to the MSFD. DEVOTES may provide information for the biodiversity of the deep Adriatic sea (http://www.devotes-project.eu/);
- PERSEUS. Interactions (pressures and components) possible effect of these pressures in the different components in Adriatic sea (http://www.perseus-net.eu/site/content.php?locale=1&sel=419&artid=364);
- CIESM-Marine Peace Parks; The aim of this initiative was to identify new marine peace parks. At least one of these is in the Adriatic sea;
- ADRIPLAN: Funded by the EU, this initiative is aimed at refining and providing recommendations and guidelines on maritime spatial planning in North and South Adriatic Sea. The regions where selected on the scientific knowledge and the availability of authorities(www.adriplan.eu);
- CoCoNet: The approach of this project is mostly science based and is focused on MPA network design. It aims to identify networks of potential or existing small-scale MPAs many, which could support wind-farms in the north-western Mediterranean and in the Black Sea.

- WP2: This is a science-based project focused on the distribution of deep and coastal habitats and gathering information to implement MPA networks(http://www.coconet-fp7.eu/index.php/about-coconet).
- VECTOR: Aims to improve understanding of how environmental and manmade factors are currently impacting marine ecosystems how they will do so in the future. The project addresses invasives, outbreaks and changes in fisheries distribution and productivity - (http://vector.conismamibi.it/).
- NETCET project: Cofunded by the IPA Adriatic CBC Programme and more specifically within the Priority 2 "Natural and Cultural Resources and Risk Prevention," the general aim of this Cross-border Cooperation Programme is strengthening sustainable development capabilities of the Adriatic region through a concerted strategy of action among the partners of the eligible territories. The main objective of the NETCET project is to develop common strategies for the conservation of cetaceans and sea turtles in the Adriatic through a pan-Adriatic cooperation. The NETCET project runs from October 2012 to September 2015.

**Assessment of the area against CBD EBSA criteria**

| **CBD EBSA criteria** (Annex I to decision IX/20) | **Description** (Annex I to decision IX/20) | **Ranking of criterion relevance** (please mark one column with an X) | | | |
|---|---|---|---|---|---|
| | | **No information** | **Low** | **Medium** | **High** |
| **Uniqueness or rarity** | Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features. | | | X | |
| The only area in the Mediterranean Sea where rocky outcrops called "trezze" and "tegnue" can be found is in the Northern Adriatic area. The ecological role played by these outcrops in the Northern Adriatic is extraordinary because they are the only hard substrates in the area offering shelter and reproduction sites for a number of fish and invertebrate species, including stocks under stress due to severe fishing pressure (Casellato et al., 2007).<br><br>The Mediterranean subpopulation of Bottlenose dolphin (*Tursiops truncatus*) is present in this area with highest high population density (ACCOBAMS, 2010; Fortuna et al., 2014).<br><br>This area is the northernmost occurrence of the Mediterranean monk seal (*Monachus monachus*). | | | | | |
| **Special importance for life-history stages of species** | Areas that are required for a population to survive and thrive. | | | | X |
| The Northern Adriatic area is an important feeding ground for loggerhead turtles (*Caretta caretta*) (UNEP-MAP-RAC/SPA, 2014b; Fortuna et al., 2014). It can serve as a nursery area for blue shark *Prionace glauca,* Thresher shark (*Alopias vulpinus*) and Sandbar sharks (*Carcarinus plumbeus*) (Costantini, Affronte, 2003; Soldo, 2006a; Soldo, 2006b).<br><br>There are breeding colonies of Mediterranean shags (*Phalacrocorax aristotelis desmarestii*), with average counts of 2,000 − 4,000 individuals (with high of 10,000), which includes up to 11% of the entire global population of this subspecies (Cosolo et al, 2012). This area is also important for common tern (*Sterna hirundo*) that nests on little islands in the North Adriatic area (Rendić & Sušić, 2003). | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Importance for threatened, endangered or declining species and/or habitats** | Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species. | | | | X |
| It is one of the most important breeding area for bottlenose dolphin (*Tursiops truncatus*) (VU/Mediterranean subpopulation-Bearzi et al, 2012)*, and one of the most important feeding areas for sea turtles (*Caretta caretta*) (EN) (UNEP-MAP-RAC/SPA, 2014b; Fortuna et al., 2014). Both species are listed in the Annex II of the SPA/BD Protocol.<br><br>It can serve as a nursery area for sharks (*Prionace glauca*)-listed in the Annex III of the SPA/BD Protocol, thresher shark (*Alopias vulpinus*) (UNEP/MAP-RAC/SPA, 2014a) and sandbar sharks (*Carcarinus plumbeus*) (Costantini, Affronte, 2003; Soldo, 2006a; Soldo, 2006b).<br><br>The area is very important for Mediterranean shags (*Phalacrocorax aristotelis desmarestii*), subspecies which is listed on Annex II of the SPA/BD Protocol and together with common tern (*Sterna hirundo*) which is listed on Annex I of the EU Birds Directive.<br><br>It can serve as a recovery area for the globally critically endangered (CR) Mediterranean monk seal (*Monachus monachus*) (Notarbartolo di Sciara, personal communication). | | | | | |
| **Vulnerability, fragility, sensitivity, or slow recovery** | Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery. | | | X | |
| The area includes rocky outcrops called “trezze” and “tegnue”, which are very vulnerable to any kind of bottom disturbance (Casellato et al., 2007). The area also holds populations of sharks that are vulnerable to high fishing pressure because of their long lifespan and K-selected reproduction. | | | | | |
| **Biological productivity** | Area containing species, populations or communities with comparatively higher natural biological productivity. | | | | X |
| The Northern Adriatic has been recognized as a region of high marine production at several trophic level from phytoplankton to fish (Fonda Umani, 1996) Runoff from the Po River influences the productivity of the marine ecosystem and has been linked to anchovy landings during its spawning season in the northern areas (Revelante and Gilmartin 1977).<br><br>Its one of the most productive areas in the Mediterranean sea (Pérès and Gamulin-Brida, 1973). It includes one of the Mediterranean ocean triads. (Agostini and Bakun, 2002). | | | | | |
| **Biological diversity** | Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity. | | | X | |
| The area hosts a strong diversity of benthic and pelagic habitats due an important gradient of environmental factors from its western to its eastern coasts. The area presents a high diversity of environmental conditions that supports a rich biodiversity (Ott, 1992). Numerous studies describe the distribution and abundance of marine fauna and flora of the Adriatic Sea. The area hosts seagrass beds, including *Posidonia oceanica*, *Cymodocea nodosa*, *Zostera marina* and *Z. noltii* (Zavodnik, Jaklin, 1990; Turk, 2000; Lipej et al., 2006; Turk and Lipej, 2006). Moreover, it is also a strategic area for marine vertebrates conservation, sheltering important seabird populations (Baccetti et al., 2002).The | | | | | |

* IUCN Red List categories: Extinct (EX); Extinct in the wild (EE); Critically Endangered (CR); Endangered (EN); Vulnerable (VU); Near Threatened (NT); Least Concern (LC); Data Deficient (DD).

| | | | | | |
|---|---|---|---|---|---|
| area also includes important populations of endangered marine mammals and is a feeding area for loggerhead turtles (*Caretta caretta*). According to UNEP (2011) the Cres-Lošinj Archipelago (Kvarnerić area), which is part of this area, represents the habitat of a resident population of bottlenose dolphin (*Tursiops truncatus*) studied since 1987 (Jones et al., 2011). According to Coll et al. (2010) this area is one of the hotspots of biodiversity in the Mediterranean and hosts a large number of endemic species owing to its higher isolation. | | | | | |
| **Naturalness** | Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation. | | X | | |
| *Explanation for ranking*<br>The area experiences high anthropogenic pressure, linked mainly to maritime transport, fishery and tourism. | | | | | |

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**Maps and Figures**

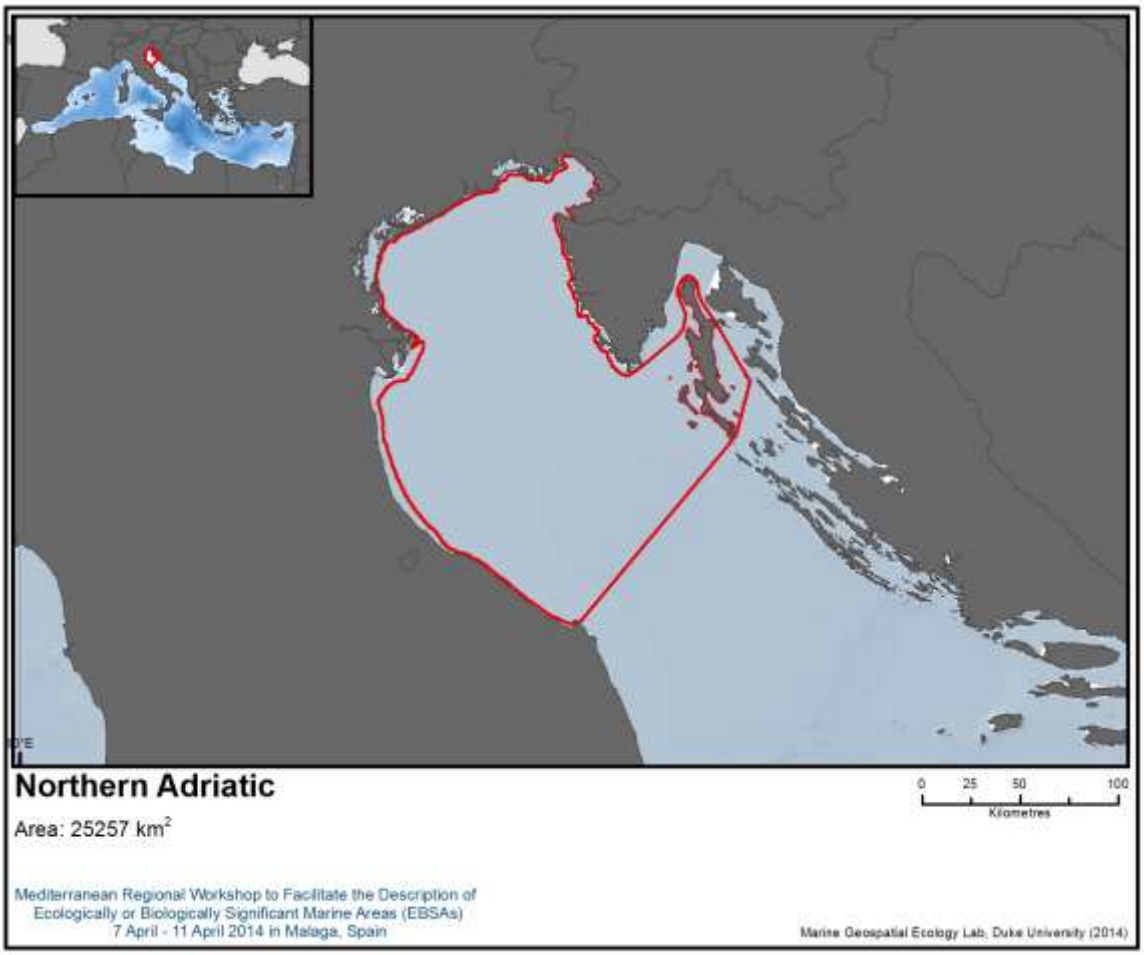


Figure 1. Area meeting the EBSA criteria.

## Area No. 2: Jabuka/Pomo Pit

### Abstract

The area encompassing the adjacent depressions, the Jabuka (or Pomo) Pit is situated in the Middle Adriatic Sea and has a maximum depth of 200 - 260 m. It is a sensitive and critical spawning and nursery zone for important Adriatic demersal resources, especially European hake (*Merluccius merluccius*). This area hosts the largest population of Norway lobster (*Nephrops norvegicus*) and is important especially for juveniles in the depths over 200 m. Based on an available scientific data it is a high density area for giant devil ray (*Mobula mobular)* which is an endemic species listed on Annex II SPA/BD protocol and listed as "Endangered (EN)" on the IUCN Red List. The Pit could function as a favorable environment for some key life history stages of the porbeagle shark, and *Lamna nasus*, which is critically endangered (IUCN, 2007), and both of which are listed on Annex II SPA/BD Protocol. Regarding benthic species, several types of corals can be found (*Scleractinia* and *Actiniaria*).

### Introduction

The area (figure 1) encompassing the adjacent depressions, the Jabuka (or Pomo) Pit is situated in the Middle Adriatic Sea and has a maximum depth of 200 - 260 m. It is a sensitive and critical spawning and nursery zone for important Adriatic demersal resources, especially European hake (*Merluccius merluccius*).

### Location

The area encompassing three distinct, adjacent depressions, with maximum depths of ca. 270, respectively. The area extends 10 nautical miles from the 200 m isobaths.

### Feature description of the area

The Jabuka/Pomo Pit is one of the most important habitats for some shared demersal stocks of the Adriatic Sea. This area has complicated geographical features, including rocky bottoms, and has unique characteristics in terms of sediments, oceanography and biota. It is a region were cold nutrient-rich waters from the Northern Adriatic flow to the bottom of the Adriatic and become trapped by the Pit. It plays an important role in the overall oceanographic dynamic of the Adriatic sea (Orlic et al., 1992; FAO AdriaMed, 2011). In general, the eastern side of the area is characterized by the presence of coralligenous communities, maerls beds and sand-muddy biocoenosis (MEDISEH, 2013). Vertical mixing between water masses is an extremely powerful and dynamic process in the basin. There have been reports showing the presence of facies and associated *Thenea muricata, Brissopsis lyrifera, Funiculina quadrangularis* and *Isidella elongate* (Gamulin-Brida, 1967) in the area. The Pit is an upwelling region, with the bottom water being cooler and more nutrient-rich than near surface waters. These conditions encourage a high abundance of fish and shellfish and the area has long been known as a productive fishing ground (FAO AdriaMed, 2011).

The Jabuka/Pomo Pit could function as a favorable environment for some key life history stages of the porbeagle shark,, and *Lamna nasus* (Scacco et al., 2012), which is critically endangered (CR)(IUCN, 2007) and listed on Annex II SPA/BD Protocol.

Based on available scientific data, the area has a high density of giant devil ray (*Mobula mobular)* in the Adriatic (Fortuna et al., 2014). Due to its geographic distribution and rare occurrence outside the Mediterranean, the giant devil ray is considered an endemic elasmobranch in the region (Notarbartolo di Sciara and Bianchi, 1998; Notarbartolo di Sciara, 2007) and listed on Annex II of SPA/BD Protocol. The Jabuka/Pomo Pit is a sensitive and critical zone for spawning and nursery for important Adriatic demersal resources especially for European hake (Županović, 1968; Županović and Jardas, 1989; Arneri and Morales-Nin, 2000; Vrgoč et al., 2004; Krstulović Šifner, 2009; Adriamed, 2011). The area hosts the largest population of Norway lobster (*Nephrops norvegicus*) and is important especially for juveniles in the depths over 200 m (UNEP-MAP-RAC/SPA, 2014). It is also the most important nursery area for black-bellied angler (*Lophius budegassa*) and horned octopus (*Eledone cirrhosa*) (Krstulović Šifner,

2009; FAO AdriaMed, 2011). The Jabuka/Pomo Pit has been the subject of numerous scientific investigations on both sides of the Adriatic. Scattered occurrences of sub-modern and fresh-looking corals are also reported at many sites in the Jabuka/Pomo Pit (Angeletti et al., 2014). The area is characterized by conspicuous numbers of benthic scavengers (e.g., *Natatolana borealis*) and other crustaceans as *Munida intermedia*, *Munida rugosa* and *Nephorps norvegicus* (Gramitto and Froglia, 1998).

**Feature condition and future outlook of the area**

Although it covers less than 10% of the total surface of the Adriatic Sea, it is one of the most important fishing grounds in the Adriatic, especially for bottom trawl fishing, which applies a high degree of fishing pressure on the resources of the area. Fish populations are vulnerable due to overfishing and high fishing pressure on juveniles.

The following are the research programs/projects taking place in the area:

- ADRIAMED: Scientific cooperation to support responsible fisheries in the Adriatic sea (Albania, Croatia, Montenegro, Slovenia, Italy). This project has been ongoing since 1999 with funding from MIPAAF and EC-DGMARE (http://www.faoadriamed.org/).
- DEVOTES: Development of strategic indicators and innovative tools for understanding marine biodiversity and assessing Good Environmental Status (GES) in terms of contribution to the MSFD. DEVOTES may provide information for the biodiversity of the deep Adriatic sea (http://www.devotes-project.eu/).
- PERSEUS: Interactions (pressures and components) possible effect of these pressures in the different components in Adriatic sea (http://www.perseus-net.eu/site/content.php?locale=1&sel=419&artid=364).
- CIESM-Marine Peace Parks: The aim of this initiative was to identify new marine peace parks. At least one of these is in the Adriatic sea.
- ADRIPLAN: Funded by the EU a couple of months ago, to refine and to provide recommendations and guidelines about the maritime spatial planning in North and South Adriatic Sea. The regions where selected on the scientific knowledge and the availability of authorities (www.adriplan.eu).
- COCONET: Approach mostly science based. MPA network design. Aims to identify networks of potential or existing MPAs many, but small- not large, which could support wind-farms in NW Med and Black sea. WP2: The distribution of deep and coastal habitats (S. Fraschetti PI). Science based project and trying to find more and more info to implement MPA networks (http://www.coconet-fp7.eu/index.php/about-coconet).
- VECTORS (Coordinated by M. Austen): Aims to improve understanding of how environmental and manmade factors are impacting marine ecosystems now and how they will do so in the future. The project is addressing invasions, outbreaks and changes in fisheries distribution and productivity - in a sea with changing pressures including marine renewables, climate change, ocean acidification, fisheries and shipping (http://vector.conismamibi.it/).
- NETCET project: Fnanced by the IPA Adriatic CBC Programme and more specifically within the Priority 2 “Natural and Cultural Resources and Risk Prevention,” the general aim of this Cross-border Cooperation Programme is strengthening sustainable development capabilities of the Adriatic region through a concerted strategy of action among the partners of the eligible territories. The main objective of the NETCET project is to develop common strategies for the conservation of cetaceans and sea turtles in the Adriatic through a pan-Adriatic cooperation. The NETCET project runs from October 2012 to September 2015.

**Assessment of the area against CBD EBSA criteria**

| CBD EBSA | Description | Ranking of criterion relevance |
|---|---|---|

| **criteria** (Annex I to decision IX/20) | (Annex I to decision IX/20) | (please mark one column with an X) | | | |
|---|---|---|---|---|---|
| | | **No information** | **Low** | **Medium** | **High** |
| **Uniqueness or rarity** | Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features. | | | | X |
| *Explanation for ranking*<br>This is the unique area in the Adriatic Sea due to geomorphologic and oceanographic features (Artegiani et al., 1997; Würtz, 2010; Zavatarelli and Pinardi, 2003). Jabuka pit plays an important role in the overall oceanographic dynamic of the entire Adriatic sea (Orlic et al., 1992; FAO AdriaMed 2011). According to de Juan and Lleonart (2010) it is the only Essential Fish Habitat in the Adriatic. | | | | | |
| **Special importance for life-history stages of species** | Areas that are required for a population to survive and thrive. | | | | X |
| *Explanation for ranking*<br>The Jabuka/Pomo Pit is a sensitive and critical zone for spawning and nursery for important Adriatic demersal resources, especially for European hake (Županović, 1968; Županović and Jardas, 1986; Arneri and Morales-Nin, 2000; Krstulović and Šifner, 2009). The area hosts a large population of Norway lobster (*Nephrops norvegicus*) (FAO AdriaMed 2011) and is important especially for juveniles in the depths over 200 m (Krstulović Šifner, 2009; UNEP-MAP-RAC/SPA, 2014). It is also a nursery zone for black-bellied angler *(Lophius budegassa*) and horned octopus (*Eledone cirrhosa*) (Krstulović Šifner, 2009).The Pit could function as a favorable environment for some key life history stages of the porbeagle shark, *Lamna nasus* (Scacco et al., 2012). | | | | | |
| **Importance for threatened, endangered or declining species and/or habitats** | Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species. | | | X | |
| *Explanation for ranking*<br>The area contains important habitat of declining stocks of European hake (*Merluccius merluccius)* (Županović, 1968; Županović, Jardas, 1986; Arneri and Morales-Nin, 2000, Vrgoč et al., 2004; Krstulović Šifner, 2009; Adriamed, 2011). The area hosts a large population of Norway lobster (*Nephrops norvegicus*), which is showing negative trends both in abundance and biomass (FAO AdriaMed, 2011). The nursery areas of the hake are located on the slopes in areas adjacent to the Jabuka/PomoPit at depths between 150 and 200 meters (UNEP-MAP-RAC/SPA, 2014). The Pit could function as a favorable environment for some key life history stages of the porbeagle shark *Lamna nasus* (Scacco et al., 2012) which is critically endangered (IUCN, 2007), and both of which are listed on Annex II SPA/BD Protocol. Based on available scientific data, it is a high density area for giant devil ray (Mobula mobular) (Fortuna et al., 2014). Due to its geographic distribution and rare record of occurency outside the Mediterranean, it is considered as an endemic elasmobranch in the region (Notarbartolo di Sciara and Bianchi, 1998; Notarbartolo di Sciara, 2007) and listed on Annex II of SPA/BD Protocol. | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Vulnerability, fragility, sensitivity, or slow recovery** | Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery. | | | X | |
| *Explanation for ranking*<br>The area contains stocks susceptible to depletion due to overfishing (UNEP-MAP-RAC/SPA, 2014). | | | | | |
| **Biological productivity** | Area containing species, populations or communities with comparatively higher natural biological productivity. | | | | X |
| *Explanation for ranking*<br>The Jabuka/Pomo Pit is an up-welling region with the bottom water being cooler and more nutrients than near surface waters. These conditions encourage a high abundance of fish and shellfish and the area has long been known as a productive fishing ground (FAO AdriaMed, 2011). The Jabuka/Pomo Pit is a sensitive and critical zone for spawning and nursery for important Adriatic demersal resources especially for European hake (Županović, 1968; Županović and Jardas, 1986; Arneri and Morales-Nin, 2000; Vrgoč et al., 2004; Krstulović Šifner, 2009; Adriamed, 2011). The area hosts a large population of Norway lobster (*Nephrops norvegicus*) (FAO AdriaMed, 2011) and is important especially for juveniles in the depths over 200 m. It is also a nursery zone for black-bellied angler (*Lophius budegassa*) and horned octopus (*Eledone cirrhosa*) (Krstulović Šifner, 2009). | | | | | |
| **Biological diversity** | Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity. | | | X | |
| *Explanation for ranking*<br>Based on available scientific data, this is a high density area for giant devil ray (*Mobula mobular*) (Fortuna et al. 2014) which is a Mediterranean endemic species listed on Annex II SPA/BD protocol, IUCN Status: Endangered (EN). The Jabuka/Pomo Pit could function as a favorable environment for some key life history stages of the porbeagle shark *Lamna nasus* (Scacco et al., 2012) which is critically endangered (IUCN, 2007), and both are listed on Annex II SPA/BD Protocol. In general, the eastern side of the area is characterized by the presence of coralligenous communities, maerls beds and sand-muddy biocoenosis (MEDISEH, 2013). Vertical mixing between water masses is an extremely powerful dynamical process in the basin. The area has been reported to be characterized by facies and associations with *Thenea muricata*, *Brissopsis lyrifera*, *Funiculina quadrangularis* and *Isidella elongate* (Gamulin-Brida, 1967.) A total of 116 fish species belonging to 56 families and 86 genera were recorded in this area (Županović, Jardas, 1986). | | | | | |
| **Naturalness** | Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation. | | X | | |
| *Explanation for ranking*<br>The area is subject to a high degree of fishing pressure. | | | | | |

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**Maps and Figures**

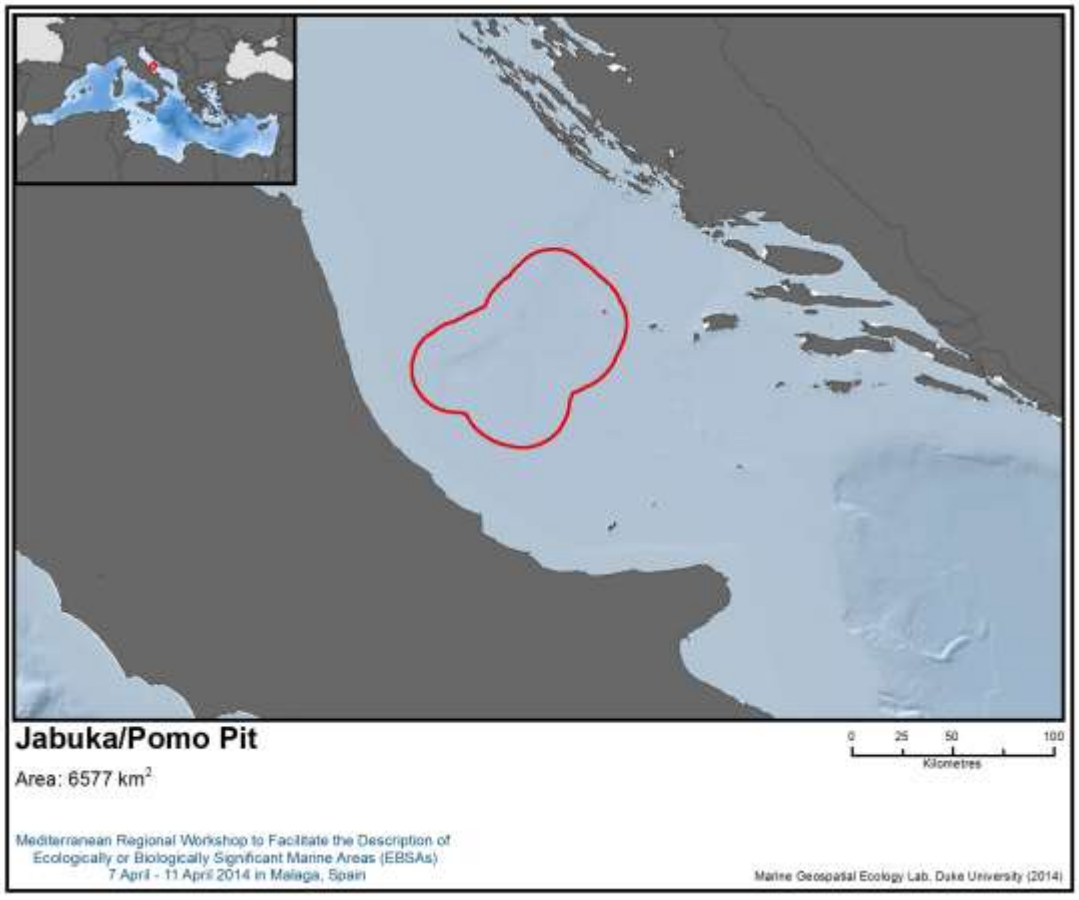


Figure 1. Area meeting the EBSA criteria.

## Area No. 3: South Adriatic Ionian Strait

### Abstract

The area is located in the center of the southern part of the Southern Adriatic basin and the northern Ionian Sea. It is characterized by steep slopes, high salinity and a maximum depth ranging between 200 m to 1500 m. Water exchange with the Mediterranean Sea takes place through the Otranto Channel, which has a sill that is 800 m deep. This area contains important habitats for Cuvier's beaked whales (*Ziphius cavirostris*), an Annex II species of the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD Protocol) in the framework of Barcelona Convention, and significant densities of other megafauna such as the giant devil ray (*Mobula mobular)*, striped dolphin (*Stenella coeruleoalba*), Mediterranean monk seal (*Monachus monachus*) and loggerhead turtle (*Caretta caretta*), all of which are listed in Annex II of SPA/BD Protocol. Benthos includes deep-sea cold water coral communities and deep-sea sponge aggregations, representing important biodiversity reservoirs and contributing to the trophic recycling of organic matter. Tuna, swordfish and sharks are also common in this area.

### Introduction

The area described (figure 1) is where the Adriatic Sea meets the Ionian Sea. Water exchange with the Ionian Sea takes place through the Otranto Channel (Artegiani et al., 1996). This area contains important habitats for Mediterranean megafauna and for rare slow-growing deep water corals.

### Location

The area is located in center of the southern part of the Southern Adriatic basin and in the northern part of the Ionian Sea. It includes the deepest part of the Adriatic Sea on the western side and it encompasses a coastal area in Albania (Sazani Island and Karaburuni peninsula). It also covers the slopes near Santa Maria di Leuca.

### Feature description of the area

This area is characterized by steep slopes, higher salinity and a maximum depth ranging from 200 m to 1500 m. It can be considered a pelagic oceanic habitat (Fonda-Umani, 1996). It is an area where southern Adriatic deep water (SAdDW) is locally formed. Water exchange with the Mediterranean Sea takes place through the Otranto Channel, whose sill is 800 m deep (Artegiani et al., 1997a). One of the major components forcing the general circulation is the Otranto Channel forcing (Artegiani et al., 1997b). The South Adriatic basin is intruded upon by Levantine Intermediate Water (LIW), a high salinity water mass formed through evaporation in the eastern Mediterranean (Zore-Armanda, 1963). Furthermore, this area encompasses the Bari Canyon, which plays an important role in the dynamics of the Adriatic Sea as it is the main channel facilitating the transport of sediments between the western Adriatic shelf and the southern basin (Oceana, 2014). The South Adriatic Pit is also characterized by open sea zooplankton, particularly euphausiids, also known as krill. There are also mesopelagic and deep zooplankton in the area (Viličić, 2008).

This area contains important habitats for Cuvier's beaked whales (*Ziphius cavirostris*), an Annex II species of the SPA/BD Protocol and significant densities of other megafauna such as the giant devil ray (*Mobula mobular)*, striped dolphin (*Stenella coeruleoalba*), Mediterranean monk seal (*Monachus monachus*) and loggerhead turtle (*Caretta caretta*) all listed in Annex II of SPA/BD Protocol. Benthos includes species of deep sea cold water coral communities, deep-sea sponge aggregations representing important biodiversity reservoirs and contributing to the trophic recycling of organic matter (Fortuna et al., 2014; UNEP-MAP-RAC/SPA, 2014a). Tuna (*Thunnus thynnus*), swordfish (*Xiphias gladius*), and sharks can also be found in the area (UNEP-MAP-RAC/SPA, 2014b).

The area hosts cnidarian-rich deep-sea habitats in the depth range of ca. 400-700 m. Recent research reveals the existence of megabenthic communities dominated by a variety of cnidarians, including frame-builders scleractinians (*Madrepora oculata, Lophelia pertusa*) (which are a backbone of this

cold-water coral communities), stony corals as *Desmophyllum dianthus* and *Stenocyathus vermiformis* and the yellow coral *Dendrophyllia cornigera*), antipatharians (*Leiopathes glaberrima*) and gorgonians (*Callogorgia verticillata*) as major habitat forming taxa, often in association with sponges like *Pachastrella monilifera* and *Poecillastra compressa* and, subordinately, serpulids (Freiwald et al., 2009; Taviani et al., 2011; Angeletti et al., 2014; Oceana, 2014). Best known examples refer to the south-western margin of the basin where scleractinian–sponge communities (i.e. *Madrepora oculata, Lophelia pertusa, Dendrophyllia cornigera, Desmophyllum dianthus, Poecillastra compressa, Pachastrella monilifera*) have been documented in the Bari Canyon, Gondola Slide and Dauno Seamount (Angeletti et al., 2014 and references therein). According to recent research, this area encompasses an almost continuous belt of patchy cold water coral sites along the entire south-western margin (Apulian), connecting the Adriatic populations with those inhabiting the Ionian margin - Santa Maria di Leuca coral province (Angeletti et al., 2014). The communities of Santa Maria di Leuca have the most significant growth between 500-700 m depth, which is controlled by oceanographic factors, namely the influx of Adriatic Deep Water (Angeletti et al., 2014). This provides a regular supply of nutrients and particulate organic matter. In 2006, Santa Maria di Leuca was designated under the GFCM as a Fishery Restricted Area (FRA) banning the use of towed gears due to the relationship between the Lophelia reef and the occurrence of priority commercial species (e.g. *Aristaeomorpha foliacea, Aristeus antennatus, Merluccius merluccius, Nephrops norvegicus, Pagellus bogaraveo*). This area is a site of active coral growth since the latest Pleistocene (Taviani et al., 2011. and the references therein). Deep-sea sponge aggregations represent important biodiversity reservoirs and contribute to the trophic recycling of organic matter (Oceana, 2014).

Close to the coral biocoenosis, some typical bathyal species also occur (e.g. *Chimaera monstrosa, Dalathias licha, Galeus melastomus, Aulopus filamentosus, Chlorophthalmus agassizi, Helicolenus dactylopterus, Caelorinchus caelorhincus*) (Oceana, 2014).

Due to this area's strong oceanographic conditions it constitutes an important migratory corridor for megafauna like the short-beaked common dolphin (*Delphinus delphis*) and marine turtles (Oceana, 2014).

**Feature condition and future outlook of the area**

The area is one of the most important fishing grounds for pelagic species and deep water bottom trawling. Slow growing deep water corals are sensitive to bottom trawling, and pelagic species are affected by high fishing pressure and by-catch (Rogers, 2004).

The following are the research programs/projects taking place in the area:

- ADRIAMED: Scientific cooperation to support responsible fisheries in the Adriatic Sea (Albania, Croatia, Montenegro, Slovenia, Italy)- since 1999 this project and is going every year with a new funding from MIPAAF and EC- DGMARE (http://www.faoadriamed.org/).
- DEVOTES: Development of strategic indicators and innovative tools for understanding marine biodiversity and assessing Good Environmental Status (GES) in terms of contribution to the MSFD. DEVOTES may provide information for the biodiversity of the deep Adriatic Sea (http://www.devotes-project.eu/).
- PERSEUS: Interactions (pressures and components) possible effect of these pressures in the different components in Adriatic Sea (http://www.perseus-net.eu/site/content.php?locale=1andsel=419andartid=364).
- CIESM-Marine Peace Parks: The aim of this initiative was to identify new marine peace parks. At least one of these is in the Adriatic Sea.
- ADRIPLAN: Funded by the EU a couple of months ago, to refine and to provide recommendations and guidelines about the maritime spatial planning in North and South Adriatic Sea. The regions where selected on the scientific knowledge and the availability of authorities. www.adriplan.eu

- COCONET: The approach of this project is mostly science-based and focused on MPA network design. It aims to identify networks of potential or existing MPAs which could support wind-farms in NW Med and Black sea.
- WP2: The distribution of deep and coastal habitats. Science based project and trying to find more and more info to implement MPA networks(http://www.coconet-fp7.eu/index.php/about-coconet).
- VECTORS: Aims to improve understanding of how environmental and manmade factors are impacting marine ecosystems now and how they will do so in the future. The project is addressing invasions, outbreaks and changes in fisheries distribution and productivity - in a sea with changing pressures including marine renewables, climate change, ocean acidification, fisheries and shipping. http://vector.conismamibi.it/
- NETCET (Network for the Conservation of Cetaceans and Sea Turtles in the Adriatic): The main objective of this project, which is financed by the IPA Adriatic CBC Program and more specifically within the Priority 2 "Natural and Cultural Resources and Risk Prevention," is to develop common strategies for the conservation of cetaceans and sea turtles in the Adriatic through regional cooperation. Due to the migratory nature of these species cross-border collaboration and shared management responsibility between Adriatic states is crucial in order to plan effective long-term conservation strategies. The NETCET project runs from October 2012 to September 2015 (http://www.netcet.eu/).

**Assessment of the area against CBD EBSA criteria**

| **CBD EBSA criteria** (Annex I to decision IX/20) | **Description** (Annex I to decision IX/20) | **Ranking of criterion relevance** (please mark one column with an X) | | | |
|---|---|---|---|---|---|
| | | **No information** | **Low** | **Medium** | **High** |
| **Uniqueness or rarity** | Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features. | | | | X |
| *Explanation for ranking*<br>The area hosts biodiversity hotspots of the bathyal bottoms of the Mediterranean Sea (Mastrototaro et al., 2010), and the only Adriatic population of Cuvier's beaked whales (*Ziphius cavirostris*) (UNEP-MAP-RAC/SPA, 2014). | | | | | |
| **Special importance for life-history stages of species** | Areas those are required for a population to survive and thrive. | | | | X |
| *Explanation for ranking*<br>There have been sightings of the Cuvier's beaked whales in the area, and the Southern Adriatic has been indicated as a nursery area for females with juvenile animals (UNEP-MAP-RAC/SPA, 2014a). | | | | | |
| **Importance for threatened, endangered or declining** | Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species. | | | | X |

| | | | | | |
|---|---|---|---|---|---|
| **species and/or habitats** | | | | | |
| *Explanation for ranking*<br>The area contains important habitats for Cuvier's beaked whales (*Ziphius cavirostris)* an Annex II species of the SPA/BD Protocol and significant densities of other megafauna such as the giant devil ray (*Mobula mobular)*, striped dolphin (*Stenella coeruleoalba*), Mediterranean monk seal (*Monachus monachus*) and loggerhead turtle (*Caretta caretta*) all listed in Annex II of SPA/BD Protocol (Kashta, L., 2010, Fortuna et al., 2014; UNEP-MAP-RAC/SPA, 2014a).<br><br>This area encompasses almost continuous belt of patchy cold water coral sites along the entire south-western margin (Apulian) connecting the Adriatic populations with those inhabiting the Ionian margin in Santa Maria di Leuca (Angeletti et al., 2014; Oceana 2014).<br><br>Around Sazani Island, loggerhead sea turtles are frequent. Monk seals have been visiting regularly (Kashta, 2010). | | | | | |
| **Vulnerability, fragility, sensitivity, or slow recovery** | Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery. | | | | X |
| *Explanation for ranking*<br>Deep-sea cold water coral communities and deep sea sponge aggregations are sensitive to bottom trawling (Oceana, 2014) because of their slow growth rates, fragility and slow or unlikely recovery after direct destruction (Rogers, 2004). Also, genetic and reproductive studies strongly suggest that in areas where deep-water corals are impacted by trawling, the colonies can be reduced to a small size and sexual reproduction is no longer viable (Rogers, 2004 and references therein). | | | | | |
| **Biological productivity** | Area containing species, populations or communities with comparatively higher natural biological productivity. | | | X | |
| *Explanation for ranking*<br>Compared to the other parts of the Adriatic basin, it is the most oligotrophic area with lower biological productivity. The presence of corals in the Santa Maria di Leuca area seems to be linked to an energetic trophic system characterized by an important vertical flux particulate matter occurring from the southern Adriatic to the Northern Ionian. This transfer is a crucial factor for corals (Mastrototaro et al., 2010 and the references therein). | | | | | |
| **Biological diversity** | Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity. | | | | X |
| *Explanation for ranking*<br>This area contains important habitats for cetaceans, monk seal (*Monachus monachus*), marine turtles and other species belonging to megafauna (Fortuna et al., 2014; UNEP-MAP-RAC/SPA, 2014a, UNEP-MAP-RAC/SPA, 2014b). The area has important banks for deep sea cold-water coral communities, often in association with sponges and serpulids (Freiwald et al., 2009; Mastrototaro et al., 2010; Taviani et al., 2011; Angeletti et al., 2014; Oceana, 2014). This biogenic habitat act as a refuge as well as a spawning and a nursery area for many species (Tursi et al., 2004). | | | | | |
| **Naturalness** | Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation. | | | X | |
| *Explanation for ranking*<br>Naturalness of the area is high because the negative impacts of bottom trawling is reduced by the its | | | | | |

geomorphological features of the area. Furthermore, it continues to play an important role in the water mass circulation and functioning of the Adriatic ecosystem.

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**Maps and Figures**

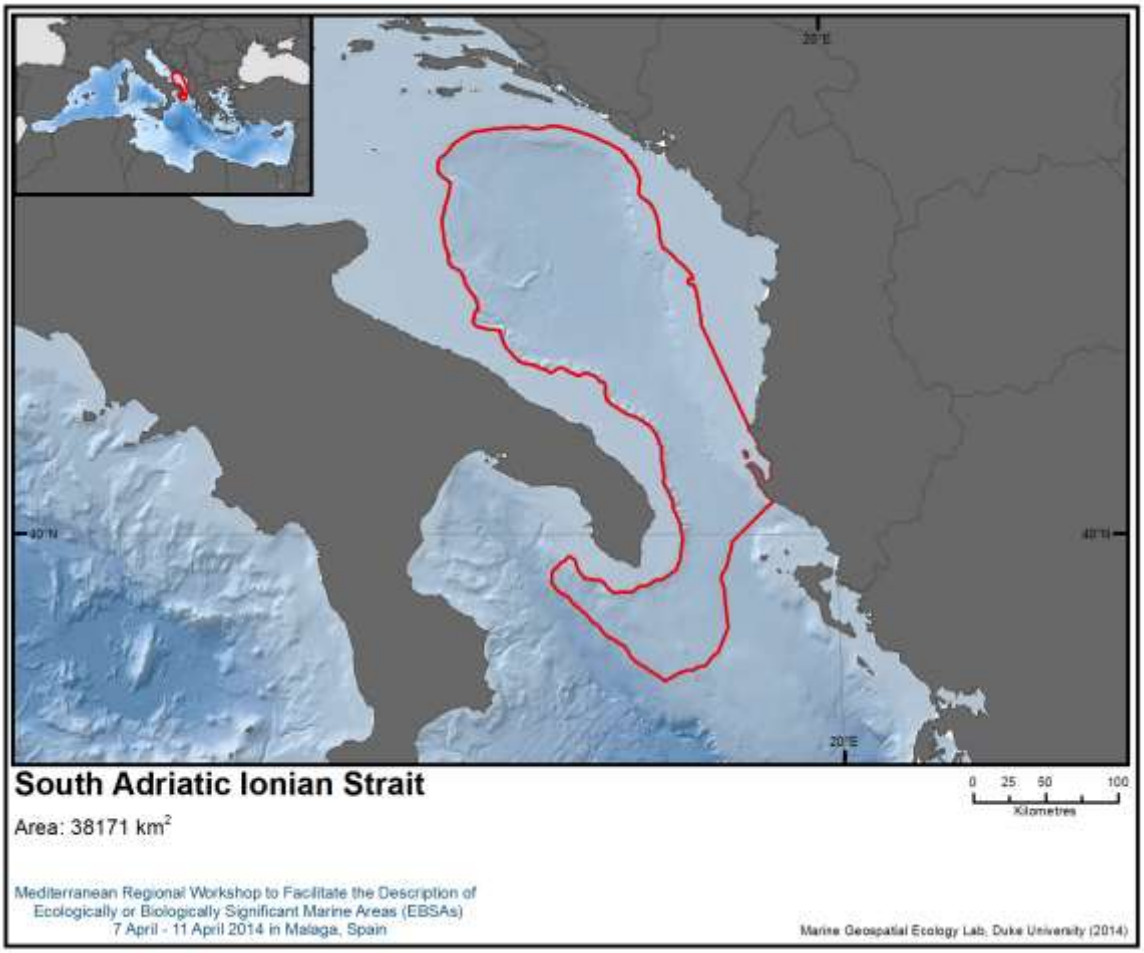


Figure 1. Area meeting the EBSA criteria.

## Area No. 4: Algero Tunisian Margin

**Résumé**

L'aire se situe entre les eaux algériennes et tunisiennes dans la partie est du bassin occidental méditerranéen. Cet espace inclue l'ASPIM (Aire Spécialment Protegée d'Importance Mediterranéenne) de Taza-banc des Kabyles, la zone marine de 5 parcs nationaux côtiers, une zone humide côtière MAB/UNESCO ainsi que la plus grande île de la partie sud-est du bassin occidental de la Méditerranée, avec l'archipel de la Galite. L'intérêt de cette zone réside dans son importance pour l'avifaune marine migratrice, dont beaucoup d'espèces menacées nichent dans les zones humides littorales de ce secteur. Cette zone présente également la particularité de concentrer 55 % des espèces protégées par la Convention de Barcelone ainsi que la majorité des habitats considérées en Méditerranée comme patrimoniaux, sensibles et/ou à forte productivité biologique. Ces habitats sont également le siège d'importants processus biologiques et écologiques notamment migratoires. Le long de cette zone sont rencontrés des canyons, encore mal connus mais dont l'intérêt écologique pourrait constituer un élément supplémentaire. La zone est considérée sensible avec au moins cinq points chauds de la biodiversité marine méditerranéenne connues.

**Introduction**

La zone marine comprise entre l'île du Pisan à Béjaia (Algérie) et la perpendiculaire est de l'île de la Galite (Tunisie).

Le secteur allant de la frontière algéro-tunisienne à Bejaia est très diversifié avec des avancées de la chaîne tellienne externe sui gagnent sur la mer. Ce secteur est caractérisé par un ensemble de falaises plus au moins élevées (<40 m) taillées dans les roches dures ignées et métamorphiques, dont les versants sont escarpés et couverts de sol et de végétation et dont la partie inférieure est battue par la mer. La structure géologique individualise des massifs rocheux, séparés par des vallées où coulent des oueds qui débouchent en mer. Les lagunes littorales entre El-Kala et Annaba confère une originalité à ce secteur de la côte algérienne. Les plages s'étendent au fond des baies, d'une largeur de quelques mètres à quelques dizaines de mètres, sont presque exclusivement sableuses. Les apports en éléments sableux sont le fait des oueds Seybouse, Kébir Est et Ouest.

Dans le bassin ouest méditerranéen l'eau intermédiaire et (WIW) et l'eau profonde (WMDW) après sa circulation et son accumulation à 2000 m de profondeur dans le bassin algéro-provencal ces eaux s'orientent par la suite vers les profondeurs du bassin Tyrrhénien (-3900 m) (Millot, 1999; Robinson et al., 2001). A partir de Février, la zone présente une forte concentration en chlorophylle qui s'accroit vers l'est, probablement parce que les tourbillons cycloniques génèrent des remontées sur le côté est de la mer d'Alboran, l'enrichissement des couches supérieures jusqu'à la fin de l'été (Août) entre Almeria et Oran. Le débit d'eau quittant Alboran se restructure le long de la côte algérienne. Pendant l'hiver, le vent forçant maintient downwelling près de la côte africaine, où relativement faible et tourbillons anticycloniques éphémères caractérisent circulation AW (Würtz, 2010).

Dans la liste des aires méditerranéennes pélagiques proposées à la protection par Greenpeace (2008, modifiée) pour leur importance pour les espèces pélagiques, la zone décrite y est largement représentée.

Selon Camiñas (2004), des spécimens de tortues caouannes de l'Atlantique sont connu pour migrer dans la mer Méditerranée pendant la première la moitié de l'année et ensemble, avec ceux de la Méditerranée, ils se rassemblent chaque année pour l'alimentation dans une large zone autour de les Îles Baléares. Agrégations se produisent également du printemps à la fin de l'été autour d'autres zones, notamment le long du littoral algérien, avec une période de migration de l'Atlantique à la Méditerranée et vice versa ouest.

**Situation géographique**

L'aire se situe entre l'île du Pisan à Béjaia (Algérie) et la perpendiculaire est de l'île de Galite en Tunisie sur une longueur de plus de 500 km et une surface marine approximative de 13 000 $km^2$ avec des profondeurs comprises entre 0 et 500 m.

Sa limite ouest est la limite ouest de la partie marine du Parc National de Gouraya (île des Pisans) et sa limite est correspond à l'alignement est de l'île de La Galite. Cette zone intègre les aires marines de quatre parcs nationaux, une ASPIM[9] et un site Ramsar.

**Description des caractéristiques de la zone**

**Importance des formations géologiques et de la géomorphologie**

Les fonds marins alternent entre platiers larges à pente douce, principalement localisés en face des baies alors que les zones des caps et des falaises littorales sont prolongées par les fonds rocheux, très accidentés à pente abruptes.

La partie algérienne de la zone décrite commence à Béjaia qui se caractérisée par quatre types sédimentaires (1) les sédiments calcaires (sables, graviers et vases calcaréo-siliceuses) jalonnent la bordure rocheuse du golfe de Béjaia, (2) les sédiments siliceux (près de 60% du plateau continental et son rebord) représentés par les vases silico-calcaires et les vases silico-argileuses, (3) les sédiments argileux représentés par les boues argilo-siliceuses et (4) les sédiments sableux et graveleux sont représentés de façon secondaire (Leclaire, 1972).

A Skikda de la côte vers le large, des sables fins, des sables envasés, des vases sableuses, des sables et des graviers, et des vases pures, soit une distribution des sédiments en fonction de la bathymétrie (Leclaire, 1972) alors qu'à Annaba, six catégories sont mise en évidence : les boues argilo-siliceuses s'étendent du large de oued Bou Alallah au Ras El Hamra, les sables et sablons calcaréo-siliceux s'étendent sur la quasi totalité de la côte du golfe (de Ras Rosa à Ras El Hamra), les vases silico-argileuses s'étendent près de la côte de oued Bou Alallah au Ras Rosa, les vases calcaréo-silicieuses recouvrent le large du centre du golfe, les sables et graviers calcaires couvrent essentiellement le large de Ras Rosa et les vases calcaires couvrent une fine partie du centre du golfe (Leclaire, 1972).

Les fonds affaissements des falaises littorales abruptes se prolongent généralement en mer par des fonds d'éboulis qui constituent des paysages particuliers avec de nombreuses grottes et cavités très propices à certaines espèces d'oursins comme l'oursin diadème, des serranidés, des Lepadogasters. Ce type de fond est également caractérisé par de nombreuses éponges, des algues calcaires, de nombreux bryozoaires et divers alcyonnaires encroûtants. Quelques grottes sous marines ont été mises en évidence sur une partie des côtes de Béjaia, de Skikda, de Jijel et de Collo. Ces grottes constituent des écosystèmes particuliers de la Méditerranée abritant une biodiversité tout à fait particulière vivant souvent dans les conditions d'obscurité. Plusieurs espèces sont observées à l'entrée et dans les grottes : les agélas orangées, des clathrines jaunes, des éponges épineuses oranges, des éponges rognons, des éponges encroûtantes bleuâtres, des éponges à cratères, des serpules, des anémones encroûtantes jaunes, éponges carvinicoles jaunes, du faux corail, des galathés, des cigales de mer, des corbs, des apogons.

Les fonds de coralligène du secteur de Gouraya, de Jijel, de Skikda et d'El Kala sont caractérisés par biodiversité benthique et ichtyologique très diversifié. Les explorations réalisées sur des portions des substrats durs de la zone marine décrite montrent principalement deux principaux faciès, le faciès à gorgonaires alors que le second, *Astroides calycularis*, est considéré comme indicateur de la tendance des eaux méditerranéennes au réchauffement.

[9]http://testing.rac-spa.org/banc_des_kabyles.

**Importance biologique et écologique**

La zone considérée présente un intérêt majeur en tant que réservoir de la diversité biologique marine et littorale du bassin occidental. Cette zone est caractérisée par :

- Sa représentativité de la Méditerranée en termes de diversité spécifique, de diversité écosystémique et de diversité des processus écologiques ;
- La présence d'au moins cinq des hot spot connus au sud de la Méditerranée ;
- La présence d'une ASPIM (aire marine de Taza – Banc des Kabyles) (http://testing.rac-spa.org/banc_des_kabyles) ;
- La présence de quatre parcs nationaux côtiers incluant une partie marine ;
- La présence de 13 écosystèmes remarquables de la Méditerranée (Grimes, 2010b) ;
- La présence de près de 55 % espèces protégées par la Convention de Barcelone (www.rac-spa.org) ;
- La zone où se rencontre le plus important gisement de corail rouge *Corallium rubrum* de la Méditerranée ;
- Une zone importante pour l'activité halieutique (Massuti et al., 2004) ;
- La présence du plus important archipel de la Galite[10] du sud-est de ce bassin. Les fonds rocheux, les herbiers de phanérogames et les fonds corraligènes abritent de nombreuses espèces d'intérêt écologique ou commercial et de grandes potentialités pour le frai et le nourrissage d'espèces. Une multitude d'espèces d'intérêt biologique pour la Méditerranée réparties sur de nombreux paysages sous-marins dont les formations organogènes des Vermets (*Dendropoma petraeum*, *Goniolithon byssoides*, *Astroides calycularis*, *Cladocora coespitosa*), les forêts de Cystoseires, les forêts de *Laminaria rodriguezii*, les peuplements de *Dictyopteris polipodioides*, et les fonds de maërl (www.apal.nat.tn) ;
- La présence d'un Canyon au large du golfe de Bejaia qui est l'un des plus important de la côte algérienne[11], situé entre 300 et 2500 m de profondeur (Pilar et al. 2014) et probablement de la partie sud du bassin occidental. Cette zone est connue pour les poissons, les crustacés et les mollusques (Massuti *et al.*, 2004) ;
- Au moins 10 zones de fraie importantes sont connues dans ce secteur, notamment celle de Bejaia pour les petits pélagiques tels que l'anchois *Engraulis encrasicolus* (Bacha et Amara, 2012, Bacha, 2009). Les pêches expérimentales pour les espèces démersales ont révélé la présence de zones de pêche importantes pour plusieurs espèces (environ 20), notamment des espèces de poissons, des mollusques et des crustacés (Massuti et al., 2004).

**Les habitats remarquables**

Grimes (2010) décrit les plus importants écosystèmes connus dans le secteur oriental de la côte algérienne, dont la majorité répondent au critère de la représentativité, de la rareté, de la naturalité, de la vulnérabilité, en particulier : (1) l'écosystème à *Posidonia oceanica*, (2) l'écosystème du coralligène, les fonds de corail rouge *Corallium rubrum*, (3) les fonds de maërl, (4) les forêts à Cystoseires de mode battu, (5) les encorbellement à *Lithophyllum lichenoides*, (6) les trottoirs à Vermets, (7) les bourrelets à *Corallina elongata*, (8) les forêts à *Dictyopteris membranacea*, (9) les fonds d'éboulis, (10) les caves et les grottes sous marines, (11) l'écosystème dunaire, (12) les zones humides littorales, (13) l'écosystème

[10] http://www.apal.nat.tn/infoglueDeliverWorking/digitalAssets/222_ZS_Capnegro-serrat.pdf http://testing.rac-spa.org/la_galite http://www.apal.nat.tn/infoglueDeliverWorking/ViewPaged383.html?siteNodeId=32&languageId=4&contentId=-1.

[11] Information communiqué par OCEANA à la CBD et à l'UNEP/MAP pour l'atelier méditerranéen sur les EBSA.

insulaire, en particulier avec l'île du Pisan (Béjaia), l'île d'El Aouana (Jijel) et l'archipel de la Galite (Tunisie).

Cet espace incluse également le plus important complexe acustre et saumatre de la rive sud de la Méditerranée (Lac Mellah, lac Oubeira, lac des Oiseaux, lac Bleu, la Tourbière, la lagune de Bizerte,…).

Les forêts de Cystoseires de mode battu sont dues à l'abondance de *Cystoseira stricta* dans la partie haute (< 0.5 m) de l'infralittoral. Ces forêts sont fréquentes le long de la côte d'El Kala. Leur présence est un indicateur révélateur de la pureté des eaux. Peuplement à Cystoseira de mode calme est caractérisé par *Cystoseira crinita* qui abrite un grand nombre d'espèces de petites tailles telles que *Corallina elongata, Gelidium crinale, Spyridia filamentosa* (Pangea-Consultores, EGMASA et PNEK/MEDMPA, 2005). La strate gazonnante est formée de *Dictyopteris membranacea, Plocamium cartilagineum, Padina pavonica. Les* forêts à *Dictyopteris membranacea* ont été rencontrées dans les stations de Cap Segleb par Semroud *et al*. (2004). Selon ces auteurs les corniches à *Corallina elongata sont signalées* au niveau des falaises et des parois rocheuses à forte inclinaison. Elles ont été observées dans les secteurs de M'Zara, de Boutribicha et de La Messida où elles constituent des structures biogènes remarquables.

La cartographie des herbiers à *Posidonia oceanica* d'Algérie établie par Vaissiere & Fredj (1963) indique que les herbiers étaient particulièrement bien développés dans le golfe de Annaba mais leur présence a été confirmé à El Kala, à Annaba (Cap de Garde) et à Jijel (Banc des Kabyle, Aouana). L'extrême est de la côte algérienne à la frontière algéro-tunisienne l'embouchure de l'oued Mafragh, entre Ras Cavallo à Ras M'Zina, est caractérisée par un immense herbier à posidonie.

Un récif-barrière à posidonie a été signalé près de l'entrée du canal menant au Lac Mellah au niveau de la plage Verges (Bouderesque *et al*., 1990 ; Semroud *et al*., 2004). Près de la côte, et séparé de la mer par le récif-barrière ainsi constitué, se forme un lagon, généralement occupé par *Cymodocea nodosa* et *Zostera noltii*. Côté large le récif se prolonge normalement par un herbier en pente douce. L'extension du récif-barrière est évidente surtout au printemps et en été, lorsque la longueur des feuilles est maximale et que celles-ci s'étalent à la surface (Semroud et al., 2004).

Selon l'étude réalisée par Pangea-Consultores et EGMASA/PNEK/MEDMPA (2005), Certains fonds meubles ont de nombreux affleurements du substratum qui permettent l'installation de peuplements de coralligène qui alternent avec les peuplements des fonds meubles caractéristiques. Ce sont les peuplements des fonds mixtes. Le coralligène alterne avec les graviers et sables coquilliers dans les secteurs de Cap Rosa : Entre la côte et les –90 m ; Cap Mxina - Cap Gross : A la suite des peuplements de transition et jusqu'à -100 m (Roches du Petit Stagnon, Roches de la Calle Cavelle, à la base de Cap au Camp) ; La Messida - frontière algéro-tunisienne : Notamment les fonds du Chille du Cap Roux (entre -40 et -60 m).

Selon l'étude MEDMPA (2004), le coralligène de la zone d'El Kala à la frontière algéro-tunisienne typique est constitué par un bio-concrétionnement très développé, composé d'algues calcaires, d'animaux constructeurs à squelette calcaire (Bryozoaires, Spongiaires), à tubes (Polychètes Serpulides) et à tests (Mollusques, …), cimenté et colmaté, par recristallisation. Les nombreuses cavités qui se forment au cours de la cristallisation sont peuplées par une faune ichtyologique très riche, dont on peut citer : le mérou, la badèche, le corb et quelques sparidés de grande taille *Diplodus sargus*, *Diplodus cervicus*, etc.

Certains faciès ont été décrits tels ceux à : *Parazoanthus axinellae* (particulièrement dans les grottes) et *Eunicella singularis* (gorgone blanche). Ce dernier genre constitue des faciès différents selon le biotope et la profondeur : Sur les pans verticaux à profondeur moyenne (-15 m) on retrouve le faciès à *Eunicella cavolinii* (gorgone jaune) ; sur les replats faiblement inclinés et les blocs reposant sur le sédiment. Il faut noter que la faune, à ce niveau, représente dans la couverture du substrat un pourcentage par rapport à la flore nettement plus important que dans l'étage infralittoral.

Les vases pures se mêlent au coralligène commençant généralement à partir des -50 m, sauf au niveau du cap Rosa où ils se limitent aux fonds à partir de -80 m. Dans la région d'El Kala, l'étage du circalittoral et la biocénose du Coralligène sont d'autant plus importants qu'ils constituent le biotope et l'association

biologique exclusifs et préférentiels de *Corallium rubrum*, le corail rouge, espèce très recherchée pour sa forte valeur marchande. De plus, l'étage du circalittoral est l'espace marin de la région d'El Kala le plus soumis à la pression humaine car toutes les activités de pêche du corail rouge se concentrent au niveau de cet étage. Les fonds coralligènes s'étendent sur d'importantes surfaces dans les eaux du PNEK, sur des fonds rocheux, mais aussi sur substrats meubles. Ils commencent selon la transparence de l'eau, entre -20 et -40 m et vont jusqu'à -120 m de profondeur dans certaines localités algériennes.

L'importance de la biocénose du coralligène dans la région d'El Kala est liée à son association biologique exclusive et préférentielle au corail rouge (*Corallium rubrum*), le corail rouge, espèce commerciale très recherchée.

Les fonds de 0 à 15-20 m de profondeur à proximité des côtes rocheuse ou au pied des massifs et des falaises côtières, en raison de l'érosion marine de la côte sont des fonds parsemés d'éboulis. Ces éboulis, dont certains la taille dépassent plusieurs mètres de diamètre, sont séparés les uns des autres par des espaces plus ou moins importants où s'accumulent les sédiments meubles. Au niveau de ces sédiments meubles existent des peuplements de substrats meubles très diversifiés, et en particulier fréquemment des herbiers de Posidonies. Les fonds d'éboulis apparaissent sur le plan sédimentaire comme des fonds très hétérogènes d'où une grande diversité des espèces et des peuplements floristiques et faunistiques.

La surface des roches exposée à la lumière est colonisée aussi bien par des algues (*Sargasum vulgare*, *Codium* bursa) que des animaux (*Eunicella singularis, E. cavolinii, Sphaerechinus granularis*). Les parois verticales beaucoup moins éclairées présentent un peuplement de type sciaphile où les algues (*Halimeda tuna, Udotea, petiolata, Peyssonnelia squamaria*) et les colonies du Cnidaire *Paraozanthus axinella* dominent. Les faces ou les surfaces les plus obscures présentent un peuplement de milieu semi-obscur à dominance de Spongiaires. La faune ichtyologique est très diversifiée avec notamment les espèces du genre *Diplodus*, *Epinephelus alexandricus* et *E. guaza* (Pangea-Consultores, EGMASA et PNEK/MEDMPA, 2005).

Le fond à maërl est situé au large de la côte, plus particulièrement au large des îles d'El Aouana. C'est un lieu extraordinaire, composé de l'accumulation d'algues calcaires dont le thalle fortement minéralisé ressemble aux coraux. L'espèce la plus fréquente est *Lithothamnion coralloides*, qui tapisse le fond et donne sa couleur mauve à tout ce peuplement, qui est désigné sous le nom de maërl.

Les moules *Mytilus galloprovincialis* et *Perna perna*, constituent généralement des communautés mixtes, présentes sur presque tout le littoral algérien. La réduction drastique de la répartition de ces espèces est un effet conjugué de la prédation humaine et de la pollution. Les moulières naturelles constituent des gisements importants des Bivalves *Mytilus galloprovincialis* et *Perna perna*. Ces moulières sont réparties dans différentes régions littorales. Les plus importantes sont celles signalées à Taza, dans la région de Skikda et à El Kala. Dans cette dernière, ces moulières sont associées au peuplement à *Cystoseira stricta* de l'infralittoral supérieur.

Dans la région de Jijel, les formations géologiques sont à l'origine de la grande diversité morphologique de la région, où on recense des promontoires (Ras Afia ; Ras El Aouana), des îlots (îlot de Mensouriah ; îlot Hadjret Tafalkout), des îles (îles El Aouana), une presqu'île (presqu'île de Ziama), des petites baies (baie d'El Aouana ; baie des Aftis ; baie de Taza ; baie de la grotte merveilleuse), des criques (criques de Ziama Mensouriah) et des falaises.

Selon l'étude réalisée par (Pangea-Consultores, EGMASA et PNEK/MEDMPA, 2005); MedPAN, 2008-2012) dans la région d'El Kala, le peuplement algal des biotopes sciaphiles plus profonds est dominé par les espèces citées plus haut. Elles sont accompagnées par *Pseudolitophyllum expensum, Pseudolitophyllum cabiochae* et *Mesophyllum incrustans*. A ce niveau de profondeur, les algues caractéristiques du coralligène se développent de façon importante et marquent le passage le plus souvent à l'étage qui suit. Même si c'est le domaine des algues photophiles, la faune est riche et bien représentée, bien que cela n'apparaisse pas toujours au premier coup d'œil. On peut y rencontrer des Mollusques *Patella coerulea*, *Purpura haemastoma*, les oursins *Paracentrotus lividus*, *Arbacia lixula et*

*Sphaerechinus granularis*, cette dernière étant plus sciaphile. D'autres espèces, indicatrices d'un peuplement sciaphile, constituent le faciès à *Parazoanthus axinellae* (Zoanthaire colonial de couleur jaune) et à *Ophidiaster ophidianus* (grand astéride rouge) sur la roche littorale à éclairement diminué.

**Les espèces remarquables**

Les différents inventaires biologiques marins établis dans l'aire marine decrite font ressortir une diversité biologique remarquable, par son nombre, par sa qualité et par sa structure. La présence d'espèces dites à "statut"[12] en Méditerranée avec des densités et des surfaces couvertes relativement importante constitue un support supplémentaire à l'importance écologique et biologique de cet espace.

La zone considérée abrite 55% des espèces menacées de la Méditerranée.

| **Végétation marine** | **Faune marine** | |
|---|---|---|
| **Phanérogames marines**<br>***Posidonia oceanica***<br><br>**Algues marines**<br><br><u>Phaeophytes</u><br>*Cystoseira ercegovicii*,<br>***Cystoseira mediterranea,***<br>*Cystoseira compressa*,<br>***Cystoseira sedoites,***<br>***Cystoseira spinosa,***<br>*Cystoseira stricta*<br><br><u>Rhodophytes</u><br>***Lithophyllum lichenoides***<br>*Lithophyllum frondosum*,<br>*Lithophyllum incrustans*,<br>*Corallina elongata*, | **Eponges**<br>***Hippospongia communis* (Lamarck, 1813)**<br>***Spongia officinalis* Linnaeus, 1759**<br>*Spongia virgultosa* (Schmidt, 1862)<br>***Spongia agaracina***<br><br>**Cnidaires**<br>***Corallium rubrum* (Linnaeus, 1758)**<br>Le corail noir *Antipathes subpinnata*<br>***Astroides calycularis***<br><br>**Madréporaires**<br>*Cladocora coespitosa*,<br>Gorgones *Eunicella singularis*,<br>*E. verrucosa*,<br>*E. cavolini*<br>*Lophogorgia veratophyta*.<br><br>**Porifères**<br>***Axinella polipoides***<br><br>**Echinodermes**<br>***Ophidiaster ophidianus***<br>***Centrostephanus longispinus***<br>***Paracentrotus lividus*.**<br>***Astopecten irregularis,***<br><br>**Mollusques**<br>*Lithophaga caudigera*,<br>***Lithophaga lithophaga,***<br>*Patella aspera*,<br>*Patella caerulea*,<br>*Patella lusitanica*,<br>***Pinna nobilis* Linnaeus, 1758**<br>***Pinna rudis* Linnaeus, 1758** | **Poissons et squales**<br>*Alopias vulpinus* (Bonnaterre, 1788)<br>*Sphyrna zygaena* (Linnaeus, 1758)<br>*Myliobatis aquila* (Linnaeus, 1758)<br>*Pteromylaeus bovinus* (E. Geoffroy St Hilaire, 1817)<br>*Chimera monstrosa* Linnaeus, 1758<br>*Balistes carolinensis* Gmelin, 1788<br>*Callionymus lira* Linnaeus, 1758<br>***Epinephelus alexandrinus* (Valenciennes, 1828)**<br>***Epinephelus guaza* (Linnaeus, 1758)**<br>*Mola mola* (Linnaeus, 1758)<br>*Ranzania laevis* (Pennant, 1776)<br>*Zeus faber* Linnaeus, 1758<br>***Epinephelus marginatus,***<br>***Epinephelus guaza,***<br>***Sciaena umbra***<br>*Umbrina cirrosa*.<br><br>**Mammifères marins**<br>***Balaenoptera acutorostrata* Lacepède, 1804**<br>***Delphinus delphis* Linnaeus, 1758**<br>***Stenella coeruleoalba* (Meyen, 1833)**<br>***Tursiops truncatus* (Montagu, 1821)** |

[12] Annexes II et III du Protocole ASP BD de la Convention de Barcelone.

| | | |
|---|---|---|
| | **Crustacés**<br>*Lepas anatifera* Linnaeus, 1767<br>*Mitella pollicipes* (Gmelin, 1790)<br>***Palinurus elephans*** (Fabricius, 1787)<br>***Scyllarides latus*** (Latreille, 1803)<br>*Galathea squamifera*, | ***Physeter catodon***<br><br>**Reptiles**<br>***Caretta caretta***<br>***Dermochelis coriacea***<br><br>*Oiseaux*<br>***Phalacrocorax aristotelis***<br>***Pandion haliaetus*** |
| **Oiseaux d'eau**<br>Sans être exhaustif une importante avifaune d'eau fréquente cette zone<br>**Puffin cendré, *Calonectris diomedea diomedea***<br>**Goéland d'Audouin, *Larus audouinii***<br>**Cormoran huppé méditerranéen, *Phalacrocorax aristotelis desmarestii***<br>Faucon pèlerin, *Falco peregrinus*<br>**Faucon d'Eléonore, *Falco eleonorae***<br>Fauvette mélanocéphale, *Sylvia melanocephala*<br>Aigrette garzette, *Aigretta garzetta*<br>**Balbuzard pécheur, *Pandion haliaetus***<br>Vautour fauve, *Gyps fulvus*<br>**État des caractéristiques et perspectives d'avenir pour la zone**<br>L'aire est relativement moins exposée aux impacts anthropiques. Dans sa partie algérienne, c'est l'une des zones les moins urbanisées avec une un fort degré de naturalité, toutefois le risque lié au transport des hydrocarbures reste important dans cette région. Dans sa partie tunisienne le facteur de stress le plus important demeure l'activité touristique. Pour l'ensemble de l'aire la surexploitation halieutique, notamment par les chalutiers et les petits métiers, demeure également un facteur à considérer.<br>La partie algérienne l'aire est un centre d'intérêt pour les recherches visant à accroitre les connaissance dans la perspective de la protection et de la gestion intégrée de cet espace (Pangea-Consultores, EGMASA et PNEK/MEDMPA, 2005; MedPAN, 2008-2012); campagne d'évaluation des ressources halieutiques, 29004-2005 dans le cadre de la coopération algéro-espagnole, campagne d'évaluation des ressources démersales, MPRH/2013-2014) ainsi que plusieurs projets de recherche universitaire (MESRS/PNR/2010-2017). Entre 1995 et 2001 une évaluation de la qualité des substrats durs (0-120 m) a été fait sur la base de cinq indices biotiques sur 217 stations couvrant 300 km de l'aire (Grimes et al., 2009, Grimes, 2010).<br>Deux évaluations des ressources corallifères ont été menées, la première portant exclusivement sur la zone marine algérienne à la frontière de la Tunisie (ECOVALOR/AIC, 1997) et la seconde initié par le Ministère de la Pêche et des Ressources Halieutiques en Algérie avec le groupement CREOCEAN-COMEX-CNRS, 2008-2009). | | |

**Évaluation de la zone selon les critères de la CDB**

| **Critères CBD EBSA (Annexe I de la décision IX/20)** | **Description** (Annexe I de la décision IX/20) | **Classement de la pertinence du critère** | | | |
|---|---|---|---|---|---|
| | | **Pas d'info** | **Faible** | **Moyenne** | **Élevée** |
| **Caractère unique ou rareté** | Aires contenant des espèces, des populations ou des communautés i) uniques (« la seule du genre »), rares (dans quelques endroits seulement) ou endémiques et/ou ii) des habitats ou des | | | | X |

| | | | | | |
|---|---|---|---|---|---|
| | écosystèmes uniques, rares ou distincts; et/ou iii) des caractéristiques géomorphologiques ou océanographiques uniques ou inhabituelles | | | | |
| **Explication de classement**<br>55 % des espèces figurant dans les annexes II et II du Protocole ASP BD de la Convention de Barcelone sont rencontrées dans cette zone (www.rac-spa.org).<br><br>13 habitats (écosystèmes) marins et côtiers remarquables de la région méditerranéenne sont décrits dans cette aire et dont certain comme l'écosystème à Posidonia oceanica présente un taux de vitalité exceptionnel comme à Jijel et à El Kala (Grimes, 2010). Cet écosystème et celui du coralligène constituent des entités à très forte diversité biologique et à forte productivité biologiques. La faune et la flore associées et dépendantes dans leur installation et leur fonctionnement de ces habitats leur confèrent un caractère hautement biostratégique.<br><br>La présence d'un Canyon au large du golfe de Bejaia qui est l'un des plus important de la côte algérienne[13], situé entre 300 et 2500 m de profondeur (Pilar et al. 2014) et probablement de la partie sud du bassin occidental. Cette zone est connue pour les poissons, les crustacés et les mollusques (Massuti *et al.*, 2004). | | | | | |
| **Importance particulière pour les stades du cycle de vie des espèces** | Aires nécessaires à la survie et à l'essor d'une population | | | X | |
| **Explication de classement**<br>Les conditions créées par les habitats et les écosystèmes remarquables de la zone favorisent la reproduction, le recrutement et l'installation des espèces, notamment sensibles, comme le Goeland d'Audouin, le corail rouge (ECOVALOR/AIC, 1997), l'oursin diadème, la grande nacre de Méditerranée *Pinna nobilis* et plusieurs autres espèces (Grimes, 2005). La densité des populations est également maintenue, en partie, grâce à la présence de ces habitats, notamment les espèces marines migratrices ainsi que les oiseaux marins qui nichent sur les îles et îlots de l'aire. L'aire est également une zone de nidification de plusieurs espèces d'oiseaux marins migrateurs.<br><br>Au moins 10 zones de fraie importantes sont connues dans ce secteur, notamment celle de Bejaia pour les petits pélagiques tels que l'anchois *Engraulis encrasicolus* (Bacha et Amara, 2012, Bacha, 2009). Les pêches expérimentales pour les espèces démersales ont révélé la présence de zones de pêche importantes pour plusieurs espèces (environ 20), notamment des espèces de poissons, des mollusques et des crustacés (Massuti et al., 2004). | | | | | |
| **Importance pour les espèces et/ou les habitats menacés, en danger ou en déclin** | Aires contenant des habitats nécessaires à la survie et au rétablissement d'espèces menacées, en danger ou en déclin, ou comprenant d'importants regroupements de ces espèces. | | | | X |
| **Explication de classement**<br>L'existence des habitats (écosystèmes) à *Posidonia oceanica* (Boudouresque et al., 2006), l'écosystème à coralligène et les fonds de Maërl sont très importants à la survie de nombreuses espèces, particulièrement benthiques. L'écosystème à Posidonie est également très important pour la phase de reproduction de certaines espèces nectobenthiques. Ces écosystèmes participent directement au maintient de la productivité biologique élevé de la zone et contribue grâce à la propagation des | | | | | |

[13] Information communiqué par OCEANA à la CBD et à l'UNEP/MAP pour l'atelier méditerranéen sur les EBSA.

<table>
<tr><td colspan="6">larves et des juvéniles à l'exportation de la matière organique vivantes dans les zones voisines.<br><br>13 écosystèmes remarquables, représentatifs et sensibles de la Méditerranée sont mis en évidence dans la zone décrite pour l'EBSA (Grimes, 2010b).<br><br>La présence du plus important archipel de la Galite[14] du sud-est de ce bassin. Les fonds rocheux, les herbiers de phanérogames et les fonds corraligènes abritent de nombreuses espèces d'intérêt écologique ou commercial et de grandes potentialités pour le frai et le nourrissage d'espèces. Une multitude d'espèces d'intérêt biologique pour la Méditerranée réparties sur de nombreux paysages sous-marins dont les formations organogènes des Vermets (Dendropoma petraeum, Goniolithon byssoides, Astroides calycularis, Cladocora coespitosa), les forêts de Cystoseires, les forêts de Laminaria rodriguezii, les peuplements de Dictyopteris polipodioides, et les fonds de maërl (www.apal.nat.tn).<br><br>La zone proposée inclue plusieurs espèces figurant sur la liste des espèces menacées et en danger celle des espèces dont l'exploitation est réglementées) de la Convention de Barcelone (Annexes II et III du Protocole ASP/BD) (www. RAC SPA. org).<br><br>La zone considérée est déterminante pour la survie du corail rouge Corallium rubrum (ECOVALOR/AIC, 1997).</td></tr>
<tr><td>Vulnérabilité, fragilité, sensibilité ou récupération lente</td><td>Aires contenant une proportion relativement élevée d'habitats, de biotopes ou d'espèces sensibles, qui sont fragiles sur le plan fonctionnel (hautement susceptibles d'être dégradés ou appauvris par les activités humaines ou par des phénomènes naturels) ou dont la récupération est lente</td><td></td><td></td><td></td><td>X</td></tr>
<tr><td colspan="6">Explication de classement<br>Les écosystème vulnérables de la Méditerranée sont rencontrés dans cette zone, per exemple : herbier (Laborel-Deguen et Laborel, 1977, Pergent et al., 1993, Boudouresque et al., 2006), Terrasses à vermets, l'écosystème à Corail rouge et le coralligène en général, des espèces à biochimie complexe comme la Pinna nobilis ou des espèces à inversion sexuelle très vulnérable comme Epinephelus marginatus, dont les densités de l'airesont parmi les plus importantes de la Méditerranée. Toutefois, la proximité de cette zone de la partie orientale de la Méditerranée l'expose aux risques liés aux espèces indo pacifiques qui pénètrent par le canal de Suez. Le cas de Caulerpa taxifolia qui est signalée en Tunisie dans la région de Bizerte Langar et al. (2002) et du scléractinaire à zooxanthelles encroûtant des substrats rocheux Oculina patagonica signalé à capo Negro (Galite, Tunisie) (Sartoretto et al., 2008).</td></tr>
<tr><td>Productivité biologique</td><td>Aires contenant des espèces, des populations ou des communautés dont la productivité biologique naturelle est supérieure à celle des autres aires</td><td></td><td></td><td></td><td>X</td></tr>
<tr><td colspan="6">Explication de classement<br>Parmi les points chauds de la chlorophylle apparaissent en Février au large de la côte orientale de l'Algérie. Ils sont susceptibles d'être corrélées à la surface divergence (Würtz, 2010). De même qu'une zone importante pour l'activité halieutique est mise en évidence dans le secteur de Bejaia, notament pour les petits pélagique, en particulier l'Anchois (Massuti et al., 2004).</td></tr>
<tr><td>Diversité biologique</td><td>Aires comprenant des écosystèmes, des habitats, des communautés ou des espèces ayant un niveau de diversité biologique</td><td></td><td></td><td>X</td><td></td></tr>
</table>

[14] http://www.apal.nat.tn/infoglueDeliverWorking/digitalAssets/222_ZS_Capnegro-serrat.pdf http://testing.rac-spa.org/la_galite http://www.apal.nat.tn/infoglueDeliverWorking/ViewPaged383.html?siteNodeId=32&languageId=4&contentId=-1.

| | | | | | |
|---|---|---|---|---|---|
| | supérieur à celui des autres aires, ou qui présentent une diversité génétique plus élevée | | | | |
| **Explication de classement**<br>Les différentes études réalisées sur cette portion de la côte montre une diversité spécifique et écosystémique élevée. La quasi totalité des habitats marins et côtiers remarquables décrits en Méditerranée sont rencontrés dans cette zone. La présence d'au moins cinq des hot spot connus au sud de la Méditerranée, d'une ASPIM (aire marine de Taza – Banc des Kabyles) (http://testing.rac-spa.org/banc_des_kabyles). | | | | | |
| **Caractère naturel** | Aires possédant un caractère naturel plus élevé que dans les autres aires, en raison du faible niveau ou de l'absence de perturbations ou de dégradations causées par les activités humaines | | | | X |
| **Explication de classement**<br>60 % de la zone littorale de cette aire, notamment le long de la côte algérienne est non urbanisée ou très faiblement urbanisé. Une partie importante, notamment de la zone frontalière n'est exposée à aucune source de pollution majeure avec une quasi absence d'unités industrielles. | | | | | |

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**Cartes et Figures**

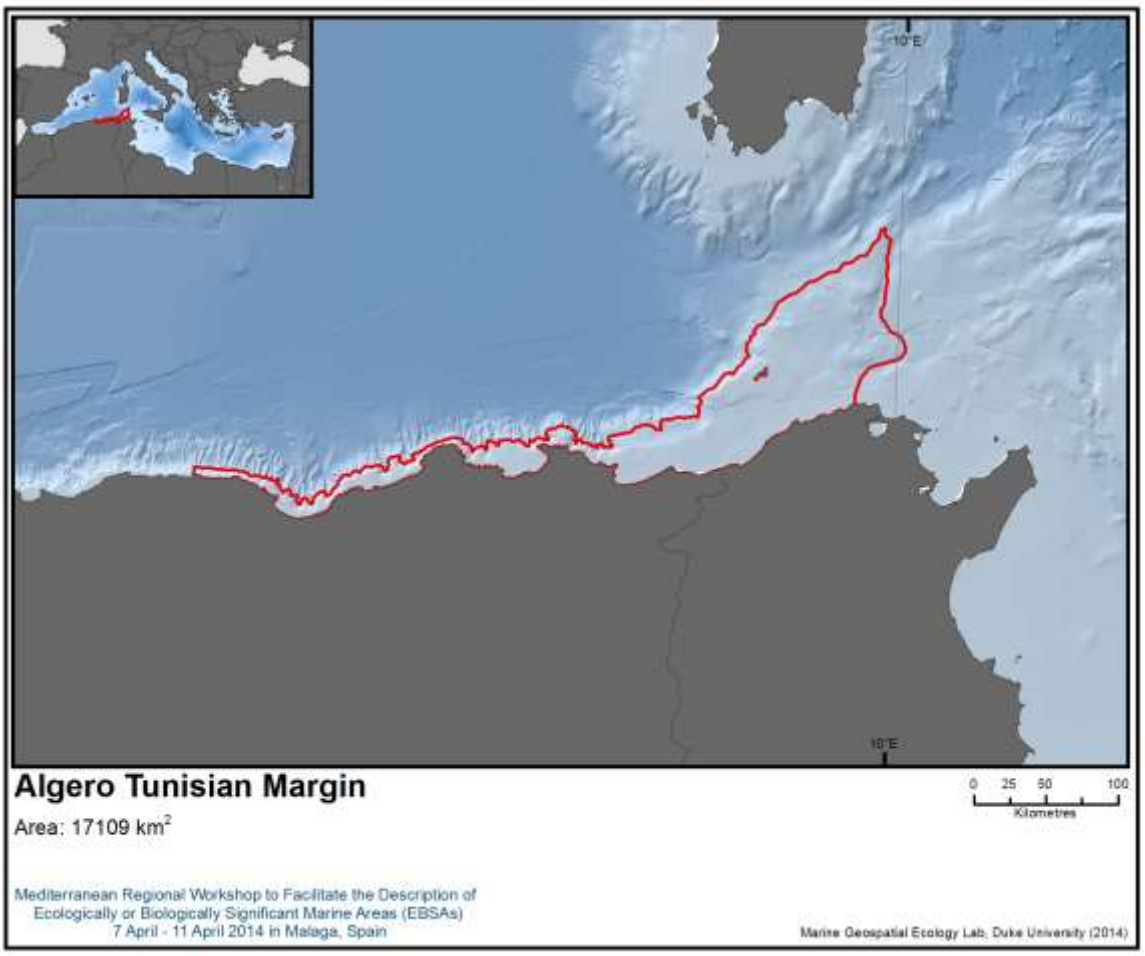


Figure 1. Carte de l'aire remplissant les critères AIEB.

## Area No. 5: Alboran Sea and Connected Areas

### Abstract

The area includes the Strait of Gibraltar, Alboran Sea and connected Spanish, Moroccan and Algerian areas towards the east, where 6 SPAMIs have been declared and one has been proposed (Alboran seamounts). The area has a complex hydrology due to the confluence of Atlantic and Mediterranean waters and the diverse seafloor geomorphology, with a heterogeneous shelf, various islands and a slope with abundant seamounts, submarine canyons and mound structures caused by fluid venting. These features facilitate the presence of a wide diversity of habitats and species, including a large proportion of endangered/vulnerable habitats and threatened species. Due to its geographical location, this biodiversity hotspot resulting from the confluence of typical Atlantic (European and north-western African) and Mediterranean species also contain several endemic species of invertebrates (Strait of Gibraltar and Alboran Sea) and marine-birds and a large number of species that they only occur in this part of the Mediterranean Sea. Moreover, it represents the obligatory pathway for migrations of large pelagics (bluefin tuna), sea turtles and marine mammals and an important and strategic biologically and ecologically significant area for breeding and feeding of several threatened cetaceans and marine birds.

### Introduction

The area (figure 1) is located in the westernmost part of the Mediterranean Sea, between Spain, Morocco and Algeria, covering an area of ca 250,000 km$^2$. The depth range spans between 0 and ca. 3300 m, with an average of ca. 2500 m (UNEP-MAP-RAC/SPA 2010b). The circulation pattern is very complex in the Alboran Sea where surface and recent Atlantic Waters (AW) that form 2-3 anticyclonic gyres, and near-bottom Western Mediterranean Deep Waters (WMDW) promote a high oceanographic heterogeneity and the presence of upwellings (IEO-MAGRAMA 2012a; IUCN, 2012, and references therein).

The general information reported for this area is based on scientific documents (publications, conference proceedings), reports from different Spanish and international institutions and organizations (MAGRAMA, IEO, Universities, CSIC, Oceana, MARUM, IUCN, WWF, Greenpeace, etc.) and recent projects and assessments (e.g., INDEMARES, DEEPER, IDEADOS, MEDITS, Marine Strategy Framework Directive initial evaluation, MATE-CNL/FFEM/CdL Project/2006-2013). Some model outputs indicate that there is high productivity, high biodiversity and high proportion of endangered and vulnerable species in this area, and that it represents an area of importance for marine mammals, sea turtles and marine birds within the Mediterranean (Coll et al., 2010; IEO-MAGRAMA-SEO, 2012; and IEO-MAGRAMA-CSIC et al., 2012).

### Location

The area includes the Strait of Gibraltar, Alboran Sea and connected Spanish, Moroccan and Algerian areas towards the east, where 6 SPAMIs have been declared and one has been proposed (Alboran seamounts). The limits of the area are defined by the western boundary of the Barcelona Convention and RAC/SPA, and to the east by a line joining Cape of Aguilas (Spain) to the area near Orán (Algeria). ACCOBAMS has proposed an area of importance for marine mammals with a similar geographical scope of this area.

### Feature description of the area

The Alboran Sea represents the westernmost part of the Mediterranean Sea and is mainly located between Spain, Algeria and Morocco, covering an area that spans 180 km in width and ca. 350 km in length. The limits of the area are defined to the west as proposed by the Barcelona Convention and RAC/SPA, and to the east with a line joining Cape of Aguilas (Spain) to (Algeria) (35°36′N 1°12′W). The average depth is 445 m, with a maximum depth of ca. 1,500 m in its eastern part. An arc of mountains, known as the Gibraltar Arc, wraps around the northern, western, and southern sides of the Alboran Sea. The Gibraltar Arc is made up of the Baetic Cordillera of southern Spain and the Rif Mountains of Morocco. The circulation pattern is very complex and displays seasonal variation reflecting the interesting water balance between the Mediterranean Sea and the Atlantic Ocean (IEO-MAGRAMA et al., 2012a and references

therein). Within the Mediterranean basin,water evaporation increases the salinity of the water mass compared to the water from the Atlantic input through the Strait of Gibraltar. The upper layer of the Alboran Sea is influenced by the swift Atlantic current that forming two anticyclonic gyres, namely western Alboran Gyre (WAG) and the eastern Alboran Gyre (EAG). The circulation exhibits considerable variability, characterized by the stability of the two–gyre system in the summer months, and by a coastal jet sometimes called the Algerian Current flowing close to the African shore in the winter. This water mass, which is known as the Atlantic Surface Water mass (ASW) and occurrs down to 150-200 m depth with temperatures ranging 9-16°C and salinity values increasing towards the east between 36.2-36.6‰. In the Alboran Sea, the M.A.W. forms two anticyclonic eddies (Gascard and Richez, 1985): Western vortex (permanent) and East vortex (occasional). The modified Atlantic water flows from the Spanish coast (2 ° W) to the Algerian coast (1 ° W) in the form of an intense jet. This is the origin of the Almeria-Oran Front (Arnone et al., 1990). The front Almeria-Oran is a hydrological structure composed of an Atlantic jet, an anticyclonic eddy and the surrounding Mediterranean waters (Andersen et al, 2004.). The length of this does not exceed more than 200 km. Its width is of the order of 20 km. Its thickness varies between 150 m and 200 m (Prior et al., 1993). Furthermore, the productivity level, high biomass chlorophyll were measured (up to 23 mcg L-1) (Prieur et al., 1993). It is useful to recall that Mediterranean waters in the surrounding content of chlorophyll a was 0.5 mcg (Prior et al., 1993).

The Mediterranean Intermediate Water (MIW) mass flows towards the west at 200-700 m depth with a salinities of ca 38‰ and temperatures of ca. 13°C. At the bottom or below 1,000 m depth, the Western Mediterranean Deep Water (WMDW) flows towards the Strait of Gibraltar with salinities of 38.4‰ and temperatures of 12.7 °C. Due to its density, the water sinks to the lower depths of the Alboran Sea and flows out into the Atlantic Ocean through the Strait of Gibraltar.

Different areas of the northern and southern Alboran Sea display high levels of primary production due to upwelling (Sarhan et al. 2000; UNEP-MAP-RAC/SPA 2010b; IEO-MAGRAMA et al., 2012a). These areas also contribute to high productivity of zooplankton and ichtyoplancton, including spawning and nursery areas of important commercial species (e.g. small pelagics) (STCEF 2006). The Alboran Sea also represents an area of high biological productivity at different levels, promoted by the presence of nearly permanent upwellings in the north-western part of the basin (Sarhan et al., 2000). Unlike the Mediterranean Sea, which is generally considered an oligotrophic (low primary productivity) basin, the Alboran Sea is considered one of the highest centers of productivity in the Mediterrranean Basin. The water flow, leaving the Alboran, restructures itself along the Algerian coast, mainly due to the Coriolis effect and remains along slope. During the winter, wind forcing maintains downwelling close to the African coast, where relatively small and short-lived anticyclonic eddies characterize AW circulation. Chlorophyll hotspots appear in February off the eastern coast of Algeria (IUCN 2012).

The submarine geomorphology of the area is very complex with the presence of 2 main basins (Alboran and Algerian) and a narrow shelf (generally less than 20 kms from the coast) and a slope that can be abrupt, intermediate or progresive depending on its inclination (IEO-MAGRAMA, 2012 a,b). The shelf is heterogeneous and includes prodeltaic structures (linked to rivers), rocky outcrops that can be in some cases of volcanic origin (e.g. in front of Cape of Gata) and different types of carbonate shelves composed of Maërl (e.g., Cape of Gata, Alboran Island) (Ballesteros, 2006; Templado et al., 2006; IEO-MAGRAMA 2012 a,c). The slope display a wide variety of submarine structures such as different submarine canyons of different sizes (including those of the Alboran Ridge) (Würtz 2012), seamounts of different relieves (Djibouti Bank, Alidade Bank and Yusuf ridge) (DEEPER 2010; IUCN 2012; UNEP-MAP-RAC/SPA 2010b; Palomino et al., 2012), several carbonate mounds of different origin (Lo Iacono et al., 2008; Hebbeln et al., 2009; Pardo et al., 2011), submarine structures caused by fluid emissions such as pockmarks and mud volcanoes (Somoza et al. 2012 Soto et al. 2010; Hilário et al., 2011; Gennari et al. 2013) as well as contouritic systems resulted from the strong deep near bottom water currents (Hernández-Molina et al., 2011; Palomino et al., 2011). This wide variety of submarine structures in both the shelf and the slope in such a representative area as it is the Alboran Sea and its connected areas (Strait of Gibraltar and Gulf of Vera towards Algeria) promotes a wide diversity of substrate types and therefore

of habitats and associated biota, resulting in ecosystems that are rich in species and in ecological interactions (Templado et al., 2012; IEO-MAGRAMA, 2012 a,c).

A high number of habitats that are rare or threatened within the Mediterranean and Atlantic Ocean occur in this area because some habitat forming species only occur in this area of the Mediterranean Sea (Barea Azcón et al. 2008; Templado et al. 2012). In the outer shelf, besides the occurrence of important seagrass beds of 4 seagrass species (including the westernmost populations of *Posidonia oceanica*) and macroalgal beds of a wide variety of species (from kelps of the threatened species *Laminaria ochroleuca* to small coralline turfs), other threatened, sensitive, productive and biodiverse habitats increment the seafloor diversity such as coralligenous bottoms dominated by corals (e.g. *Corallium rubrum, Dendrophyllia ramea, D. cornigera*) (e.g. Alboran platform and rocky bottoms along the shelf), gorgonians of Atlantic (e.g. *Leptogorgia lusitanica, Eunicella verrucosa*), north-western Africa (e.g., *Eunicella labiata, E. gazella, Elisella paraplexauroides*) (only mediterranean populations in Alboran Sea locations) and Mediterranean affinity (e.g. *Paramuricea clavata*) (Strait of Gibraltar, Alboran shelf), sponges of different affinities (e.g. *Asconema setubalense* that does not occur in other Mediterranean areas) as well as a wide variety of sedimentary habitats such as sea-pen dominated communities, sponge communities with rare species, facies of crinoids (e.g. *Leptometra phalangium*) and maërl beds (Ballesteros, 2006; STCEF, 2006; Barea Azcón et al., 2008; Oceana, 2008; García Raso et al., 2010; IEO-MAGRAMA, 2012a,c; Templado et al., 2012; Lo Iacono et al., 2012; Sitjá and Maldonado, 2014).

In the slopes of the Alboran Sea, a wide variety of threatened and rare habitats also occur such as (1) cold-water coral reefs (dominated by *Madrepora oculata*, *Lophelia pertusa*, *Dendrophyllia cornigera*) (e.g. Strait of Gibraltar, Djibouti Bank, Chella Bank, Cabliers Bank), (2) giant deep-sea oyster aggregations (*Neopycnodonte cochlear*) (e.g. El Idrissi Bank), (3) Deep-sea sponge aggregations (e.g. Alboran platform, Chella Bank, Djibouti Bank), (4) Gorgonian and black coral gardens (e.g. Chella Bank), (5) compact muds with seapens or with bamboo corals (*Isidella elongata*) (e.g. throughout the sedimentary bottoms of the area) and (6) cold seeps displaying chemosynthetic communities (e.g. mud volcanoes Alboran Sea) (Alvarez-Pérez et al., 2005; STCEF, 2006; Hebbeln et al., 2009; Oceana, 2008, 2010; DEEPER, 2010; Hilário et al., 2011; IUCN 2012; Pardo et al., 2011; Templado et al., 2012; IEO-MAGRAMA, 2012 a,c; Gori et al., 2013; Sitjá and Maldonado, 2014). Some of these habitats are common components of the seamounts, submarine canyons and cold seeps that occur in the Alboran Sea and are very sensitive to anthropogenic activities (e.g., fisheries).

As mentioned before, in the area, the mixing of Atlantic and Mediterranean waters promote an area of confluence of fauna and flora that results in a high biodiversity, where more than 60 subtropical components from north-western Africa also display their single European and Mediterranean populations (Barea Azcón et al. 2008; Rueda et al. 2010). Moreover, several endemic species occur mainly in some locations (Strait of Gibraltar and Alboran Sea) or in deep-sea submarine structures throughout the IMS (e.g. deep shelf of Alboran Island, mud volcanoes) (Gofas 1998; Peñas et al. 2006; Sitjá and Maldonado 2014). Due to its geographical location, the exceptional biodiversity of marine flora and fauna compared to other parts of European Seas and also to other areas of the Mediterranean Sea isnotable in the Alboran Sea and other connected areas (e.g. Strait of Gibraltar, Algerian coast). Indeed, several species that are well-represented in the area are rare in other parts of the Mediterranean and Atlantic (Templado et al. 1993; Gil de Sola 1994; Flores-Moya et al. 1995; Salas 1996; Abelló et al. 2002b; González and Sánchez 2002; Luque and Templado 2004; Peñas et al. 2006; Barea Azcón et al. 2008; Hebbeln et al. 2009; Coll et al. 2010; García-Rodríguez et al. 2011; Gofas et al. 2011; Bradai et al. 2012; IEO-MAGRAMA 2012a, c; Sitjá and Maldonado, 2014). More than 70% of the threatened Mediterranean marine flora and fauna display important populations in the Alboran Sea, including typical shelf (e.g. seagrasses, *Corallium rubrum, Patella ferruginea, Astroides calycularis, Centrostephanus longispinus, Cymbula nigra* and 95% of mollusc species included in the UNEP-MAP, etc.) and slope occurring species (e.g. Cold-water corals, antipatharians, *Errina adspera*) as well as large vertebrates (Barea Azcón et al. 2008; Coll et al. 2010; IEO-MAGRAMA 2012 a, c).

Another important feature of the "Alboran Sea and connected areas" is that it represents a compulsory area for the migratory pathway of different species of tuna, cetaceans and sea turtles entering from the Atlantic to the western Mediterranean, through the Strait of Gibraltar, and represent an important feeding area for some of these threatened vertebrates (Camiñas 2004; De Metrio et al. 2005; IEO-CSIC-MAGRAMA et al. 2012; IEO-SEO-MAGRAMA et al. 2012; Aranda et al. 2013). The loggerhead turtle *Caretta caretta* is another important migratory species considered as being extinction threatened under the Habitat Directive, Barcelona Convention, Convention of Migratory Species and included in the IUCN red list of threatened species. There are important populations of the loggerhead turtle in the Alboran Seas as well as migratory movements and important foraging within the IMS area (Camiñas 2004; Casale et al. 2007; Eckert et al. 2008; IEO-MAGRAMA 2012a,c).

A high degree of marine mammal biodiversity is also found in the Alboran Sea and connected areas (12 spp of cetaceans recorded so far) and specific portions of the area are important for breeding or foraging such as the Straits of Gibraltar for killer whales (*Orcinus orca*) and sperm whales (*Physeter macrocephalus*) and the Alboran Sea shelf areas for the short-beaked common dolphin (*Delphinus delphis*)and *Tursiops truncatus* - listed in Annex II Habitat Directive, open-sea areas for *Ziphius cavirostris* or in both shelf and open sea areas for pilot whales (*Globicephala melas*) (IEO-CSIC-MAGRAMA et al. 2012). The short-beaked common dolphin merits particular attention, because its population in the Alboran Sea is one of the healthiest in the Mediterranean, after a dramatic decline in most of its Mediterranean range (Forcada et al 2004; Notarbartolo di Sciara, 2002; Cañadas et al. 2005; Cañadas and Hammond, 2008; IEO-CSIC-MAGRAMA et al. 2012). There are some records of the presence of monk seal (*Monachus monachus*) in the southern Alboran Sea (e.g. Chafarinas Islands, Habibas Island, Rachoun Island), but no current detailed information on their populations is available (IEO-MAGRAMA 2012a).

As for other migratory species, the Strait of Gibraltar-Alboran area is important for the migratory movements (from the Atlantic to the Mediterranean and from Europe to Africa), feeding and breeding of more than 20 marine bird species, including 7 threatened species (SEO/BirdLife 2012; Paracuellos and Jérez 2003; Paracuellos and Nevado 2003). Two of these threatened species, the Audouin's gull (*Larus audouinii*) and the Balearic shearwater (*Puffinus mauretanicus*), are endemic of the area and productive areas within the area, such as the Alboran Sea and that between Ebro Delta and Balearic Islands are of high importance for feeding (on small pelagic fishes) and breeding at different seasons of these two migratory species (Abelló et al. 2003; Louzao 2006; Arcos 2009; IEO-SEO-MAGRAMA 2012). Subspecies of other marine birds (*Hydrobates pelagicus melitensis, Calonectis diomedea diomedea, C.d. borealis* and *Phalacrocorax aristotelis desmarestii*) also display important populations in this area, which is also of importance for wintering of other sensitive marine birds (García-Barcelona et al. 2010). The results of two recent Scopoli's shearwater counting schemes at both sides of the Strait of Gibraltar during autumn migration corroborate this major re-evaluation of the Mediterranean population size of the species. On the north side of the Strait, from 150,000 to 211,000 individuals were counted annually in October and November (from 2003 to 2008) migrating from the Mediterranean to the Atlantic (Programa MIGRES 2009). In the same months, more than 500,000 individuals were estimated to migrate annually (from 2005 to 2007) to the Atlantic off the southern coast of the Strait (Navarrete 2008).

**Feature condition and future outlook of the area**

The main anthropogenic impacts in the area are water pollution driven by the intensity of tourism in some coastal areas, fishing (e.g. bottom trawling, fishing lines) that has produced some impacts in certain habitat types and has also impacted sea turtles, cetaceans and seabirds, longline fishing, and shipping. According to the initial evaluation of the MSFD on the Spanish sector areas, the impact on the deep-sea and offshore habitats is not as high as in the shelf, and a low amount of information on this topic is still available for some areas (IEO-MAGRAMA et al. 2012a,c,e; IEO-SEO-MAGRAMA 2012; IEO-CSIC-MAGRAMA 2012). Some deep-sea areas are in very good conditions due to the low trawling activity and structural complexity of their habitats. The presence of alien species is not significantly higher than in

other parts of the Mediterranean Sea, but there is little information is available for deep-Sea alien species (Öztürk, 2010; Coll et al. 2010).

A number of projects, research programs, expeditions and sample processing from past projects are planned for this area such as INDEMARES, monitoring programs of the MSFD, MEDITS surveys, and programs of the Andalusian and Spanish Governments. Demersal stocks and environmental quality evaluation surveys are conducted by the Algerian government. Monitoring programs by are conducted by the Algerian Observatory of Environment and Suistanable development and implementing the national Action Plan for MPAs that 3 concern the Alboran Sea by the Algerian National Conservatory of Coastal. There has been cooperation between the Algerian government and the Spanish Institute of Oceanography for pelagic evaluation of stocks in Algerian waters.

**Assessment of the area against CBD EBSA criteria**

| **CBD EBSA criteria** (Annex I to decision IX/20) | **Description** (Annex I to decision IX/20) | **Ranking of criterion relevance** (please mark one column with an X) | | | |
|---|---|---|---|---|---|
| | | **No information** | **Low** | **Medium** | **High** |
| **Uniqueness or rarity** | Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features. | | | | X |
| *Explanation for ranking*<br>There are several endemic invertebrate species at both sides of the Strait of Gibraltar (Gofas, 1998) and around 60 spp. that only occur in this part of the Mediterranean (Rueda et al. 2010; IEO-MAGRAMA 2012c; Barea-Azcón et al., 2008). Several threatened species belonging to Annex II of UNEP-MAP, such as *Corallium rubrum, Patella ferruginea, Errina aspera, Astroides calycularis, Centrostephanus longispinus, Asterina pancerii, Cymbula nigra* and cold-water corals (occurring in seamounts), among others, are present in this area (Barea-Azcón et al. 2008). It is also an area of importance for the endemic Audouin's gull and Balearic shearwater (IEO-SEO-MAGRAMA, 2012). The mud volcanoes occurring in the area contains cold seeps (mud volcanoes) with chemosynthetic communities (Hilário et al., 2011) | | | | | |
| **Special importance for life-history stages of species** | Areas that are required for a population to survive and thrive. | | | | X |
| *Explanation for ranking*<br>The area is important for migratory movements and/or feeding of sea-turtles, bluefin tuna and other large pelagic fishes (Camiñas 2004; De Metrio et al. 2005; IEO-CSIC-MAGRAMA et al. 2012; IEO-SEO-MAGRAMA et al. 2012; Aranda et al. 2013). Endemic marine birds such as Audouin's gull and Balearic shearwater use the area for feeding and breeding or just for feeding respectively (IEO-SEO-MAGRAMA, 2012). The area contains one of the healthiest population of short-beaked common dolphins, and other cetaceans use the area for foraging, especially the Straits of Gibraltar for killer whales (*Orcinus orca*) and sperm whales (*Physeter macrocephalus*) (IEO-CSIC-MAGRAMA et al. 2012). | | | | | |
| **Importance for threatened, endangered or declining species** | Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species. | | | | X |

| | | | | | |
|---|---|---|---|---|---|
| **and/or habitats** | | | | | |
| *Explanation for ranking*<br>More than 70% of the threatened Mediterranean marine flora and fauna (based on the Annex II by UNEP-MAP) display important populations in the Alboran Sea and conected areas (when compared to the rest of the Mediterranean), including typical shelf (e.g. seagrasses, *Corallium rubrum, Patella ferruginea, Astroides calycularis, Centrostephanus longispinus, Cymbula nigra* and 95% of mollusc species included in the UNEP-MAP, etc.) and slope occurring species (e.g. Cold-water corals, antipatharians, *Errina adspera*) as well as large vertebrates (Audouin's gull and Balearic shearwater). Among a large list of sensitive Mediterranean habitats (e.g. coralligenous bottoms, seagrass meadows of 4 different species, kelp beds, vermetid terraces, insularic ecosystems, cold-water coral banks) also occur in locations of the Spanish, Moroccan and Algerian coasts (IEO-MAGRAMA, 2012a,c; IUCN, 2012 and references therein). Caves are highly abundant throughout the coastline of continental and insularic margins and they provide potential habitat for monk seal recolonization (IUCN 2012). | | | | | |
| **Vulnerability, fragility, sensitivity, or slow recovery** | Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery. | | | | X |
| *Explanation for ranking*<br>Several habitats and invertebrate species with low growth rates (e.g. cold-water corals, antipatharians, bamboo corals, large desmosponges and hexactinellids, deep-sea oysters, *Posidonia oceanica*, coralligenous sessile species), as well as vertebrates vulnerable to anthropogenic activities (e.g. Delphinus delphis, Audouin's gull) occur in the area (IEO-MAGRAMA, 2012a,c; IUCN, 2012 and references therein; Camiñas 2004; De Metrio et al. 2005; IEO-CSIC-MAGRAMA et al. 2012; IEO-SEO-MAGRAMA et al. 2012; Aranda et al. 2013). | | | | | |
| **Biological productivity** | Area containing species, populations or communities with comparatively higher natural biological productivity. | | | X | |
| *Explanation for ranking*<br>Different areas of the northern and southern Alboran Sea display high levels of primary production due to the presence of upwellings. These areas also support high productivity of zooplankton and of ichtyoplancton, including spawning and nursery areas of important commercial species (e.g. small pelagics) (Sarhan et al., 2000; UNEP-MAP-RAC/SPA, 2010b; IEO-MAGRAMA et al., 2012a). The Alboran Sea also represents an area of high biological productivity at different levels, promoted by the presence of nearly permanent upwelling in the north-western part of the basin but other areas display similar productivity levels than in the Mediterranean. | | | | | |
| **Biological diversity** | Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity. | | | | X |
| *Explanation for ranking*<br>The mixing of Atlantic and Mediterranean waters promotes an area of confluence of fauna and flora that results in a high biodiversity where more than 60 subtropical components from subtropical north-western Africa also display their single European and Mediterranean populations (Templado et al. 1993; Gil de Sola 1994; Flores-Moya et al. 1995; Salas 1996; Abelló et al. 2002b; González and Sánchez 2002; Luque and Templado 2004; Peñas et al. 2006; Barea Azcón et al. 2008; Hebbeln et al. 2009; Coll et al. 2010; García-Rodríguez et al. 2011; Gofas et al. 2011; Bradai et al. 2012; IEO-MAGRAMA 2012a, c; Sitjá and Maldonado, 2014; Rueda et al. 2010; García Raso et al. 2010; IUCN 2012). | | | | | |
| **Naturalness** | Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or | | | X | |

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|---|---|---|---|---|---|
| | degradation. | | | | |
| *Explanation for ranking*<br>Some shelf areas are exposed to intense trawling and pollution but some slope areas and islands (Alboran, Habibas) and coastal locations (Cape of Gata) are less degraded. There is an increasing number of Marine Protected Areas that may improve the naturalness of the area (IUCN 2012; IEO-MAGRAMA 2012 a,c). | | | | | |

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**Maps and Figures**

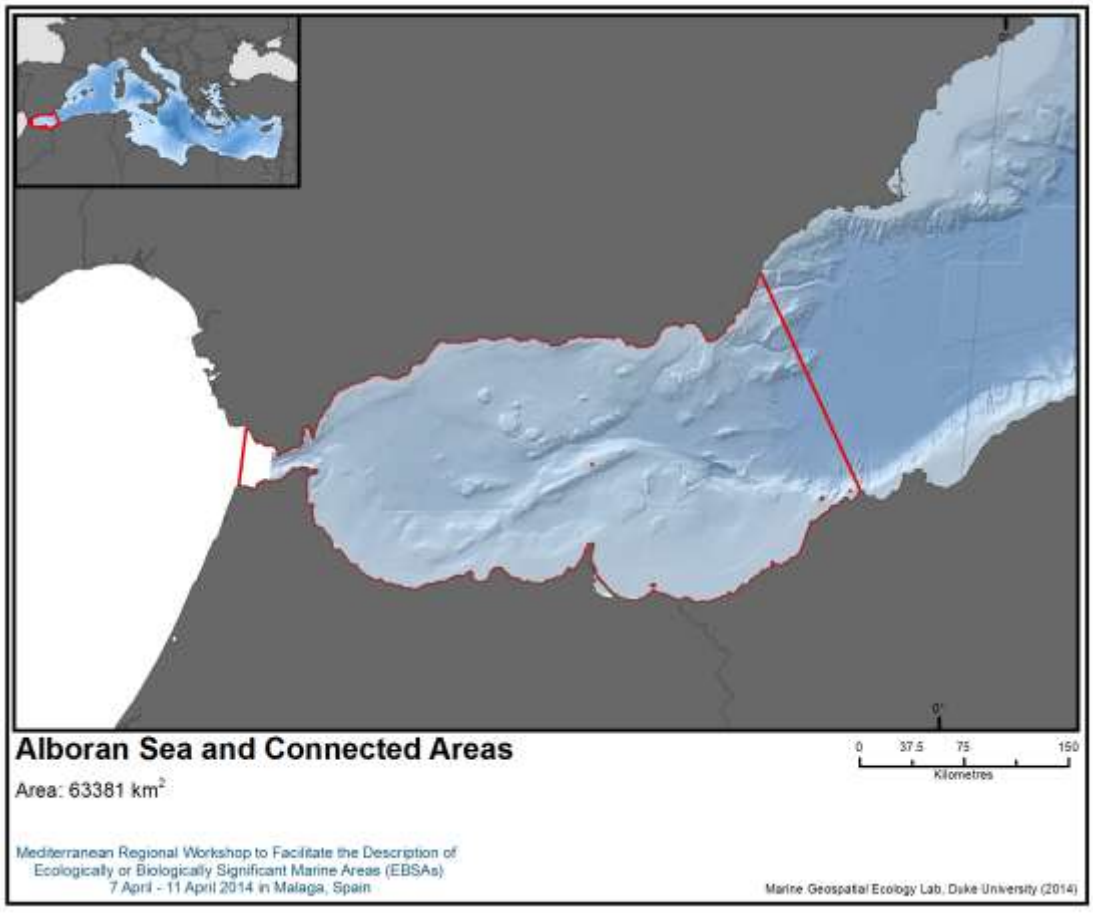


Figure 1. Area meeting the EBSA criteria.

## Area No. 6: North-Western Mediterranean Pelagic Ecosystems

### Abstract

The area is characterized by a set of geomorphological and oceanographic characteristics which enable it to host marine mammal species at comparatively exceptional levels of species diversity and abundance. The oceanography of the water masses in the area is at the base of its productivity and extraordinary biological and ecological significance. For some groups of large pelagics, including tuna and tuna-like species, the western Mediterranean represents an important reproduction and feeding area. Marine turtles (*Caretta caretta* and *Dermochelys coriacea*) from the Atlantic as well as *C. caretta* from the eastern and central Mediterranean are distributed in the northern part of the island and the Catalan Sea. The Balearic Islands represent an area of contact of the two turtle populations. The area also includes ca. 63 Important Bird Areas, with important populations of the endemic Balearic shearwater and Audouin's gull.

### Introduction

The area (figure 1) encompasses the Pelagos Sanctuary as well as 2 previously proposed SPAMIs such as the Gulf of Lion and the southern Balearic Islands. It also contains several SPAMIs and IBAs, based on the high ecological and biological value of the area. A central feature of the area is the Provencal-Corsican-Ligurian Basin, which is bordered by the Balearic sub-basin to the west, the European continental coastline with its Gulf of Lion and Ligurian Sea to the north, the Italian coastline and the Tyrrhenian Sea to the East, and the Algeria Sea to the south. The area also contains large islands, such as Corsica, the Balearic Archipelago, and the Tuscan Archipelago and a very wide area with coastal and open-waters that is important for migratory movements, feeding and breeding of different species of large pelagic fishes, such as bluefin tuna and swordfish, as well as threatened species of marine turtles (Logger head turtle), marine mammals and marine birds (Audouin's gull and Balearic shearwater).

### Location

The area is located from the southern Balearic Islands to the Ligurian Sea, included the Gulf of Lion and some part of the Tyrrhenian Sea.

### Feature description of the area

The area is characterized by a set of geomorphological and oceanographic characteristics which enable it to host marine mammal species at comparatively exceptional levels of species diversity and abundance. A central feature of the area is the Provencal-Corsican-Ligurian Basin, which is bordered by the Balearic sub-basin to the west, the European continental coastline with its Gulf of Lion and Ligurian Sea to the north, the Italian coastline and the Tyrrhenian Sea to the East, and the Algeria Sea to the south (Wurtz, 2010; Wurtz, 2012). The area also contains large islands, such as Corsica, the Balearic Archipelago, and the Tuscan Archipelago. The Balearic promontory is a major feature of the western Mediterranean Basin which is 348 km long, 105 km wide and elevated from between 1000 to 2000 m above the surrounding marine basins (Acosta et al., 2001a, 2002, 2004b). The Balearic Islands represent the natural boundary between two sub-basins of the Western Mediterranean and the Algerian sub basin (located in the southern part) and the Balearic basin (located to the north).

The oceanography of the water masses in the area is at the base of its productivity and extraordinary biological and ecological significance. Although the Mediterranean is generally considered an oligotrophic sea, the area (e.g., in the western Ligurian Sea (Cattaneo-Vietti et al., 2010)), is marked by a relatively high mesotrophic productivity with primary productivity peaks reaching up to 500 $gC/m^2$/year and above in summer, in correspondence of a frontal system known as the "Ligurian front." This productivity is caused by a variety of mechanisms of fertilization: the enrichment by coastal waters and submarine hydro contributions, doming, delayed effect of winter mixing bringing salt nutrients on the surface, frontal zone between coastal waters driven in the cyclonic flow and offshore waters, local upwelling phenomena associated with meso-scale vortices (100 km diameter), presence of the Ligurian-Provencal current and existence of complex flowing structures involving divergences and convergences. Current dynamics in the Balearic sub-basin are affected by atmospheric forcings (Hopkins, 1978) making

the Balearic region a transition zone where two important water masses with different physical, chemical and biological properties meet (García et al., 2006). The area is characterized by geostrophic circulation of water masses. Mesoscale eddies and convergent fronts arise as a result of the interactions of the circulating water with the obstructions posed by the islands (López-Jurado et al., 1995). The southern area generates regular anticyclonic eddies and represents a convergence zone and, therefore, a strong retention zone (Lòpez-Jurado et al., 2008). The southern area is also influenced by the instability of the Almeria-Oran front and by mesoscale features generated from the Algerian current (Millot, 2005). Blocking conditions can also be caused by the presence of large gyres located to the south of Ibiza and Formentera Islands. These gyres damp circulation through the channels and divert Atlantic surface waters towards Cabrera (south of Mallorca) and the Menorca Islands. In this area, very high salinity values (up to 38.6‰.) can be found in the intermediate layer. The surface waters forming the Balearic Currents are all of Atlantic origin but some are more recent Atlantic origin. The presence of both new and older Atlantic waters in the channels gives rise to ocean fronts that affect the ecosystem dynamics in the area. Moreover, the Mallorca and Ibiza channels play an important role in the regional circulation of this area and their topography conditions the water exchange between these two sub-basins (Pinot et al., 2002). Both hydrodynamic forces in the area as well as the complex topographic features in the Balearics determine its productivity.

An international sanctuary for the conservation of Mediterranean marine mammals – the Pelagos Sanctuary – was established by an international treaty among France, Italy and Monaco in 2001. In addition, other features in the area, both geomorphological (e.g., the Strait of Bonifacio, submarine canyons such as the Caprera and the Genoa canyons) and other oceanographic features such as the Tyrrhenian cyclonic gyre) concur with the Ligurian Front to the present areas especially suitable for hosting marine mammal species. The Pelagos Sanctuary area, complemented by an extension to the SE into the Tyrrhenian Sea, and another extension to the west encompassing the Gulf of Lion all the way to the Balearic sub-basin, are essential to the diet of many cetacean species in the western Mediterranean. During the winter, hydrological events produce a significant mixing of waters allowing the migration of nitrates, phosphates and silicates of lower strata to the euphotic layer. In the spring, there is an increase of water temperatures and a stabilization of the surface of the water masses. These phenomena facilitate a higher level of spring and summer primary productivity than the coastal area, particularly within the frontal zone where the observed productivity is relatively high throughout the year. The phytoplankton bloom begins in mid-April, lasts about six weeks and culminates in early May. The high level of primary productivity is critical to the structure of the upper levels of the food chain, particularly for tertiary consumers such as cetaceans, which are especially abundant in summer. A primary example is the case of the Euphausiacea that find in this production the necessary elements they need to grow. Thus, *Meganyctiphanes norvegica*, a boreal species, are in exceptional abundance in the summer but also in autumn. This bathypelagic crustacean is the only known source of food for fin whales during the summer in the Ligurian-Provencal basin. The Balearic sub-basin represents an essential area for the migratory, reproduction and/or nursery pathways of different species of large vertebrates as tunas, cetaceans, and sea turtles entering from the Atlantic to the western Mediterranean, through the Strait of Gibraltar. For some groups of large pelagic, including tuna and tuna-like species, the western Mediterranean represents an important reproduction and feeding area. Marine turtles (*Caretta caretta* and *Dermochelys coriacea*) from the Atlantic as well as *C. caretta* from the eastern and central Mediterranean are distributed in the northern part of the island and the Catalan Sea. The Balearic Islands represent an area of contact of the two turtle populations mainly for feeding, some of which are considered threatened species (Camiñas, 2004; De Metrio et al., 2005; IEO-CSIC-MAGRAMA et al., 2012; IEO-SEO-MAGRAMA et al., 2012; Aranda et al., 2013).

### *1. Pelagic Fish*

Bluefin tuna (BFT) (*Thunnus thynnus*) is of valuable commercial importance and the eastern Atlantic stock ranges from Iceland to Cape Blanco off the Moroccan coasts and the whole Mediterranean Sea. Migration towards the Mediterranean of large reproducers takes place during the reproductive season with

spawning mainly taking place in June (Rodríguez-Roda, 1967). BFT appear to exhibit spawning site fidelity in both the Mediterranean Sea and the Gulf of Mexico, the two main spawning areas which have been clearly identified (Block et al., 2005; Teo et al., 2007). Hence, adults born in the Mediterranean Sea return to the western and central areas to spawn. The southern Balearic area is considered one of the most important spawning sites for the stock along with others which have been identified in Sicilian waters and in the eastern basin off the coasts of Turkey and northern Cyprus (García et al., 2003; Karakulak et al., 2004).

It is thought that the complex hydrodynamic regime which exists around the Balearic Islands, particularly the southern part, resulting from the interaction between the inflowing surface Atlantic water masses (AW) and Mediterranean surface waters (MW), plays a key role in the spawning of BFT (García et al., 2003; Alemany et al., 2005, 2006, 2007). Past surveys on BFT spawning behavior off the Balearic archipelago imply that BFT favors the low salinity (Atlantic waters) and a specific temperature range of (23-25ºC) (Bernal and Quintanilla, 2005; García et al., 2003) making the Balearic Sea conditions close to ideal for BFT spawning. Data showing the position of vessels targeting bluefin tuna in the Mediterranean made available by the ICCAT Scientific Committee supports the importance of this area as a spawning ground for the species (ICCAT Secretariat Report on Statistics and Coordination of Research, 2011; figure 2).

A recent survey conductedoff the eastern coast of the Mallorca Islands found considerable numbers of billfish larvae (Alemany et al., 2006). Other pelagic species that are also known to reproduce in summer around the Balearic Islands include albacore (*Thunnus alalunga*), common dolphinfish (*Coryphaena hippurus*), small tuna such as frigate tuna (*Auxis* spp.), little tunny, skipjack tuna, Other large scombroids breeding in the area include Swordfish (*Xiphias gladius*) and *Tetrapturus* spp. (Alemany et al., 2006). Small pelagic species spawning in these waters include anchovy (*Engraulis encrasicolus*) and round sardinella (*Sardinella aurita*).

***2. Sharks***

A total of 71 species of cartilaginous fishes live and breed in the Mediterranean and many of these are present in the Balearic region (Cavanagh and Gibson, 2007). For many species, there is very little information available. Aggregations of basking shark (*Cetorhinus maximus*) have been observed in the northern Balearic region (Walker et al., 2005). A strong correlation between the presence of *C. maximus*, chlorophyll concentration and prey abundance in these areas indicates that they are important feeding sites (Sims, 2003; Sims et al., 2003).

***3. Marine turtles***

The Balearic Archipelago is an important developmental habitat for loggerhead turtles from Atlantic and Mediterranean origin. The loggerhead turtle has a complex life cycle (Camiñas and de la Serna, 1995; Carreras et al., 2004). Large numbers of late juvenile loggerhead turtles occur all year round off the Balearic Islands (Mejías and Amengual, 2001) while juvenile loggerhead sea turtles from rookeries located in the eastern Mediterranean and the north-western Atlantic use feeding grounds in the Western Mediterranean (Carreras et al., 2006) but there they experience high levels of attrition due to long-line by-catch (Camiñas, 2004).

In addition, the monitoring conducted both by the French marine turtle network and in the framework of the PACOMM program has highlighted the strong presence of marine turtles in the area (figure 3; Oliver, 2010).

***4. Cetaceans***

Some of the above mentioned conditions attract many marine mammal fauna that gather to feed and breed. Marine mammals are currently only represented in the area by species of the Order Cetacea (the only other marine mammal historically present in the area, the Mediterranean monk seal *Monachus monachus*, has been extirpated, but could return in the future given the existence of appropriate habitat for this species).

Cetaceans regularly found in the area (figure 4) include (ACCOBAMS, 2010) :

- Fin whale, *Balaenoptera* physalus (ACCOBAMS, 2013). Most of the Mediterranean population spends significant amounts of the year in the area, mostly in water deeper than 1000 m. The area contains a major feeding ground but newborn animals are also frequently seen here.
- Sperm whale, *Physeter macrocephalus*. The population is represented here both by social units (females with young), mostly around the Baleares but as of recent also in the Ligurian Sea, and by solitary males. Whales frequent preferably slope areas, however they can also be found in deeper waters. Recent studies have proven that waters around the Balearic Island, especially in the deepest waters, around canyons and in the Emile Baudot Escarpment, are key areas for the Mediterranean sperm whale population. The results from these studies show that both male and female meet in this part of the western Mediterranean. The area is used by this endangered population of some 300 individuals (Brotons et al., 2013), not only as a feeding ground but also as a breeding site (Pirotta et al., 2011; Drouot et al., 2004).
- Cuvier's beaked whale, *Ziphius cavirostris*. The area contains beaked whale "hotspots" including the Genoa canyon, the Caprera canyon, west Sardinia and areas north of the Balearic Islands, normally in depths >600 m. Animals are found there year-round, and it contains both feeding and breeding grounds.
- Long-finned pilot whale, *Globicephala melas*. Found here in deep waters, with a decreasing frequency of occurrence from the Baleares eastwards. Large groups often include young and even newborn individuals, indicating that the area may be important both for feeding and breeding.
- Risso's dolphin, *Grampus griseus*. Distribution of this species in the area is largely limited to steep slopes. Individuals live in small to medium groups and this species is found permanently in the area.
- Common bottlenose dolphin, *Tursiops truncatus* (ACCOBAMS, 2012). Found mostly over the continental shelf throughout the area, with areas of greater density including the Tuscan shelf, western Corsica, north-eastern and north-western Sardinia, areas of the shelf off the continental coast of France, and around the Baleares.
- Striped dolphin, *Stenella coeruleoalba*. A mostly pelagic species, common throughout the area in waters >1000 m.
- Short-beaked common dolphin, Delphinus delphis. Rare throughout the area, except to the NW of Sardinia (ACCOBAMS, 2004).

In addition to species of marine mammals present throughout the year, other marine mammals are sighted around the Balearic Islands, and these waters may be important to these species as possible feeding and mating ground. The fin whale is the largest free-ranging predator found in the Mediterranean Sea. Recent studies (Cotté et al., 2009) suggest that fin whales have a year round presence to the north of the Balearic Islands with winter distribution patterns being more dispersed. It appears that whales were observed mostly within the mean cyclonic circulation in the northern part of the Western Mediterranean, limited to the north by the Northern Current and to the south by the North Balearic front (Rio et al., 2007). This species is known to favor upwelling and frontal zones with high zooplankton concentrations. In the Mediterranean Sea, the sperm whale mostly inhabits the continental slope waters where mesopelagic cephalopods, the species' preferred prey, are most abundant (Reeves and Notarbartolo, 2006). Genetic data suggest that sperm whales in the Mediterranean constitute a separate population (Drouot et al., 2004).

### *5. Marine birds*

**Important for Life-history stages - high:** The area includes ca. 63 Important Bird Areas, with global criteria and thresholds met on 87 occasions, and regional criteria and thresholds an additional 89 times (figure 5). These sites have been designated for 18 species and together contain roughly half a million

individuals. Exact areas of highest usage vary between species, colonies and life-history stages, but taken together encompass much of the area defined.

*Breeding*

The area is used by birds as a key feeding area during the breeding season, being used during various life history stages including during incubation, brooding and chick rearing – critical periods in the reproductive cycle. This area is the most important area globally for the Critically Endangered Balearic shearwater, with the entire global population, 3000 pairs in 2009 (Arcos et al., 2011), breeding on cliffs and small islets in the Balearic islands. Breeding takes place between February and June (Ruiz and Martí 2004). When raising young, adult birds form feeding concentrations off the east coast of Spain (Arcos and Oro 2002), where they mostly inhabit the productive continental shelf and associated fronts where high prey concentrations occur around the Ebro Delta (Louzao *et al*., 2006b).

The area is also key to the Near Threatened Audouin's gull, with the Ebro Delta colony alone holding 67% (14,177 pairs) of the global population in 2007 (Gutiérrez and Guinart, 2008). The species primarily forages in coastal and continental shelf areas, with 30% of birds within 15 nautical miles (nm) and 80% within 30 nm of colonies. Juveniles tend to forage in upwelling zones, whereas subadults and adults are more independent of these sites (Martinez-Abrain et al., 2002).

Other species breeding and feeding in globally significant numbers include black-headed gull, gull-billed tern, little tern, Mediterranean gull, Scopoli's shearwater, sandwich tern, slender-billed gull, Yelkouan shearwater, and yellow-legged gull. Species breeding in regionally significant numbers include the Mediterranean subspecies of European shag and European storm-petrel (the latter may warrant full species status) and common tern (BirdLife, 2013).

Extensive tracking data studies have been conducted on several of the key species from several colonies over multiple years, providing insights to their at-sea distribution and abundance in the marine environment. Scopoli's shearwater (n=153) have been tracked from breeding colonies in Mallorca, Menorca, Columbretas, la Maddalena and Tuscany which together hold >14000 individuals (up to 10% of the global population). Audouin's gull (n=63) have been tracked from breeding colonies in the Ebro Delta, Aire and Ibiza which together hold 40000 individuals (2/3 of global population). Balearic shearwater (n=26) have been tracked from breeding colonies in Ibiza, Menorca and Mallorca which together hold 6000 individuals (40% of the global population). Maps showing the distribution from tracking data are shown in the figures section (figures 6 to 8).

*Migration and non-breeding*

Most Balearic shearwaters leave the Mediterranean for a post-breeding moult in the Atlantic coast of south-west Europe, mainly Portugal, north-west Spain and the Bay of Biscay (Ruiz and Martí 2004, Ramírez et al., 2008, Arcos et al., 2009). Tracking data shows that other migratory seabirds which exit the Mediterranean during the non-breeding season also travel through the area, stopping to feed, before continuing their journey. Some species also travel here from other areas to spend the non-breeding season.

**Threatened Species - high:** Balearic shearwater (*Puffinus mauritanicus*) is listed as Critically Endangered by IUCN, and is also listed on Annex I of the EU Birds Directive and Annex of Barcelona Convention. Scopoli's shearwater (*Puffinus diomedea diomedea*) is about to be given full species status and is likely to be listed as Near Threatened by IUCN, and is already included on Annex I of the EU Birds Directive and the Annex of Barcelona Convention. Audouin's gull (*Larus audouinii*) is listed as Near Threatened by IUCN and is included on Annex I of the EU Birds Directive and the Annex of Barcelona Convention. The Yelkouan shearwater also occurs regularly in smaller numbers and is listed as Vulnerable by IUCN and is included on Annex I of the EU Birds Directive and the Annex of Barcelona Convention.

Other species found here listed under the Birds Directive and Barcelona Convention include gull-billed tern, little tern, Mediterranean gull, sandwich tern, slender-billed gull, Yelkouan shearwater and European storm-petrel. Annex II includes black-headed gull and yellow-legged gull.

**Vulnerability - medium:** The Balearic shearwater is a long-lived species and therefore immediate threats affect adult mortality rates. Adult survival is the main conservation concern, as this is unusually low for a Procellariiform (Oro et al. 2004). It is very philopatric, and lays only one egg. Adult birds do not commence breeding until their third year (Oro *et al.* 2004). Birds are susceptible to by-catch in fisheries (Louzao et al 2011) and have been shown to shift their non-breeding distribution due to sea surface temperature variations linked to climate change (Wynn et al, 2007; Yesou, 2003).

**Uniqueness – medium/high:** The area includes a number of seabirds that are endemic to the Mediterranean. The area includes the key breeding sites and feeding areas for the entire global population of Balearic shearwater and at least 70% of the global population of Audouin's gull. The area is also used extensively by the Mediterranean endemic subspecies of European shag and European storm-petrel.

**Feature condition and future outlook of the area**

One part of the area is within an international sanctuary established by a treaty. However, animals are under diverse pressures from humans, including: ship strikes (fin whale, sperm whale); noise (mostly Cuvier's beaked whale, but other species as well); fisheries interactions (common bottlenose dolphin, sea-turtles, birds); disturbance by intrusive whale watching (several species including fin and sperm whales off France); and chemical pollution (coastal dolphins).

**Assessment of the area against CBD EBSA criteria**

| **CBD EBSA criteria** (Annex I to decision IX/20) | **Description** (Annex I to decision IX/20) | **Ranking of criterion relevance** (please mark one column with an X) | | | |
|---|---|---|---|---|---|
| | | **No information** | **Low** | **Medium** | **High** |
| **Uniqueness or rarity** | Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features. | | | | X |
| *Explanation for ranking*<br>This area is the most important area globally for the Critically Endangered Balearic shearwater, with the entire global population, 3000 pairs in 2009 (Arcos et al., 2011), breeding on cliffs and small islets in the Balearic islands. Breeding takes place between February and June (Ruiz and Martí, 2004). When raising young, adult birds form feeding concentrations off the east coast of Spain (Arcos and Oro, 2002), where they mostly inhabit the productive continental shelf and associated fronts where there are high concentrations of prey around the Ebro Delta (Louzao *et al*., 2006b). The area is also key to the Near Threatened Audouin's gull, with the Ebro Delta colony alone holding 67% (14,177 pairs) of the global population in 2007 (Gutiérrez and Guinart 2008). The area includes a number of seabirds that are endemic to the Mediterranean. The area includes the key breeding sites and feeding areas for the entire global population of Balearic shearwater and at least 70% of the global population of Audouin's gull. The area is also used extensively by the Mediterranean endemic subspecies of European shag and European storm-petrel. | | | | | |
| **Special importance for life-history stages** | Areas that are required for a population to survive and thrive. | | | | X |

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|---|---|---|---|---|---|
| **of species** | | | | | |
| *Explanation for ranking*<br>The high primary productivity of the northern area supports a large population of fin whales in the Mediterranean (Reeves and Notarbartolo 2006). In addition, the area is used as a breeding ground for all the species which are regularly found there. The area is also used by birds as a key feeding area during the breeding season, containing the most important area globally for the Critically Endangered Balearic shearwater, with the entire global population, 3000 pairs in 2009, breeding on cliffs and small islets in the Balearic islands and they mostly inhabit the productive continental shelf and associated fronts where high prey concentrations occur around the Ebro Delta. The area is also key to the Near Threatened Audouin's gull, with the Ebro Delta colony alone holding 67% (14,177 pairs) of the global population in 2007. Other species breeding and feeding in global significant numbers include black-headed gull, gull-billed tern, little tern, Mediterranean gull, Scopoli's shearwater, sandwich tern, slender-billed gull, Yelkouan shearwater, and yellow-legged gull. Species breeding in regionally significant numbers include the Mediterranean subspecies of European shag and European storm-petrel (the latter may warrant full species status) and common tern (BirdLife, 2013). The southern Balearic area is of high importance for the spawning of bluefin tuna and other large and rare pelagic species (e.g. Lampridídae, *Trachipterus trachipterus, Zu cristatus, Lophotes lacepedei*) (Alemany et al., 2006; STCEF, 2006; Rodríguez et al., 2013) and also for foraging of loggerhead turtle (IEO-MAGRAMA et al., 2012d; Mejías and Amengual, 2001; García et al., 2003; Alemany et al., 2005, 2006; STCEF, 2006; Rodríguez et al., 2013) | | | | | |
| **Importance for threatened, endangered or declining species and/or habitats** | Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species. | | | | X |
| *Explanation for ranking*<br>The area supports Mediterranean cetacean subpopulations that have been classified by the IUCN Red List as Endangered (sperm whale, short-beaked common dolphin), and Vulnerable (fin whale, Cuvier's beaked whale, common bottlenose dolphin, striped dolphin). The area alsocontains important populations of the endangered loggerhead turtle and the threatened bluefin tuna. Balearic shearwater (*Puffinus mauritanicus*) is listed as Critically endangered by IUCN, and is also listed on Annex I of the EU Birds Directive and Annex of Barcelona Convention. Scopoli's shearwater (*Puffinus diomedea diomedea*). It is expected to be given full species status and is likely to be listed as Near Threatened by IUCN, and is already included on Annex I of the EU Birds Directive and the Annex of Barcelona Convention. Audouin's gull (*Larus audouinii*) is listed as Near Threatened by IUCN and is included on Annex I of the EU Birds Directive and the Annex of Barcelona Convention. The Yelkouan shearwater also occurs regularly in smaller numbers and is listed as Vulnerable by IUCN and is included on Annex I of the EU Birds Directive and the Annex of Barcelona Convention. Other species found here listed under the EU Birds Directive and Barcelona Convention include gull-billed tern, little tern, Mediterranean gull, sandwich tern, slender-billed gull, Yelkouan shearwater and European storm-petrel. Annex II includes the black-headed gull and the yellow-legged gull. | | | | | |
| **Vulnerability, fragility, sensitivity, or slow recovery** | Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery. | | | | X |
| *Explanation for ranking*<br>All cetacean species found in the area are highly susceptible to depletion due to their slow growth, high longevity, low reproductive rate – particularly considering the high levels of human usage of the area (fishing, shipping, recreation, population pressure along the coastline, pollution) (Reeves and | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Notarbartolo, 2006). The Balearic shearwater is a long-lived species and therefore immediate threats affect adult mortality rates and are susceptible to by-catch in fisheries and have been shown to shift their non-breeding distribution due to sea surface temperature variations linked to climate change. | | | | | |
| **Biological productivity** | Area containing species, populations or communities with comparatively higher natural biological productivity. | | | | X |
| *Explanation for ranking*<br>The Gulf of Lion area is characterized by the highest known pelagic primary productivity levels in the Mediterranean (RAC/SPA, 2010). This, in turn, has an effect on cetacean biomass of the subregion, which is the highest in the Mediterranean. The Ebro Delta area is also important for primary productivity. In both areas the small pelagic production is also high, but some parts of the Balearic Islands are less productive in terms of primary productivity. | | | | | |
| **Biological diversity** | Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity. | | | | X |
| *Explanation for ranking*<br>The area hosts 8 regular species of cetaceans, and a number of other species that occasionally enter the Mediterranean from the Atlantic (e.g., Humpback and common minke whales). As such, it has one of the highest levels of cetacean diversity in the Mediterranean. The Gulf of Lion and Ebro delta display very high level of fish biodiversity (Mouillot et al., 2011). | | | | | |
| **Naturalness** | Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation. | | | X | |
| *Explanation for ranking*<br>Considering the high levels of human usage of the area (fishing, shipping, recreation, population pressure along the coastline, pollution), the area has a low level of naturalness. | | | | | |

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**Maps and Figures**

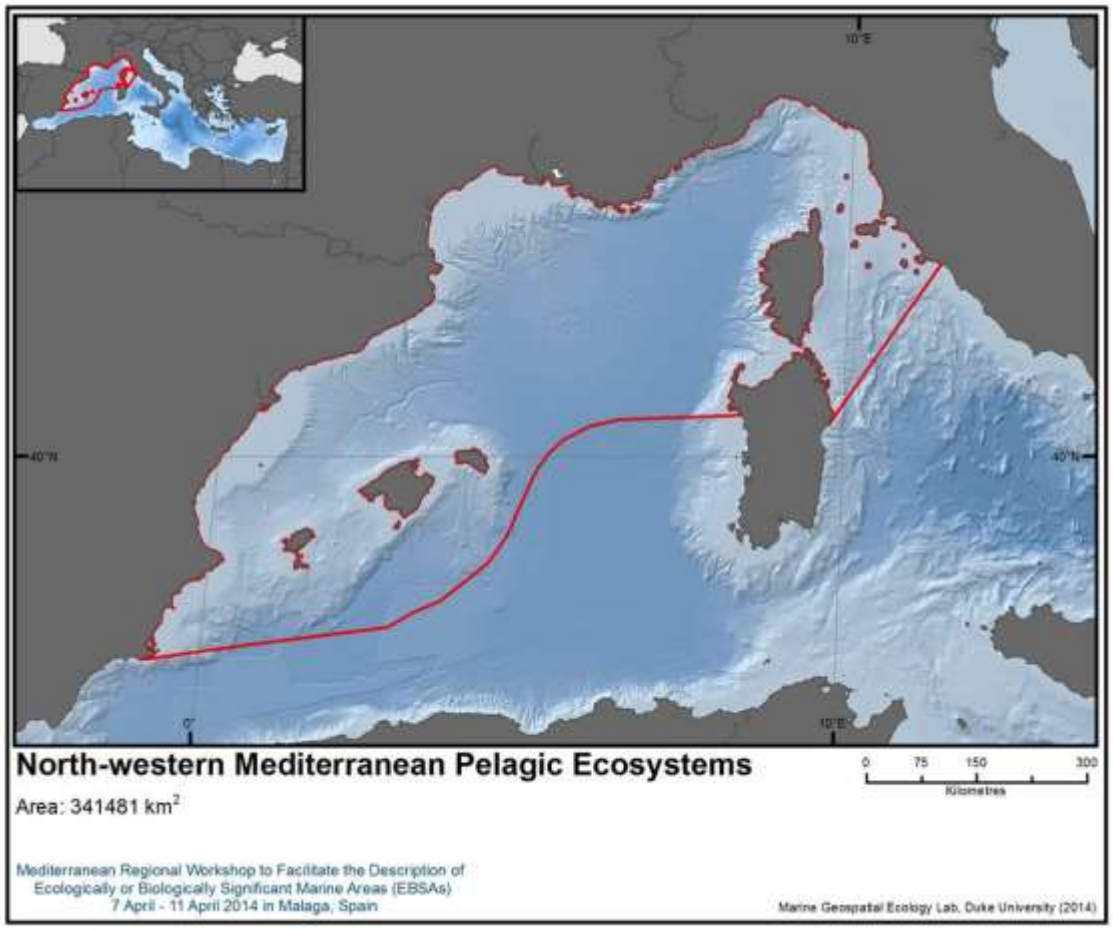



Figure 1. Area meeting the EBSA criteria.


Figure 2. Spawning areas identified for bluefin tuna (ICCAT, 2010).

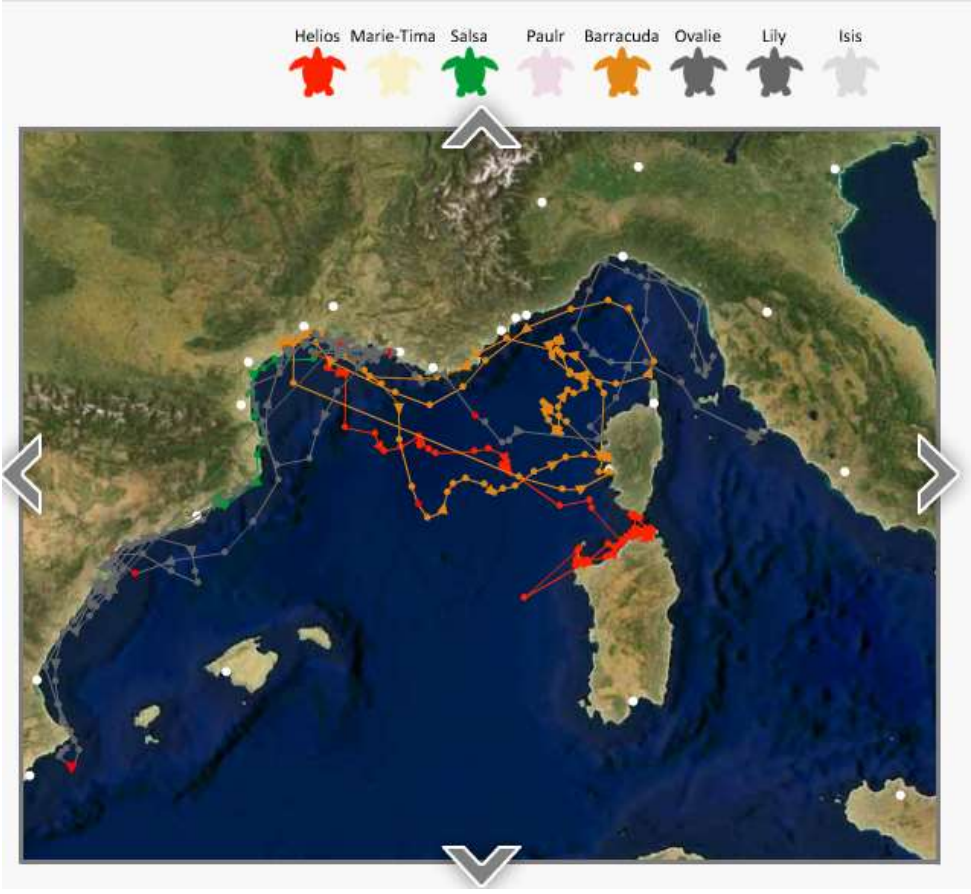
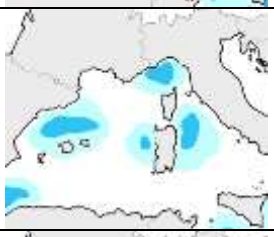
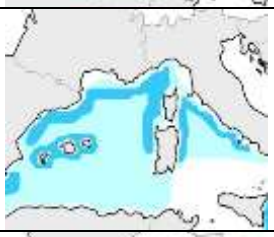



Figure 3. Tracking of several marine turtles in the area (http://www.cestmed.org/index.php/fr/suivi).

| | |
|---|---|
| **Fin whale** |  |
| **Sperm whale** |  |
| **Cuvier's beaked whale** |  |
| **Long-finned pilot whale** |  |
| **Risso's dolphin** |  |
| **Common bottlenose dolphin** |  |
| **Striped dolphin** |  |

| | |
|---|---|
| **Short-beaked common dolphin** |  |

Figure 4. Maps of distribution of the different species of Cetaceans in the area (adapted from Notarbartolo di Sciara and Birkun, 2010).

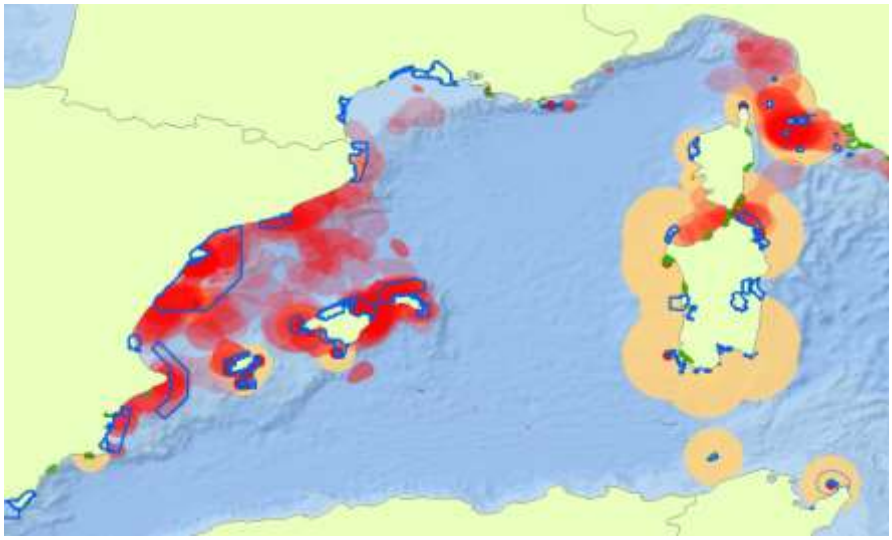


Figure 5. Important Bird Areas and key foraging sites for seabirds in the NW Mediterranean. Key: Blue polygons = IBAs of global importance, green polygons = IBAs of regional importance, red areas = feeding hotspots from tracking data, pink areas = predicted feeding areas.

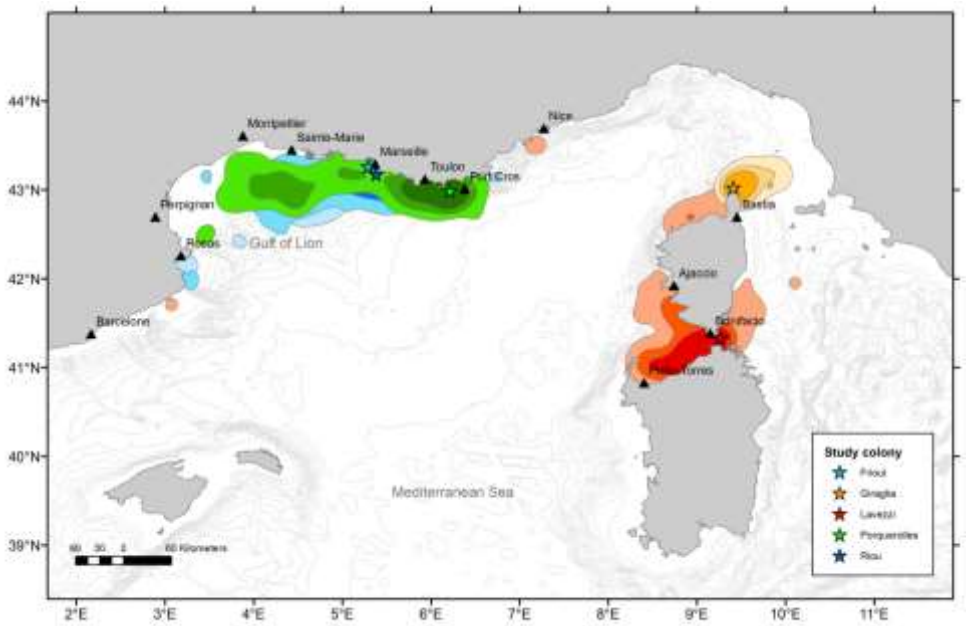



Figure 6. Summer distribution of 120 Scopoli's shearwaters based on fixed kernel density analysis: 90, 70 and 50% kernel contours are displayed for each colony. Shearwaters were fitted with GPS on 5 different nesting sites (stars) during the chick-rearing period (mid-July to mid-Sept 2011; Peron et al 2012).

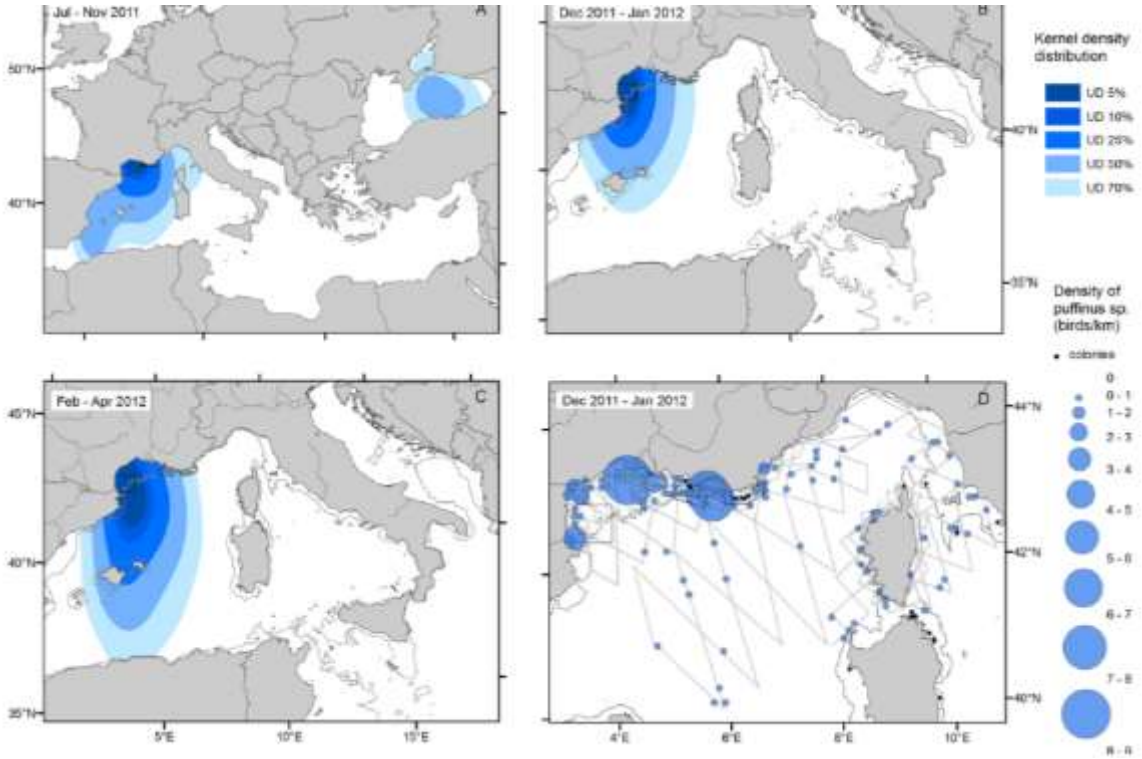



Figure 7. Kernel density distribution of 15 yelkouan shearwaters tracked across the interbreeding period (2011-2012). A,B,C - spatial extent of shearwater range (70%UD), focal area (50%UD) and core area (25%, 10% and 5% UD) at different period of the year; D - densities of Puffinus shearwater observed in December-January 2012; Peron et al., 2013).

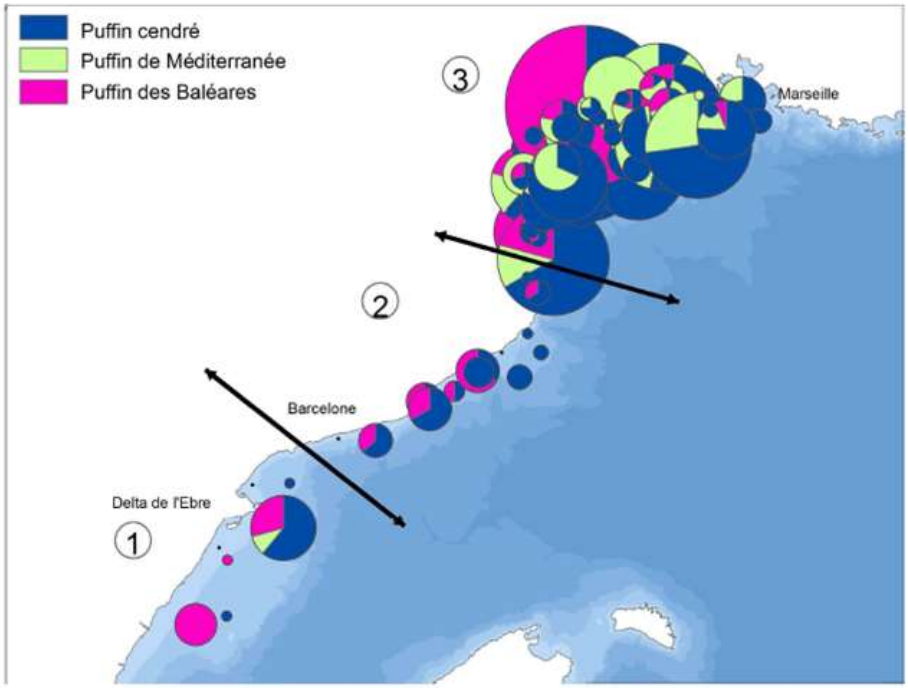



Figure 8. Proportion of the workforce of the three main species species of shearwaters between 2008-2010 in two Spanish areas and in the Gulf of Lion (biggest circle : 250 ind.).

## Area No. 7: North-Western Mediterranean Benthic Ecosystems

**Abstract** The area is both representative of the peculiarities of the western basin in terms of oceanographic conditions, geomorphology and contains ecosystems that harbour singular trophic webs. With its wide variety of seafloor features, including on the shelf and the slope, the area hosts a unique diversity of habitats from the mediolittoral down to the bathyal zone, and also contains a large amount of biodiversity, characterized by engineer species (species that create or modify habitats). Most of the species and habitats in this area are vulnerable and characterized by low resilience.

### Introduction

The area (figure 1) is relatively wide and is located in the same area as 11 SPAMIs and two new candidate SPAMIs (southern Balearic and Gulf of Lion; UNEP-MAP-RAC/SPA, 2010a). The depth range of the area spans between 0 and around 2500 m (UNEP-MAP-RAC/SPA, 2010b).

The general information data reported for this area is supported by a large amount of available information, based on scientific documents (publications, conference proceedings), reports from different national and international institutions and organizations (Agence des Aires Marines Protégées, MAGRAMA, IEO, ISPRA, Universities, CSIC, Oceana, MARUM, IUCN, WWF, Greenpeace, etc.) and recent projects and assessments (e.g. CARTHAM, CAPCORAL, CORSEACAN, EUSeaMap, INDEMARES, IDEADOS, MEDITS, MEDSEACAN, Marine Strategy Framework Directive initial evaluation, PACCOM). Some model outputs indicate high productivity, high biodiversity, high proportion of endangered and vulnerable species within the Mediterranean (Coll et al., 2010; Tunesi et al., 2010; and Martin et al., in press).

### Location

The area is located off the coasts of Italy, Monaco, France and Spain. The depth range of the area is between 0 and 2500 m and it covers a surface of 196000 $km^2$.

### Feature description of the area

The wide variety of seafloor features in both the shelf and the slope supports a high diversity of substrate types and habitats (e.g., mediolittoral biogenic constructions, underwater caves, Posidonia beds, coralligenous assemblages, rhodolith beds, engineering benthic invertebrate assemblages in the deep circalittoral and in the bathyal zones, deep-sea chemosynthetic assemblages), resulting in shelf and slope ecosystems that are specific and rich in species and in ecological interactions (figure 2).

On the shelf, common components of photic-benthic ecosystems are macroalgal assemblages of a wide variety of species as well as important seagrass beds of 4 species including the key-stone species *Posidonia oceanica*. This endemic species, strictly confined to this sea, constitutes a key component of the ecosystem in term of biodiversity (with several thousand animals and four hundred plants, including a high percentage of rare or endemic species), habitat (offering nursery habitat and spawning-ground), and functioning role (see synthesis in Boudouresque et al., 2012). It represents a highly productive ecosystem with a high vegetal biomass that form the base of many food webs (Boudouresque et al., 2012). The area shelters continuous meadows but also “unique” natural monuments like Posidonia barrier reefs (PNUE/UICN/GIS Posidonie, 1990 (PNUE/UICN/GIS Posidonie, 1990) and several most extensive Posidonia meadows of the Mediterranean basin (graphic displays of the distribution of the benthic assemblages available at:

www.tutelamare.it/cocoon/posidonie/app/it/index.html;
http://cartographie.aires-marines.fr/?q=node/43;
http://www.dirm.mediterranee.developpement-durable.gouv.fr/IMG/pdf/Evaluation_initiale_des_eaux_marines_web.pdf;
http://www.magrama.gob.es/es/costas/temas/estrategias-marinas/em_levantino-balear.aspx;http://jncc.defra.gov.uk/page-5040).

Underwater marine caves are an the important habitat in the area (e.g., Ligurian Coast, Tuscan coast and Archipelago, North Sardinian coast – Cicogna et al, 2003; and in the Provence region, Corsican coasts – CARTHAM, Mèdes Islands Marine Reserve). In terms of conservation, as far as the Mediterranean European states are concerned, caves are natural habitats that come under Habitat Directive on the conservation of natural habitats and of wild fauna and flora and appear as such as priority habitats requiring protection (Directive 92/43).

A relevant list of endemic benthic species (e.g., several Cystoseira species, *Posidonia oceanica*, *Asterina pancerii*, *Cladocora caespitosa*, *Lithophaga lithophaga*, *Pinna nobilis*) with some of them restricted to the Western Mediterranean, such as *Laminaria rodriguezii* in some areas (e.g., MPA of Asinara - Chessa & Cossu, 2012; Eastern Corsican coasts - Bonacorsi et al. 2012a; Magaud bank – Fourt & Goujard, 2012; Columbretes islands, Cabrera archipelago, Minorca channel, - Oceana 2010b; Barberá et al., 2012; IEO-MAGRAMA, 2012b, d;).

Other threatened, sensitive, productive and biodiverse habitats are important parts of the seafloor diversity, such as coralligenous bottoms, and the emblematic species *Corallium rubrum* (e.g., in the Ligurian coasts, Tuscan archipelago, North Sardinia, Provence-Alpes-Côte d'Azur region, Corsican coasts, Banyuls-Cerbére MPA, Balearic Islands, Cap de Creus, Columbretes Islands), a species that has been mainly documented in the western and central Mediterranean. Coralligenous is considered as the second key ecosystems and constitutes a typical Mediterranean underwater seascape (sea synthesis in Ballesteros, 2006). With mäerl beds (or more globally rhodolith beds) are the result of the building activities of coralline algal and animal builders, as well as biological eroding processes. They grow in dim light conditions and in relatively calm waters. Coralligenous bottoms are considered to be of great significance both for fisheries and CO2 regulation. Mäerl beds are biodiversity "hot-spots" as they enhance biological and functional diversity of coastal sediments. They are considered as vulnerable habitat according to the Regulation EC 1967/2006 (European Commission, 2006).

Different scleractinian corals (e.g., *Dendrophyllia ramea, D. cornigera*) with slow growth rates as well as gorgonians that are restricted to the western Mediterranean and the Adriatic Sea (e.g., *Eunicella verrucosa*,) (e.g., different Catalano-Balearic areas, Provence region and Corsica) are common components of hard bottom assemblages. Sponges and bryozoans aggregations, mäerl beds, as well as a wide variety of sedimentary habitats such as sea-pen dominated communities, deep biological detritic communities, facies of crinoids (e.g., *Leptometra phalangium*) make up the wide variety of sensitive biogenic habitats occurring in the area (Agnesi et al., 2010; Barberá et al., 2003; Ballesteros, 2006; STCEF, 2006; Oceana, 2007; Rossi et al., 2008; Barea Azcón et al., 2008; Oceana, 2008; Barberá et al., 2012; IEO-MAGRAMA, 2012b, d; Templado et al., 2012; Lo Iacono et al., 2012; Martin et al., in press).

The deep submarine geomorphology of the area is very complex and diverse with the presence of 3 main basins (Algerian, Balearic and Liguro-Provencial) a shelf that is narrow in some parts (as less as 1,5 km in Corsica) and as wide as 50 km in the Ebro Delta area or the Gulf of Lion. The shelf is heterogeneous and includes prodeltaic structures (e.g., Ebro Delta), rocky outcrops (e.g., Esquine, Blauquière, Magaud banks), sometimes of volcanic origin (e.g., Columbretes), deep biodetritic assemblages and different types of carbonate shelves (e.g., Maërl beds and coralligenous formations in Menorca Channel), among others (Ballesteros, 2006; Barberá et al., 2012; IEO-MAGRAMA, 2012b,d). The slope displays a wide variety of ecologically important submarine structures such as many submarine canyons (Würtz, 2012; Harris and Whiteway, 2011), more than 10 seamounts of different heights and geologic origin (Acosta et al. 2003, 2013; Oceana 2010a, b; UNEP-MAP-RAC/SPA, 2010b), submarine structures caused by fluid emissions such as pockmarks (Acosta et al., 2001, 2003; Lastras et al., 2004, Zeppili et al., 2012) as well as contouritic systems resulted from the strong deep water currents (Vandorpe et al. 2011).

In the slopes of the area, a wide variety of threatened and/or sensitive engineering benthic invertebrate assemblages habitats also occur such as (1) cold-water coral reefs (dominated by *Madrepora oculata, Lophelia pertusa, Dendrophyllia cornigera, Desmophyllum dianthus*) (e.g. in the Balearic seamounts, Cap de Creus, Lacaze-Duthiers, Cassidaigne submarine canyon), (2) Deep-sea sponge aggregations (e.g.

Balearic stony sponges seamount), Cassidaigne, outh-western Corsican canyons (4) Gorgonian and black coral gardens (e.g., Balearic seamounts, Cassidaigne,) and (5) compact muds with seapens or bamboo corals (*Isidella elongata*) (e.g., Blanes canyon, canyons of the Gulf of Lion and Corsican canyons such as Ajaccio) (STCEF, 2006; OCEANA 2008, 2010; Ordines and Massutí, 2008; Orejas et al., 2009; Greenpeace, 2009; Maynou and Cartes, 2012; Lo Iacono et al., 2012; Templado et al., 2012; IEO-MAGRAMA, 2012 b,d; Gori et al. 2013, Fourt and Goujard, 2012; Goujard and Fourt, 2012; figure 3). Some of these deep-sea habitats are components of the seamounts and submarine canyons and are very sensitive to anthropogenic activities (e.g. fisheries) due to their three dimensional structure and their low growth rates.

Different areas such as the canyon system of the Gulf of Lion and the Ebro Delta display high levels of primary production due to the presence of upwellings and river outputs (Estrada 1996; UNEP-MAP-RAC/SPA 2010b; Würtz, 2010) and upwellings in the Cassidaigne region. These areas also support a high productivity of zooplankton and ichtyoplancton, including spawning and nursery areas of important commercial species (e.g., small pelagics, hake) (Champalbert, 1996; Abelló et al., 2002a; Gil de Sola et al., 2006; STCEF, 2006).

Some species are restricted to specific geomorphological structures such as stony sponges on seamounts, cold water corals in canyons and seamounts, specific hydromedusa in canyons (Gili et al., 2000), or the carnivorous sponge *Asbestopluma hypogea*, found in dark submarine caves and deep sea canyons (Harmelin and Vacelet, 1997; Aguilar et al., 2011).

**Feature condition and future outlook of the area**

Corse-Ligurian-Provencal basin experiences the combined pressure of natural environmental fluctuations and the impacts of human activities, in addition to the same constraints facing the Mediterranean Sea, which is particularly sensitive to any change due to the fact that it is small and semi-closed. The profound changes of the Mediterranean ecosystem caused by the combination of increasing human impacts and natural factors are increasingly worrying especially due to its important endemism. This area is very densely populated and hosts a significant amount of tourism. Several human activities can damage the ecosystems of the area, in particular, water contamination due to seawage outfalls, runoffs and industrial discharges, different types of fishing (e.g., bottom trawling, fishing lines), and mooring and intensive anchoring.

According to the initial evaluation of the Marine Strategy Framework Directive (MSFD) on the areas located in Spain, impacts on the deep sea and offshore habitats is not as high as in the shelf, and there is a lack of information on this topic for some areas (IEO-MAGRAMA et al., 2012b, d, f). A number of projects, research programs, expeditions and sample processing from past projects are planned for this area such as INDEMARES, monitoring programs of the MSFD, MEDITS surveys.

**Assessment of the area against CBD EBSA criteria**

| **CBD EBSA criteria** (Annex I to decision IX/20) | **Description** (Annex I to decision IX/20) | **Ranking of criterion relevance** (please mark one column with an X) | | | |
|---|---|---|---|---|---|
| | | **No information** | **Low** | **Medium** | **High** |
| **Uniqueness or rarity** | Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features. | | | | X |
| *Explanation for ranking*<br>The area has a high level of uniqueness or rarity due to the presence of: | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| - Significant platforms of *Lithophyllum byssoides* (Archipelago della Maddalena, Scandola marine reserve; PNUE/UICN/Gis Posidonie, 1990)<br>- Rare natural monuments like Posidonia barrier-reef (Portofino area, Port-Cros national park, Formentera-Balearic islands), Posidonia platform (St Florent-Corsica), stripped Posidonia meadow (Porto-Vecchio Gulf; Pergent et al., 2010)<br>- A newly-identified type of coralligenous formation "atoll" (Bonacorsi et al., 2012b)<br>- Deep biodetritics formations on sandy bottoms in Gulf of Lion (Fourt and Goujard, 2012)<br>- Pockmarks (cold seeps) in the Evisa channel (Acosta et al., 2001) and in Canyon of Sétes (Zeppili et al., 2012). | | | | | |
| **Special importance for life-history stages of species** | Areas that are required for a population to survive and thrive. | | | X | |
| *Explanation for ranking*<br>The area hosts many habitats (wide *Posidonia oceanica* beds, coralligenous bottom,deep rocky banks, canyons) that are important for the life-history stage of commercial and/or threatened species (e.g., *Merluccius merluccius*, Palinurus spp, *Scyllarides latus*, *Nephrops norvegicus* – specific references in Boudouresque et al., 2012, IEO-MAGRAMA, 2012 b, d). | | | | | |
| **Importance for threatened, endangered or declining species and/or habitats** | Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species. | | | | X |
| *Explanation for ranking*<br>The area is relevant for many biogenic species/habitat as a platform of *Lithophyllum byssoides*, banks of red coral (*Corallium rubrum*), gorgonian (e.g. *Gerardia savaglia*), reefs of deep sea corals (e.g. *Lophelia pertusa, Madrepora oculata, Desmophyllum dianthus*), antipatharians (e.g., *Leiopathes glaberimma*) and a important number of endangered or threatened species of Annex 2 of the SPA/BD Protocol are present with a high level of representativeness in the area (Fourt and Goujard, 2012; IEO-MAGRAMA 2012 b,d; Fourt et al., 2013). | | | | | |
| **Vulnerability, fragility, sensitivity, or slow recovery** | Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery. | | | | X |
| *Explanation for ranking*<br>The area hosts many biogenic species/habitats (e.g., platforms of *Lithophyllum byssoides*, mäerl beds, banks of *Corallium rubrum*, reefs of deep sea corals including *Lophelia pertusa*, *Madrepora oculata*, *Desmophyllum dianthus*) and engineer species such as *Posidonia oceanica* meadows and forest of the gorgonians and black sea corals. All of these assemblages are characterized by a high vulnerability to anthropogenic impacts and a very slow recovery (see review in Boudouresque et al., 2012; Lartaud et al., in press). Moreover, several other sensitive circalittoral and bathyal habitats have muddy bottoms such as facies of Isidella elongate and sea-pen communities also occurred and are exposed to anthropogenic impact due to trawling activities. | | | | | |
| **Biological** | Area containing species, populations or | | | X | |

| | | | | | |
|---|---|---|---|---|---|
| **productivity** | communities with comparatively higher natural biological productivity. | | | | |
| *Explanation for ranking*<br>The area has a high level of benthic productivity due to the contribution of macroalgal assemblages of a wide variety of species and wide *Posidonia oceanica* meadows (characterized by a high productivity; Boudouresque et al., 2012). Nevertheless the pelagic primary production is in general low except in the Ebro Delta and Gulf of Lion. | | | | | |
| **Biological diversity** | Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity. | | | | X |
| *Explanation for ranking*<br>Due to the high complexity and heterogeneity of the geomorphology of the area, combined with relevant oceanographic characteristics (Liguro-Provençal current, upwelling, downwelling,) the area hosts a very significant biological diversity (e.g. Posidonia and coralligenous ecosystems shelter each at least more than thousand species; Ballesteros, 2006; Boudouresque et al., 2012; Deudero et al., 2012) | | | | | |
| **Naturalness** | Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation. | | | X | |
| *Explanation for ranking*<br>The situation in the area is very diverse with artificialized coastlines but also many well-preserved zones. 11 SPAMIs are declared in the area and more than 30 specially protected areas (e.g. marine reserves, national parks) and several Natura 2000 sites. | | | | | |

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**Maps and Figures**

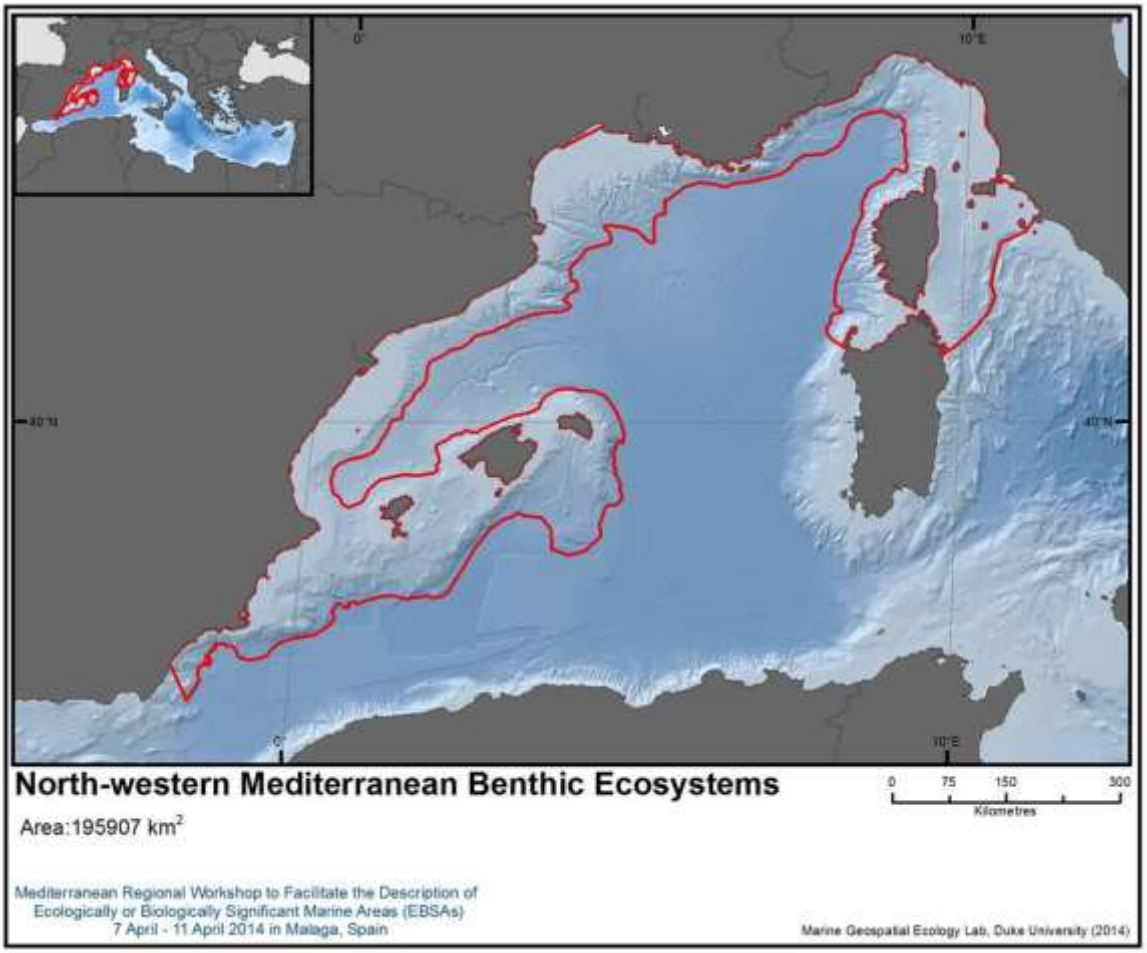


Figure 1. Area meeting the EBSA criteria.

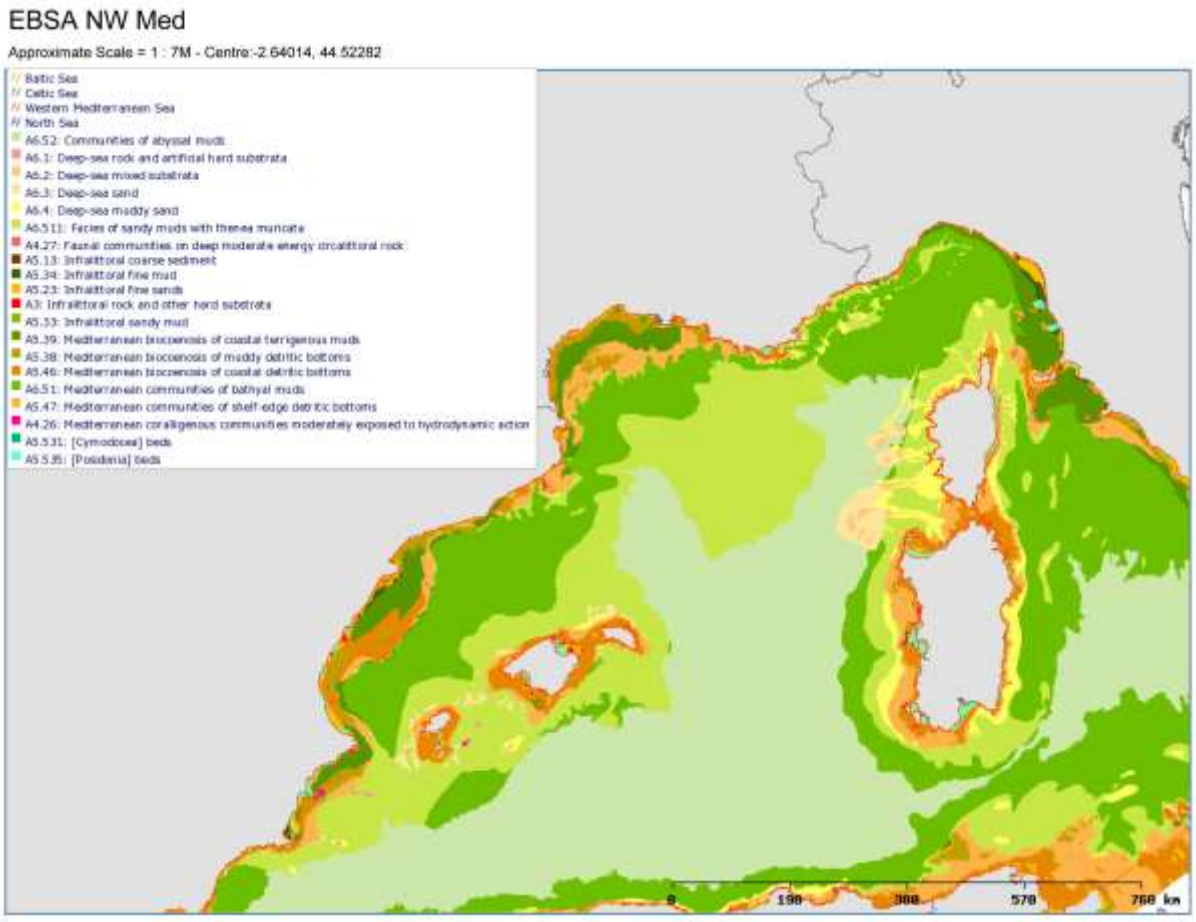


Figure 2. Map of the distribution of the main benthic habitats of the north-western Mediterranean (Broadscale modelled seabed habitats – EUSeaMap program - http://jncc.defra.gov.uk/page-5040).

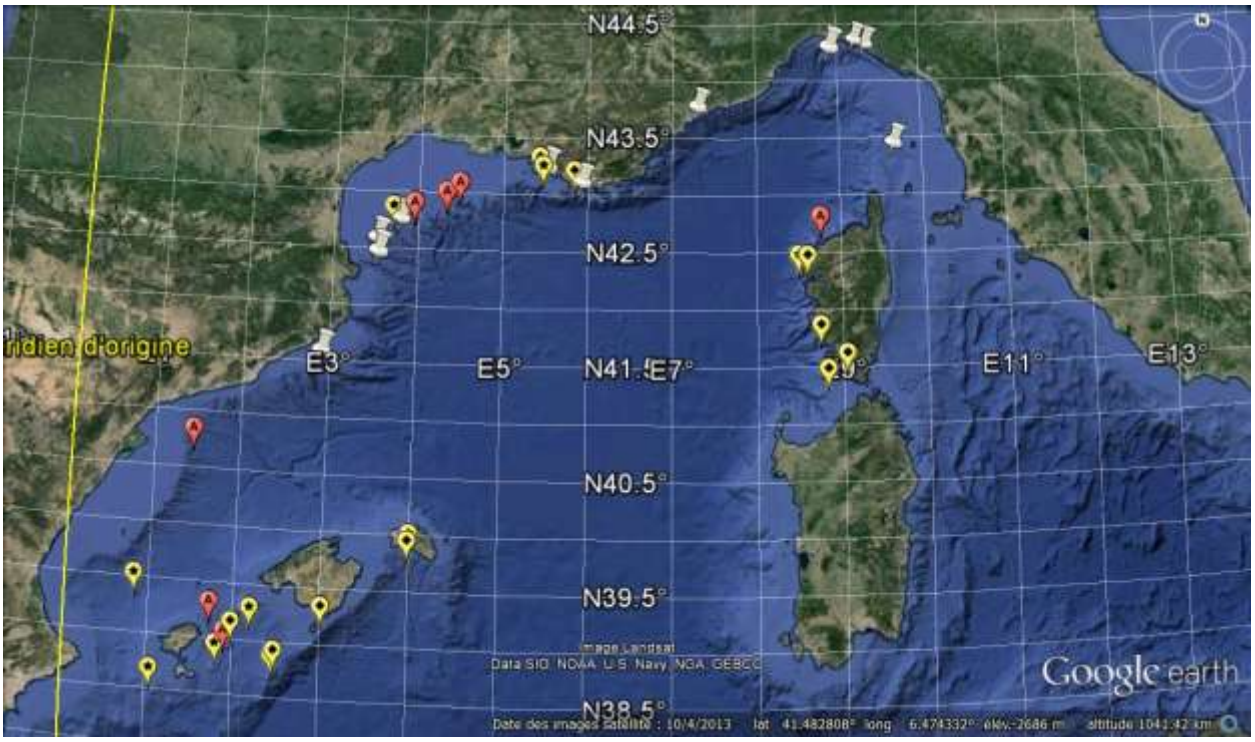


Figure 3. Deep sea cnidarian habitats known in the north-western Mediterranean. In white, live deep white corals (*Lophelia pertusa* and *Madrepora oculata*), in yellow gorgonian and antipatherian assemblages, in red *Isidella elongate* facies. (Information from MEDSEACAN, CORSEACAN and Oceana campaigns; Oceana, 2011; Goujard and Fourt, 2012; Fourt et al., 2013).

## Area No. 8: Sicilian Channel

**Abstract**

In this area, there is an exchange of water masses and organisms between the west and east Mediterranean basins. In the wider area of the Channel, significant ecological and biological components coexist spatially in a relatively limited area which is considered a biodiversity hotspot within the Mediterranean. Seamounts and deep-sea corals are found close to Sicily, including mounds of white corals, which are vulnerable species and provide valuable habitat for a number of other species. The complex oceanographic conditions in this area lead to high productivity and result in good conditions for fish spawning, making the Sicilian Channel an important spawning ground for a number of commercially important fish species, including bluefin tuna, swordfish and anchovy, as well as a number of demersal fish species. The area is a key feeding area for at least 30% of the global population of Scopoli's shearwater, 10% of the global population of the vulnerable Yelkouan shearwater colony, and the colony of the endemic Mediterranean subspecies of storm-petrel *Hydrobates pelagicus melitensis.* The area is also believed to be an important nursery area for the endangered white shark. The Sicilian Channel is thought to be the last important habitat for the critically endangered Maltese skate.

**Introduction**

Preliminary inspection of existing georeferenced data on various components of marine ecosystems, using GIS techniques, shows that most of these data sets have an impressive accumulation of data on ecological and biological features in the wider area of the Sicilian Chanel. To avoid dominance of a single source of information that could be spatially inaccurate, a procedure was followed using overlapping multiple layers to focus only on areas which were indicated as significant by at least three independent sources of information. The results of this analysis revealed a mosaic of habitats with patches corresponding to 3 to 7 different sources of information indicating importance of this habitat for one or more species or groups. The sources of information used were:

- Sharks
- Bluefin tuna (BFT)
- Seabirds
- Marine turtles
- Cetaceans
- Corals
- Small pelagic fish
- *Posidonia oceanica* meadows

Some of the above mentioned sources of information are in need of further improvement both in terms of spatial resolution and spatial coverage and it is of little doubt that scientific effort and monitoring are unequally distributed between east and south, and the north and west, focusing on some taxonomic groups more than others, carried out more in shallow than in deep habitats, etc. It is also true that part of the existing information is based on expert judgment that is not always supported by published scientific information and that it is not always feasible to distinguish between habitats vital for the existence of a species and pathways occasionally used by some migratory species. It is also understood that the boundaries of the area are likely temporally variable and could be refined using input from ongoing and future research such as 3 major projects on marine conservation carried out in Malta. However, in this particular exercise the best available and more recent information was used trying to avoid results of predictive models based on ill-defined assumptions and to combine sources of information from independent sources.

The results showed that in the wider area of the Sicilian Channel there is a variety of important biological and ecological features that co-exist spatially. These include spawning areas of BFT, vital areas of various cetacean species, an extensive *Posidonia oceanica* habitat, feeding grounds of endangered seabirds, feeding and nesting areas of sea turtles and important benthic habitats such as deep sea corals and mäerl beds. The final shape of the area was slightly increased to accommodate some more significant habitats using additional information provided during the workshop.

The Sicilian Channel is the strait of the Sea located between the island of Sicily and Tunisia where Pantelleria (Italy), Pelagie Islands and Lampedusa (Italy), and Malta, Gozo and Comino Islands (Malta) are located. It plays an important role by dividing the Mediterranean Sea into two principal sub-basins, the eastern and the western Mediterranean. The complex topography and circulation scheme makes the Sicilian Channel (figure 3) a highly productive area and a biodiversity hotspot within the Mediterranean. Its location means that it hosts many species from both basins.

The Sicilian Channel has complex bottom morphology comprising two sill systems separated by an internal deep basin. The eastern sill system is divided between the Malta plateau and Medina Bank and it has maximum depth of about 540 m and connects the Sicilian Channel with the Ionian Basin. The western sill is divided between the large Adventure Bank and the Nameless Bank (Gasparini et al., 2005). These large sill systems are separated by the narrow shelf in the central part. The shape of slope is extremely irregular, incised by many canyons, trenches and steep slopes (Fiorentino et al., 2006).

The sea bottoms of the littoral zone of the northern Tunisian coast are mainly rocky, while those of the eastern (Hammamet Gulf) and southern (Gabès Gulf) coasts are sandy to sandy-muddy. The rocky bottoms of the northern coast offer the best substratum for colonization by very rich coralligenous assemblages, while in “la petite Syrte” i.e the Gulf of Gabès *sensu lato*, and in several parts of the Hammamet Gulf, the *Posidonia* meadows show their maximum geographical distribution (e.g. Ben Mustapha et al., 1999).

Upwelling along the eastern and southern costs of Sicily is a permanent feature. As explained by Beranger et al. (2004), upwelling is governed by the south-eastward winds and by the inertia of the isopycnal domes of the AIS meanders and cyclonic vortices that can extend its influence far offshore due to the configuration of the circulation.

Many eddies of variable strength, shape and size (cyclonic and anticyclonic) have been observed in the Tunisian–Sicily region. According to Savini et al. (2009) between Adventure Bank and the Malta plateau, Levantine Intermediate Water (LIW) forms a pair of subsurface eddies (one cyclonic, one anticyclonic) along the western flank of the Malta plateau and Atlantic Ionian Stream (AIS) forms a cyclonic vortex off Cape Passero.

**Location**

The Sicilian Channel is the strait of the Sea located between the island of Sicily and Tunisia where Pantelleria (Italy), Pelagie Islands and Lampedusa (Italy), and Malta, Gozo and Comino Islands (Malta) are located.

**Feature description of the area**

***1.*** **Habitats**

**a.** ***Deep coral communities***

In the Sicilian Channel, there is a substantial variety of deep coral communities. The sessile benthos in the Sicilian Channel is dominated by the octocorals *Isidella elongata* and tall sea pen (*Funiculina quadrangularis*) as well as red coral (*Corallium rubrum*) (Freiwald et al., 2009).

Areas that are difficult or impossible for sample trawling have been studied by Ragonese et al. (2003). According to this research, those hard bottoms are characterized by huge white coral assemblages formed by madrepores (*Madrepora oculata*, *Lophelia prolifera*) and barnacles (*Balanus* sp.). Another yellow

coral, *Dendrophyllia cornigera* lives at higher depths (i.e. >500 m), colonizing rocky substrates exposed to hydrodynamism.

Records of living colonies of white coral assemblage dominated by colonies of the scleractinian *Lophelia pertusa*, *Madrepora oculata* and *Dendrophyllia cornigera* were recently identified in the Linosa trough and in the nameless bank using ROV techniques as part of the recent research conducted under the HERMES project (Freiwald et al., in press). The most intense growth of *C. rubrum* was documented in the Linosa sample site, among the white coral habitats surveyed in the Sicilian Channel.

Ninety-six different species, including fours species of black corals (*Antipathes dicotoma, Antipathes subpinnata, Parantipathes larix, Leiopathes glaberrima*) were recorded during a research expedition conducted by Greenpeace Italy in collaboration with Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA) in the Sicilian Channel in 2012 (Greenpeace Italy, 2012).

**b.** ***Cold seep communities***

Cold seep communities are the host unique chemosynthesis-based communities (not relying on photosynthetic production) dominated by bacterial mats and particular species of bivalves and tubeworms, that are associated with endosymbiotic (chemo-autotrophic) bacteria. The existence of pockmarks in the area points to the existence of these cold-seep type communities (Cartes et al., 2004). The recent discovery of pockmarks (Minisini et al., 2007) may indicate the existence of these types of cold-seep communities in the area. However, they have not been discovered yet and further research should be carried out to confirm the existence of these unique environments in this part of the Mediterranean deep sea.

**a.** ***Pelagic***

Patti et al. (2004) show how the surface circulation of the two-way exchange flow through the Sicilian Channel and its complex topography makes the Sicilian Channel a high productivity and retention area. AIS enters the channel by its west side to describe a large cyclonic meander, which embraces the Adventure Bank and then approaches the shore by the middle of the southern coast of Sicily and separates again when it encounters the shelf of Malta and then encircles a second cyclonic vortex, off Cape Passero. This circulation favors the existence of "permanent" upwelling to the left of the Stream. Coastal upwelling is believed to be the main source of nutrient pumping in the area (characterized by very low levels of river discharge).

This favors spawning activity and recruitment success processes, turning this area in a recognized spawning and nursery area for species of high commercial relevance such as bluefin tuna, swordfish, hake and greater fork beard. (e.g., Garcia Lafuente et al., 2002; Garofalo et al., 2004). The area also includes spawning grounds of red mullet (*Mullus barbatus*) (Garofalo et al., 2004) and a relatively high abundance of rays (Garofalo et al., 2003). According to Fiorentino et al. (2003) the existence of a frontal zone precisely in the middle of the area, in fact, may offer ideal conditions for small predatory organisms such as squid para-larvae, due to the richness of food particles concentrating at the convergence front.

Levi et al. (2003) investigated the stock-recruitment relationship for red mullet in the Sicilian Channel, including environmental information in terms of sea surface temperature (SST) anomaly as a proxy for oceanographic processes affecting recruitment. Results showed that, for a given level of spawning stock, higher levels of recruitment corresponded to SST, being warmer than average during the early life stages.

***2.*** **Species**

**c.** ***Endemic species***

The Maltese skate (*Leucoraja melitensis*) is a Mediterranean endemic species. Its main range now appears to be restricted to the Sicilian Channel, where it is found at depths subject to heavy trawling activity (Cavanagh and Gibson, 2006). It is extremely rare; in broad-scale surveys of the north Mediterranean coastline from 1995 to 1999, it was recorded in only 20 out of 6,336 hauls. It is also now rare off the coast of Malta and rare or absent off the coast of Tunisia, where it was previously considered moderately

common. Although population data is lacking, given the small range of the remaining population the potential detrimental impact of trawl fishing is likely to be significant. Further research is also needed on the exploitation, distribution, biology and ecology of this species, as well as trends in abundance.

The Mediterranean endemic scleractinian coral *Cladopsammia rolandi* is also present in the Sicilian Channel (Zibrowius, 1980).

**d. *Bluefin tuna***

The Sicilian waters are one of the most important spawning sites for threatened Bluefin tuna in the Mediterranean, as confirmed by Piccinetti et al. (1996a,b) which showed that BFT larvae are mainly concentrated around Sicily (the Sicilian Channel, southern Tyrrhenian and northern Ionian Seas). It is important to note that the Sicilian Channel is the site of formation of important frontal systems, which may favor the feeding requirements of larval tuna. A recent report (EC Joint Research Centre/IPSC, 2011) indicated this area as an important spawning area for BFT.

Oray et al. (2005) showed the results of a 2003 and 2004 fish egg and larval survey which encompasses the BFT spawning grounds off the southern Sicilian coasts. They reported high larvae catches in 2003 and relatively low catch in 2004. However, recent larval surveys carried out off the Tunisian part of the Sicilian Channel within the TUNIS II project reported no BFT larvae catches. As for the Balearics, data showing the position of vessels targeting bluefin tuna in the Mediterranean made available by the ICCAT Scientific Committee supports the importance of this area as a spawning ground for the species (ICCAT Secretariat Report on Statistics and Coordination of Research, 2011).

**e. *Swordfish spawning and nursery ground***

Swordfish (*Xiphias gladius*) is the second most important large pelagic species in the Mediterranean Sea. The Sicilian Channel seems to be one of the most important spawning grounds for the species along with others sites including the Balearic Isles & central Mediterranean (Di Natale, 2006).

The spawning activity of the Mediterranean swordfish appears more strictly related to climate and oceanographic features than other pelagic species. Observations at sea confirm that a surface layer at a temperature of about 22°C or more is sometimes enough to induce spawning even for a short period and the hypothesis that swordfish spawn on multiple occasions during a single season is to be seriously taken into account (Di Natale, 2006).

Although juvenile individuals are reported everywhere in the surface longline fishery (Di Natale, 2006), major concentrations are linked to the availability of a plentiful supply of food, and can change their geographical distribution substantially from one year to the other, on the basis of to oceanographic features. Juvenile swordfish are usually present along the entire Sicilian coast including small isles, the area around Malta as well as the Balearic Isles among others.

**f. *Anchovy (Engraulis encrasicolus)***

Anchovy is a short-lived pelagic species, which is distributed all over the Mediterranean and one of the most important resources in this region. It ranks second in abundance to the sardine (*Sardina pilchardus*), but first in terms of economic importance. However, the distribution of the Sicilian Channel anchovy is not regular or widespread and, rather, comprises a set of independent populations.

The dynamics of the biomass of the anchovy population in the Sicilian Channel were addressed by two European projects (Med 96-052 and Med 98-070). Results indicated that the north-west region of the southern Sicilian coast (i.e., the area off Sciacca, on the Adventure Bank) gathers the most favorable conditions for the anchovy spawning grounds (Cuttita et al., 2003). According to García Lafuente et al., (2002), distribution of anchovy in their early life history stages is highly dependent on surface water dynamics. Such study shows that the highest larval concentration is located off Cape Passero (200 km downstream of the main spawning ground). The estimated averaged age of this population, based on the length of the larvae, is 8 to 10 days, which matches the time it takes larvae that has hatched from an egg

spawned off Sciacca to travel to Cape Passero. The cyclonic circulation of water masses provides enrichment mechanisms for larvae growth and feeding, acting as an important nursery ground.

**g. *Demersal species***

Recently the diversity of demersal fish communities (Osteichthyes and Chondrichthyes) has been studied using trawl surveys under the international MEDITS program. The greatest diversity within these communities was found at the offshore bank on the western part of the south Sicilian shelf (Adventure Bank) with a high biomass of commercially important species such as hake and red mullet present. Detailed analysis of the catches from this area shows that 58 different fish species were present i.e. about 34% of the total number of fish species collected over the entire study area. The entire area delineated was inside the 100 m isobath (Garofalo et al., 2007). The eastern sector of the Adventure Bank was found to be far less diverse as was the central sector of the Sicilian Channel. However these areas also showed high variability.

Interestingly, the areas showing the greatest inter-annual variability of diversity are located mainly along the shelf edge, where topographically induced upwelling may occur (Lermusiaux and Robinson, 2001), and particularly along the average trajectory of the AIS (Robinson et al., 1991). The area where the AIS approaches the Sicilian coast is known to be a permanent upwelling area (Lermusiaux and Robinson, 2001) and was identified in the MEDITS study as an area persistently characterized by low diversity (Garofalo et al., 2007).

Hake (*Merluccius merluccius*) is one of the most studied demersal species because of its great importance in Mediterranean fisheries although many aspects related to the spatial scale of its biology remain little known. Fiorentino and colleagues (2006) recently found that hake occurs at all life stages in two distinct geographic areas, the Adventure and Malta Banks, well separated by a wide area where hake abundance is very scarce. The two nursery areas were identified at the eastern side of the Adventure Bank and Malta Bank, and in both nurseries grounds extended from about 100 m to the upper slope (approx. 200 m). Moreover, juveniles inhabit preferentially the eastern side of the Banks and show seasonal differences with the highest concentration of juveniles located along the eastern boundary of Malta Bank in autumn, and in Adventure Bank during spring. Spawning aggregations were also found in the south-western break of both Adventure Bank and Malta Bank in autumn.

Red mullet (*Mullus barbatus*) is another of the most important Mediterranean demersal species, mainly caught by bottom trawling on continental shelves. On the Italian side of the Sicilian Channel, this species is mainly found at depth less than 200 m and spawns in spring, and the 0-group recruits in late summer (Levi et al., 2003). A space-time analysis performed by Garofalo and colleagues (2004), indicated two clearly separate spawning grounds in the area, over two banks off the Adventure Bank and the Malta both at around 100 m depth. On the Adventure Bank the distribution is characterized by several patches, some of them being in coastal waters. In contrast, a large spawning area was identified close to the Maltese territorial waters. Although the recruits were rather widely distributed throughout Sicilian coastal waters, four areas of high concentrations were identified, between 20 m and 50 m depth, which were quite stable in location.

The greater fork beard (*Phycis blennoides*) is one of the most commercially important gadoids in the Mediterranean. Little is known of the spawning period. Reproduction occurs from late summer to early winter (Massutí et al., 1996; Belcari and Biagi, 1999). Two extended areas of recruit concentration (i.e. stable nursery areas) were identified on the western and eastern side of the Adventure Bank, located between 200 and 400 m deep. Other nurseries were found in the easternmost part of the Sicilian Channel., There is large interannual variability in the nursery areas (Fiorentino et al., 2003). Hydrology does not appear to play a role in explaining the position of the spawning fish and juveniles.

**h. *Cetaceans***

Fin whales are known to congregate in late February and early March in the coastal waters of the island of Lampedusa (Italy), Sicilian Channel, to feed on the euphausiid, *Nyctiphanes couchii*. Nevertheless, there

is limited information on the presence and habitat use for this species They favour upwelling and frontal zones with high zooplankton concentrations (Canese et al, 2006; Hoyt, 2005).

Bottlenose dolphins have been recorded in waters around the Pelagic Islands. Local subpopulations appear to be habitat dependent, as biogeographic and hydrographic features influence their distribution and movement patterns. Four possible ecological boundaries have been proposed for the species as follows: the Gibraltar strait, the Almerìa-Oran front, the Sicilian Channel and the Turkish Straits system. Nevertheless, information on the presence and habitat use for this species in the area is limited (Reeves and Notarbartolo di Sciara, 2006; Natoli et al., 2005; Hoyt, 2005).

**i. *White shark***

The fact that the white shark reproduces in the central Mediterranean seems to be widely accepted. The Sicilian Channel apparently represents a nursery ground for this species. There is evidence of declines and likely fishery pressures placed upon the apparent reproductive and nursery grounds in the Sicilian Channel. Very little is known about seasonal movements or key elements of the population biology of this species. Fergusson suggests that efforts should focus upon the Sicilian Channel and its environment in order to implement a scheme of protective management in "critical habitats", selected by interpreting biogeographical data (Fergusson et al., in prep; Morey et al., 2003; Soldo and Ducic, 2005; Fergusson, 2005).

**j. *Loggerhead turtle***

Lampedusa and Linosa (two Natura 2000 sites) are among the last known nesting sites of loggerhead turtle (*Caretta caretta*) in this part of the Mediterranean (Casale and Mariani, 2014). In the last four years, a total of 11 nests have been found on the island of Linosa and between one and five nests on the island of Lampedusa.

From 1995, more than 600 sea turtles have been tagged and released. During this period, it has been observed that one female turtle which was captured and marked in 1996 was observed nesting again in Linosa eight years later (EC, 2000).

Management activity in the Pelagie Islands is focused on loggerhead conservation but also includes observations to evaluate the impact of fisheries, in particular longline fishing, on loggerhead populations in the area. In this respect, an enduring collaboration was set with a number of fishermen that come from Sicily to the Pelagie Islands during the summer season for longline fishing (targeting swordfish).

***k. Seabirds***

*Yelkouan shearwater*

The Yelkouan shearwater (*Puffinus yelkouan*) is a Procellariiform strictly endemic to the Mediterranean Basin, which is listed as Vulnerable by IUCN and is included on Annexes of the EU Birds Directive and the Barcelona Convention. Yelkouan shearwaters first return to their breeding sites in late October–early November, and egg-laying occurs from mid-March to early April. Hatching follows in May and chicks fledge in July-early August (Bourgeois et al., 2008). As most of the small and medium-sized petrel species, Yelkouan shearwaters visit their nest at night and forage at sea by day. After breeding birds migrate to the Black Sea to feed (Raine et al., 2012). Malta is home to around 10% of the world's population of Yelkouan shearwaters and hold an estimated 1,190 - 1,680 breeding pairs (Sultana et al., 2011). Nine of the eleven IBAs in the Maltese Islands have been designated for this species. These seabirds arrive in the Maltese Islands starting in October to occupy nest sites. Five birds were tracked with GPS data loggers from May to June, confirming that the birds fly long distances to feeding areas, travelling over 280 km away from Malta. Most birds head to the south-east of Malta, with particular concentrations of activity along the continental shelf about 200 km away (Raine et al., 2012). Initial assessments of ongoing tracking studies during the chick rearing period, with larger sample sizes (n=37), confirm these patterns (BirdLife Malta, unpublished data).

*Scopoli's shearwater*

Scopoli's shearwater (*Puffinus diomedea diomedea*) is a Procellariiform strictly endemic to the Mediterranean Basin; it is about to be given full species status and is likely to be listed as Near Threatened by IUCN, and is already included on Annexes of the EU Birds Directive and the Barcelona Convention. 10,000 pairs (21% of the global population) breed on the Italian Pantelleria and Isole Pelagie islands, which includes Linosa Island. Tracking studies on Linosa have been ongoing since 2008 (Cecere et al., 2012) this includes data collected from during incubation (n=14) and chick-rearing (n=89) periods. Birds are shown to forage closer to the colony during chick-rearing but range more widely during incubation where feeding hotspots occur along the Tunisian and Libyan coasts. 4,000 pairs (8% of the global population) breed in Malta, though colonies have declined by 5-10% over the last 10 years (Derhe 2012). Tracking studies have also been conduced in malta including on Halfar during incubation (n=27) and chick-rearing (n=50), Fifla during incubation (n=13) and chick-rearing (n=13), and Gozo (n=10) during the whole breeding period. Birds are shown to forage closer to the colony during chick-rearing but range more widely during incubation where feeding hotspots occur along the Sicily, Tunisian and Libyan coasts. The largest population (15,000-25,000 pairs; though recent estimates suggest could be as high as 150,000 pairs) breeding on Zembra Island, Tunisia may also forage in this area, though no tracking has yet been undertaken. (Defos du Rau et al., 2012). Taken together the area is known to include the key foraging areas during the breeding season for at least 30% of the global population of this species, potentially supporting over 50% of the global population.

Scopoli's shearwater and Yelkouan shearwater both group together to form rafting flocks on the waters surface in the evening before returning to colonies under the hours of darkness to avoid predators. Based on analysis of seabird tracking data these rafts generally occur within 7 km of the colony (BirdLife International, 2014)

*European storm-petrel*

The endemic Mediterranean subspecies of storm-petrel *Hydrobates pelagicus melitensis* is listed on annexes of both the Birds Directive and Barcelona Convention. It is a localized, breeding visitor to Malta, with the current population estimated at 5,000–8,000 pairs, thought to be the largest colony in the Mediterranean (Thévenet. 2012). Long-term ringing studies running since 1968 have ringed 21,300 birds and over 2,400 of these have been retrapped at least once (Sultana and Borg, 2012). Ringing recoveries show birds move to the coast of Tunisia and Sicily, presumably to feed (Sultana and Borg, 2012).

**Vulnerability**

Shearwaters are long-lived, slow reproducing species and therefore immediate threats affect adult mortality rates. Yelkouan shearwater are threatened by low adult survival (Oppel et al 2011), with birds particularly susceptible to by-catch in fisheries (Anderson et al., 2011). Scopoli's shearwater in Malta have declined by 5-10% over the last 10 years (Derhe, 2012)

**Feature condition and future outlook of the area**

- **Overfishing and impact of fishing activities**
- ***Fishing activity***

The Sicilian Channel is one of the most important fishing areas of the Mediterranean Sea, where significant fleets operate with high fish production. In addition, the boats from the Sicilian and North African fleet are usually fishing in the Archipelago using trawl nets or purse seiners (Celoni et al., 2006). Both pelagic and demersal species are targeted and there is evidence of overexplotation of single target stocks (Levi et al., 1998). In the Sicilian Channel, demersal fishing ground overlaps with important spawning and nursery grounds and areas occupied by larvae and juveniles of some of the most commercial fish species (e.g. hake, red mullet, anchovy and great fork beard) (Fiorentino et al., 2003, Garofalo et al., 2004). For example, nursery areas are situated mainly between depths of 100 and 200 m for the hake and those for the greater fork beard were found at depths greater than 200 m (Fiorentino et

al., 2003). An important fishery in the area is the longline fishery targeting swordfish and tuna species and which has increased in effort over the past three decades (Di Natale, 2006; SCRS 2008).

- ***By-catch***

Longline fisheries in the area pose a great threat to many species including large turtles (e.g. loggerhead (*Caretta caretta*) (Baez et al. 2007). Data of fishing interaction between marine turtles and fishing activities were recorded during 12 years of activity (1994 to 2005) and results showed drifting longline as the fishing gear with the highest local impact on sea turtles (95.7%). Its peak activity is in summer period, when fishers mostly work with drifting longlines targeting swordfish and loggerhead adult females come to the pocket beach "Pozzolana di Ponente" to lay their eggs. The artisanal fleet operating in the area is mainly composed of vessels employing drifting longlines. This kind of gear results in a high number of interactions, with a mean of 40 loggerheads being hooked per year and a total of 336 specimens found with one or more hooks embedded in their flesh (see Giacoma and Solinas, 2001, Piovano et al., 2001, Nannarelli et al., 2007). In addition, chondrichthyans are also being taken as by-catch in the longline fishery (Cavanagh and Gibson 2007).

Shearwaters are threatened by low adult survival (Oppel et al., 2011), with birds particularly susceptible to by-catch in fisheries (Anderson et al., 2011).

Within the framework Life project DelTa (NAT/IT/000163), a dolphin-fishery interaction study was conducted in the archipelago of the Pelagie Islands (south Sicily). Gillnets were identified as the gear for which fishermen complained most frequently of negative dolphins interaction - in 83% of the cases recorded. Results showed frequent interaction was complained of by 72% of long liners and 100% of trawlers (Celoni et al., 2006). Moreover, the study highlights the existence of what was called "operational competitive interaction" (Bearzi, 2002) between bottlenose dolphin and fishermen. In fact, results showed a significant reduction of fishing catches for *Mullus surmuletus* when dolphins were present (Celoni et al., 2006).

- **Pollution**

There is evidence that the area between Sicily and Malta is a pollution hotspot regarding oil spills in the Mediterranean Sea (UNEP/EEA, 1999, EC Joint Research Centre/IPSC, 2006). Pollution by persistent organic pollutants (e.g., PCBs and DDTs) and heavy metals has spread all over the world as evidenced by their detection both in humans and wildlife although their impact on offshore ecosystems has been poorly investigated. Large fish such as sharks, tuna and swordfish as well as marine mammals, sea turtles and seabirds may exhibit a high potential for the accumulation of pollutants as species occupying the higher trophic levels in the pelagic food chain (e.g., Stefanelli et al., 2002, 2004; Storelli et al., 2003; Storelli and Marcotrigiano, 2006).

- **Alien species**

Non-native species invasions are currently of major global concern, they are considered to be the second largest threat to biodiversity, after habitat destruction. The invasion and survival of alien species in the Mediterranean is correlated with the general sea surface temperature increase, resulting in the replacement of local fauna with new species. Such changes affect not only local ecosystems, but also the activities of the international fishing fleet when commercial species are affected (European Science Foundation/Marine Board, 2007). Accidentally introduced into the Mediterranean Sea in 1984, the tropical alga *Caulerpa taxifolia* has spread since then, reaching the Tunisian coast. Another variety of *Caulerpa racemosa* (*Caulerpa racemosa var occidentalis*) was discovered in Tunisia and qualified as invasive (Langar et al., 2003).

- **Tourism**

The growing number of tourists presents a significant threat to many coastal habitats. In fact one of the main threats to the Pelagian Island turtle population is tourist activities in the nesting sites (Giacoma and Solinas, 2001).

- **Marine traffic**

Collisions of marine turtles with boats crossing the waters of the Sicilian Channel (between Sicily mainland and Pelagie Islands) have been recorded (Life NAT/IT/000163). In addition, the Mediterranean sperm whale subpopulation may be affected by disturbance from intense maritime traffic (development of "highways of the sea") and collisions with vessels, including high-speed ferries. More than 6% (7) of 111 sperm whales stranded in Italy (1986-1999) had died after being struck by a vessel, and 6% of 51 photo-identified individuals (22 in Italy) bore wounds or scars that were clearly caused by a collision (Pesante et al., 2002).

**Assessment of the area against CBD EBSA criteria**

<table>
<tr><th rowspan="2">CBD EBSA criteria<br>(Annex I to decision IX/20)</th><th rowspan="2">Description<br>(Annex I to decision IX/20)</th><th colspan="4">Ranking of criterion relevance<br>(please mark one column with an X)</th></tr>
<tr><th>No information</th><th>Low</th><th>Medium</th><th>High</th></tr>
<tr><td>Uniqueness or rarity</td><td>Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features.</td><td></td><td></td><td>X</td><td></td></tr>
<tr><td colspan="6">Explanation for ranking<br>The Maltese skate Leucoraja melitensis is confined largely to the Sicilian Channel.<br><br>This area is the main habitat for the white shark (Carcharadon carcharias) in the Mediterranean and one of the very few habitats in the world for this species. There are also 3 species of angel sharks and 2 species of guitar fish in this area.<br><br>Bluefin tuna, birds, turtles cetaceans and corals are not endemic species and may be found also in other parts of the Mediterranean as well. However, the area is particularly unique for bird given that it holds at least 30% of the global population of the Mediterranean endemic Scopoli's shearwater, 10% of the global population of Yelkouan shearwater and the largest colony of the endemic Mediterranean subspecies of storm-petrel (Hydrobates pelagicus melitensis).</td></tr>
<tr><td>Special importance for life-history stages of species</td><td>Areas that are required for a population to survive and thrive.</td><td></td><td></td><td></td><td>X</td></tr>
<tr><td colspan="6">Explanation for ranking<br>The area contains the only habitat of the Maltese skate (Leucoraja melitensis).<br><br>Sharks: Angel sharks and guitar fish are not migratory species and therefore they pass their entire life in this area.<br><br>BFT it is one of few spawning grounds in the Mediterranean and probably the most extended one (ICATT, 2010)<br><br>Birds: For local populations of birds the marine area is of vital importance.<br><br>Turtles: Nesting colonies of loggerhead turtle Caretta caretta on the islands of Lampedusa and Linosa in the Pelagie Archipelago – these are amongst the few remaining nesting sites for this species in this part of the Mediterranean (EC, 2000)</td></tr>
</table>

**Cetaceans**: For fin whales it is the only known feeding ground in the southern part of the Mediterranean, for the common dolphin and one of the few places of occurrence in the Mediterranean although the exact spatial distribution in the area is not well known.

Seabirds: This is a key feeding area during the breeding season for the Yelkouan and Scopoli's shearwater and the endemic Mediterranean subspecies of storm-petrel (*Hydrobates pelagicus melitensis*).

| | | | | | |
|---|---|---|---|---|---|
| **Importance for threatened, endangered or declining species and/or habitats** | Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species. | | | | X |

*Explanation for ranking*

A number of threatened and endangered species are found in the Sicilian Channel, including dolphins and whales, skates and rays. The importance of the area as spawning and feeding ground for threatened and endangered species such as bluefin tuna and fin whales, as well as nesting grounds for loggerhead turtles are discussed under the "Importance for threatened, endangered or declining species and/or habitats" criterion. Yelkouan shearwater (*Puffinus yelkouan*) is a Procellariiform strictly endemic to the Mediterranean Basin, which is listed as Vulnerable by IUCN and is included on Annexes of the EU Birds Directive and the Barcelona Convention. Scopoli's shearwater (*Puffinus diomedea diomedea*) is also endemic to the Mediterranean Basin, it is about to be given full species status and is likely to be listed as Near Threatened by IUCN, and is already included on Annexes of the EU Birds Directive and the Barcelona Convention. The endemic Mediterranean subspecies of storm-petrel (*Hydrobates pelagicus melitensis)* is listed on annexes of both the Birds Directive and Barcelona Convention.

The importance of the Sicilian Channel to threatened species of corals and the life circle of critically endangered Maltese skate is discussed under "Uniqueness or rarity" criterion.

| | | | | | |
|---|---|---|---|---|---|
| **Vulnerability, fragility, sensitivity, or slow recovery** | Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery. | | | | X |

*Explanation for ranking*

Species with vulnerable life histories include: fin whales; numerous species of elasmobranchs; loggerhead turtles; and the occasional presence of leatherback and green turtles. Vulnerable and fragile benthic habitats and species include: white coral mounds composed of *Lophelia pertusa*, *Madrepora oculata* and Balanus spp. Barnacles (Ragonese et al, 2007); the scleractinian coral *Cladopsammia rolandi* (Zibrowius, 1980); the yellow tree coral; the octocoral *Isidella elongata*; red coral; and *Funiculina quadrangularis* (cnidarian) communities (Freiwald et al., 2009).

Yelkouan shearwater are threatened by low adult survival (Oppel et al., 2011), with birds particularly susceptible to by-catch in fisheries (Anderson et al., 2011). Scopoli's shearwater in Malta have declined by 5-10% over the last 10 years (Derhe, 2012).

| | | | | | |
|---|---|---|---|---|---|
| **Biological productivity** | | | | X | |

*Explanation for ranking*

Water column primary productivity is not particularly high in this area but primary productivity of seagrasses and the secondary productivity of some animal species and communities are expected to be

significantly high.

Areas of high primary productivity and zooplankton concentration are stimulated by oceanographic features that result from the interaction of strong currents and complex topography. Current patterns are likely to retain productivity and fish larvae in the Sicilian Channel (Bakun, 2006). Upwelling is driven by wind and the meandering of the Atlantic-Ionian Stream (Robinson et al, 1991). Total biomass of demersal fish species is particularly high on the Adventure Bank, to depths of 100 m. This includes commercially important species, such as hake and red mullet (Garofalo et al, 2007). Productive benthic habitats include: white coral mounds composed of *Lophelia pertusa*, *Madrepora oculata* and Balanus spp. Barnacles (Ragonese et al, 2007); deepwater coral and octocoral assemblages; cold seeps (Minisini et al, 2007); *Funiculina quadrangularis* (cnidarian) communities (Freiwald et al, 2009).

| | | | | | |
|---|---|---|---|---|---|
| **Biological diversity** | | | | | X |

*Explanation for ranking*
In comparison to other parts of the ocean, the area has a high amount of biological diversity. In comparison to tropical coral reefs, however, the diversity is probably low. There is not enough data to compare the diversity to other parts of the Mediterranean.

| | | | | | |
|---|---|---|---|---|---|
| **Naturalness** | There are several pressures on the marine ecosystems in this area | | X | | |

*Explanation for ranking*
The Sicilian channel is an area characterized by high levels of human exploitation, the presence of invasive species, increased marine traffic and pollution.

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**Maps and Figures**

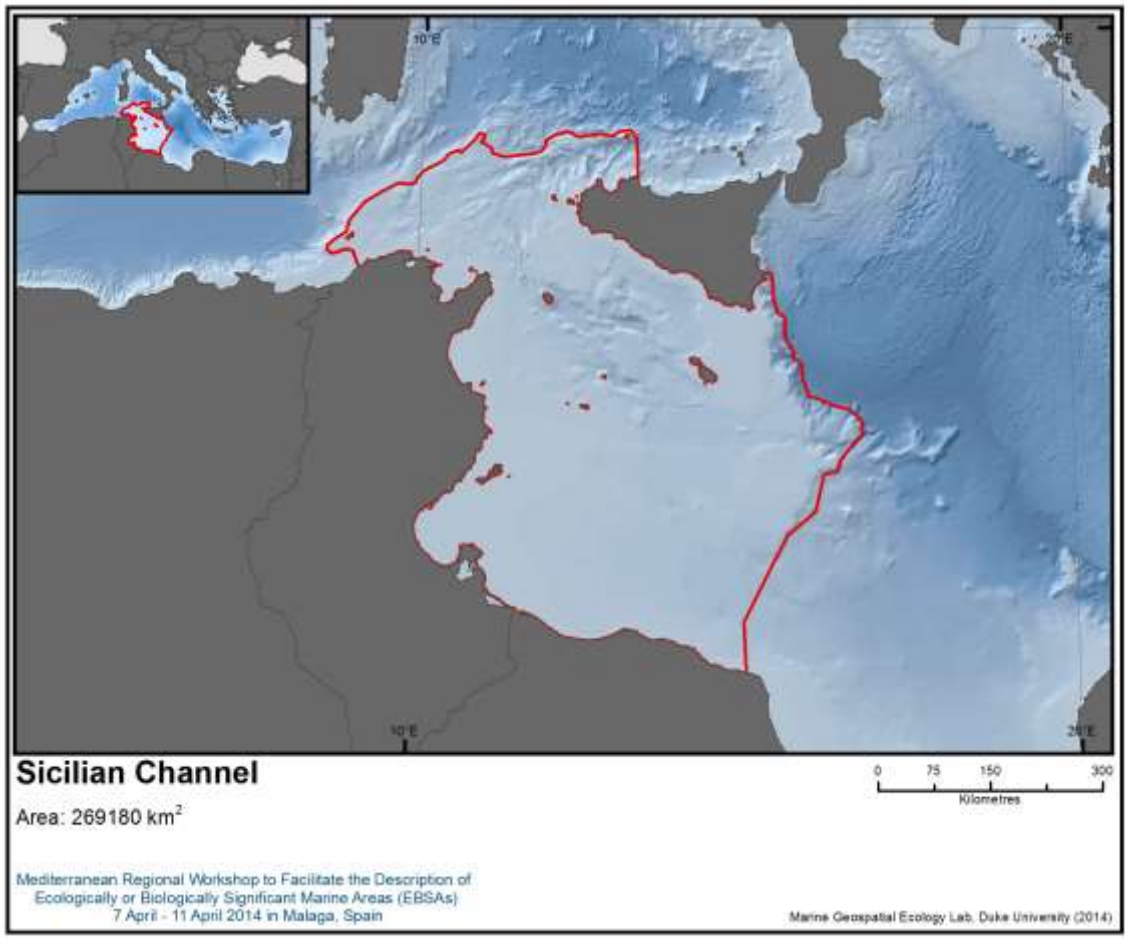


Figure 1. Area meeting the EBSA criteria.

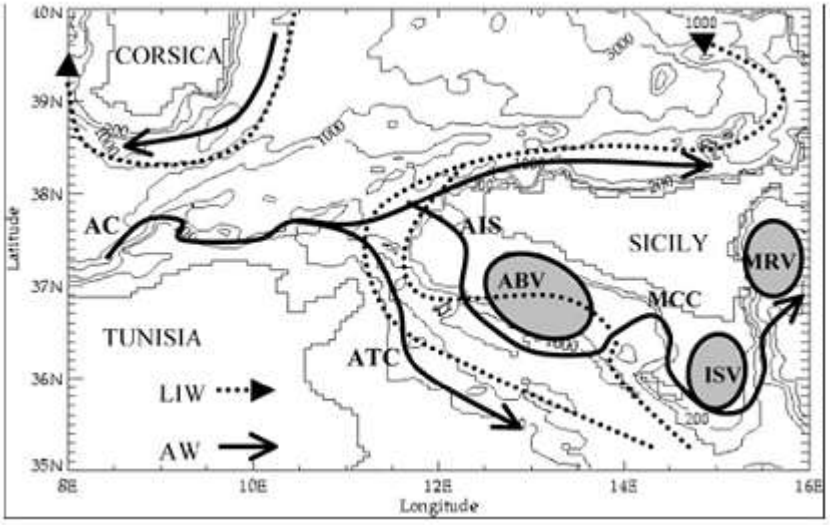


Figure 2. Circulation of sea masses on the Sicilian Channel (Source: Béranger, K., Mortier,L., Gasparini, G.P., Gervasio, L., Astraldi, M., & Crépon, M. 2004. The dynamics of the Sicily Strait: a comprehensive study from observations and models. DeepSea Research II 51: 411–440). Note: AC = Algerian Current; AW = Atlantic Water; LIW = Levantine Intermediate Water; AIS = Atlantic Ionian Stream; ATC = Atlantic Tunisian Current.

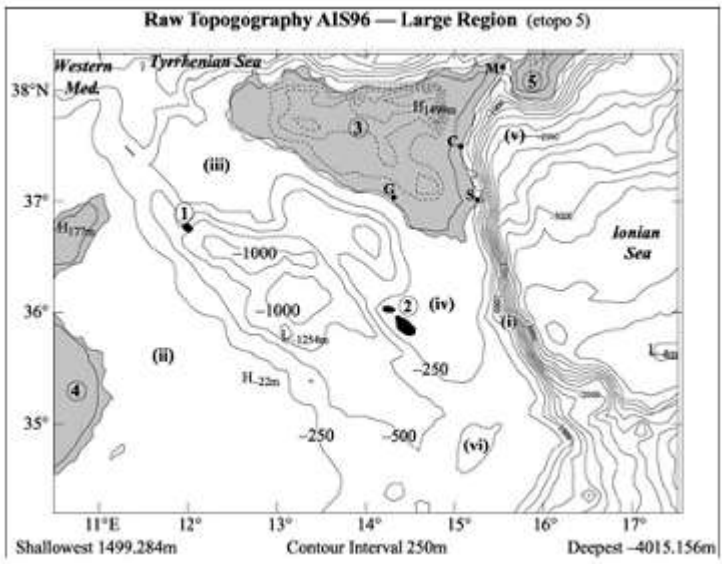


Figure 3. Topography and geography of the Sicilian Channel (Source: Lermusiaux, P.F.J., and A.R. Robinson. 2001. Features of dominant mesoscale variability, circulation patterns and dynamics in the Strait of Sicily. *Deep-Sea Research I Oceanographic Research Paper* 48/9, 1953–1997). Note: The numbers indicate Pantelleria Island (1), Malta Island (2), Sicily (3), Tunisia (4) and Calabria (5). The (i)s indicate topographic features (De Agostini, 1998): the Ionian slope (i), Tunisian shelf (ii), Adventure Bank (iii), Maltese plateau (iv), Messina Rise (v) and Medina Bank (vi). The letters indicate cities mentioned in the text: G for Gela, S for Siracusa, C for Catania and M for Messina.

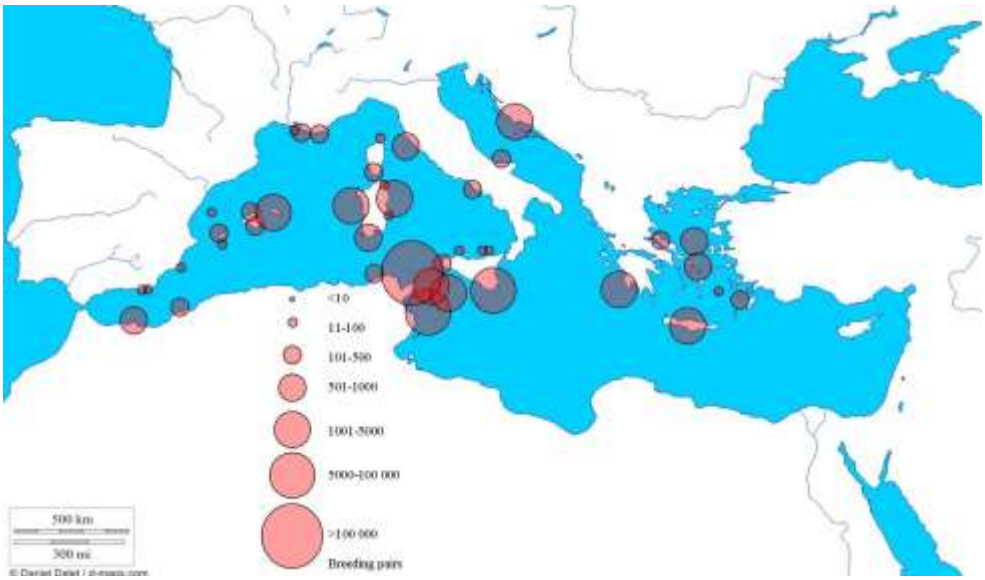


Figure 4. Breeding population of Scopoli's shearwater *Calonectris diomedea* (Thévenet, 2012).

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Figure 5. Breeding population of Mediterranean storm-petrel *Hydrobates pelagicus melitensis*. (Thévenet, 2012).

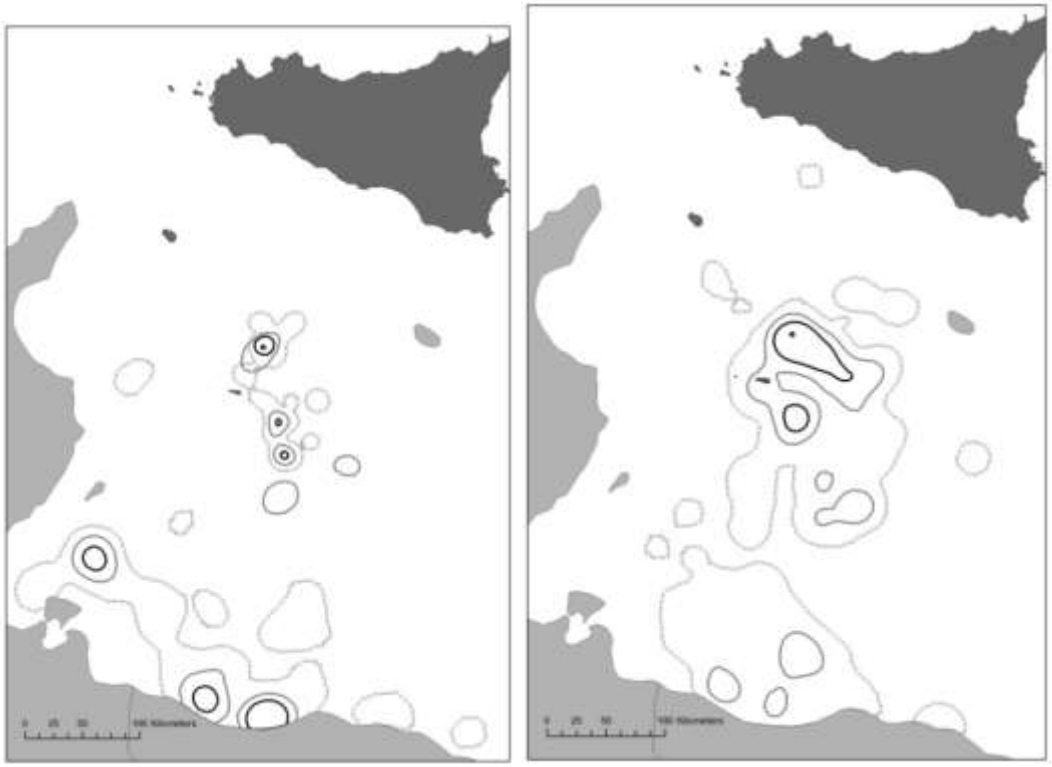

Figure 6. Kernels density analysis using GPS positions for Scopoli's shearwaters with instantaneous speed < 10 km/h. (Left) Linosa island during incubation 2008; (right) Linosa island during chick-rearing (2008-2009). Black line = 50% prob; gray line = 75%; hatched line = 95% (Cecere et al., 2012).

## Area No. 9: Le Golfe de Gabès

**Résumé**

Le Golfe de Gabès se caractérise par un linéaire côtier sur 626 km, représenté par trois grandes unités géomorphologiques:

(1) La zone renferme une grande diversité de formations littorales (sabhkas, plages, lagunes, dunes et zones humides) et écosystèmes côtiers (oasis, oueds et les communautés de végétation particulière) ;

(2) La zone marine est délimitée par Ras Kaboudia au nord, au sud par la frontière avec la Libye, et à l'est par l'isobathe -50 m au nord et de -100 m. Cette dernière limite (-100 m) semble être un importante aire de répartition du poisson guitare *Rhinobatos rhinobatos* et *Rhinobatos cumiculs* Echwikhi *et al*. (2014). On trouve également dans le Golfe de Gabès une variété d'écosystème insulaire dont les plus importantes sont les îles de Djerba, les îles Kerkennah et les îles Kneiss ;

(3) La région du Golfe de Gabès, représentant 33% des côtes tunisiennes.

Les herbiers à *Posidonia oceanica* forment l'écosystème marin le plus caractéristique et le plus important dans le Golfe de Gabès et sont menacés de plusieurs manières. Les étendues de ces herbiers dans le Golfe de Gabès sont uniques et les plus vastes de la méditerranée. La plupart des communautés benthiques associés aux herbiers présentes en Méditerranée sont représentées dans cette zone. L'amplitude des marées dans le Golfe de Gabès est unique en Méditerranée où ce phénomène est pratiquement inexistant. L'amplitude verticale de l'étage médiolittoral y est exceptionnelle, avec une diversité biologique particulière et une faune diversifiée. Le nombre des espèces inventoriées dans le Golfe de Gabès est 1658 espèces, ce qui représente 14.8 % de l'ensemble des espèces identifiées en Méditerranée. Les invertébrés sont les plus représentées avec environ 68 % de la diversité spécifique dans le Golfe de Gabès. Étant donné les particularités biologiques, biogéographiques et climatologiques, cette zone est considérée comme un laboratoire vivant des consequences et impacts possibles des changements climatiques dans des autres régions de la Méditerranée dans le future.

**Introduction**

Le littoral du Golfe de Gabès est caractérisé par des côtes basses, sableuses, sablovaseuses ou même marécageuses.

Le Golfe de Gabès constitue les nurseries et la pépinière de la Méditerranée, et la biocénose à *Posidonia oceanica* y est considérée la plus étendue au monde.

**Biodiversité des espèces**

Le nombre des espèces inventoriées dans le Golfe de Gabès est 1658 espèces, ce qui représente 14.8 % de l'ensemble des espèces identifiées en Méditerranée. Les invertébrés sont les plus représentées avec environ 68 % de la diversité spécifique dans le Golfe de Gabès.

Parmi les grands taxons, les vertébrés sont les plus représentatifs de la diversité spécifique méditerrannéene. En effet, le Golfe de Gabès comprend 42.5 % des espèces de vertébrés existant en Méditerranée, contre 18.2 % d'espèces macrophytes et 11.7 % d'invertébrés (figure 2).

**1. Espèces à intérêt**

94 espèces à intérêt patrimoniale et régionale, et introduites ont été recensées dont :

i) 39 espèces à valeur patrimoniale nationale Tunisienne, qui font l'objet des mesures de protection au niveau international ;

ii) 27 espèces à intérêt régional pour les chercheurs tunisiens ;

iii) 28 espèces introduites.

**a. Espèces à valeur patrimoniale**

La plupart des espèces inventoriées dans le Golfe de Gabès sont aussi des espèces listées dans les annexes du Protocole ASP BD de la Convention de Barcelone.

La zone des îles Kneiss, à l'intérieur du Golfe de Gabès, est très riche en espèces à valeur patrimoniale (28 espèces), suivie de la côte est de l'île de Djerba.

Il y a lieu également de mentionner que certaines espèces patrimoniales deviennent de plus en plus rares. Parmi ces espèces : *Cystoseira foeniculacea* (Ercegovic), *Hippocampus guttulatus* Leach, 1814, *Zonaria pyrum* (Gmelin, 1791), *Epinephelus marginatus* (Linnaeus, 1758), *Luria lurida* (Linnaeus, 1758), *Stenella coeruleoalba* (Meyen, 1833), *Chelonia mydas* (Linnaeus, 1758), *Caretta caretta* (Linnaeus, 1758) (Ministère de l'Environnement, 2012).

**b. Espèces à intérêt régional**

La zone de Kneiss représente un site de grande importance pour les espèces d'intérêt régional (21 espèces), suivie des régions est et ouest de Djerba.

**c. Espèces introduites**

La région du Golfe de Gabès subit les conséquences de toutes les perturbations et les modifications floristiques et faunistiques apparues en Méditerranée.

L'ouverture du canal de Suez en 1869 a relié la mer Rouge et la Méditerranée qui sont très différentes du point de vue biogéographique et initié le passage et l'installation d'espèces marines d'origine indopacifique et érythréenne ou lessepsienne dans le bassin oriental méditerranéen.

Du point de vue de cette expansion, le Golfe de Gabès représente une région favorable à l'installation des espèces introduites par son hydrographie (eaux tempérées chaudes) et son important trafic maritime (ports de Skhira, Gabès et Zarzis). Cette zone est considérée comme un laboratoire vivant des conséquences et impacts possibles des changements climatiques dans des autres régions de la Méditerranée dans le future.

Au total, il y a 65 espèces introduites observées dans le Golfe de Gabès de la flore et de la faune, avec les poissons et les mollusques (gastéropodes et bivalves) comme groupes plus nombreux (26%), suivi par les crustacés (22%) (figure 3).

Les principales espèces introduites observées dans le Golfe de Gabès et les lieux de leur observation sont: *Metapenaeus monoceros* (Fabricius, 1798), *Fulvia fragilis* (Forsskal, 1775), *Pinctada radiata* (Leach, 1814), *Trachysalambria palaestiniensis* (Steinitz, 1932) (Ministère de l'Environnement, 2012).

**Situation géographique**

Les côtes sud-est de la Tunisie (Golfe de Gabès) s'étendent du sud de la ville de Chebba jusqu'à la frontière Tuniso-libyenne. Le Golfe de Gabès se caractérise par des fonds sableux et sablo-vaseux. Le plateau continental, de pente très douce, est très étendu. C'est une zone caractérisée par une forte amplitude des marées, pouvant atteindre 2 m. Les herbiers de posidonies et de caulerpes, autrefois très fréquentes, et bien répandues tout au long des côtes du golfe se limitent actuellement aux alentours des îles de Kerkennah au niveau des hauts fonds.

La zone du Golfe de Gabès se caractérise par un linéaire côtier s'étendant sur 626 km, est représenté essentiellement par trois grandes unités géomorphologiques: le Sahel de Sfax, les jbels Matmatas et la plaine de la Jeffara. La Zone proposée est localisée dans les limites de la juridiction nationale Tunisienne.

**Description des caractéristiques de la zone**

Au point de vue des biotopes et biocénoses marines et lagunaires, le Golfe de Gabès présente des caractéristiques particulières:

- Une très faible déclivité de son plateau continental et une absence de relief sous-marin (sauf quelques bancs immergés), avec une prépondérance du substrat meuble.

- Une hydrologie marine très active et complexe liée aux effets de la houle engendrée par les vents d'est et à la circulation générale des courants marins et de marée qui le contournent et/ou le traversent.

Les conditions naturelles régnant sur le plateau des îles Kerkennah sont caractérisées par une faible profondeur, une marée importante et une eau limpide, qui confèrent au milieu marin des particularités intéressantes du point de vue des richesses en faune et flore marines.

Autour de l'archipel, se développe un immense plateau recouvert de divers types de sédiments: sable purs et peu vaseux, sable vaseux et vase sablonneuse. Le sable pur et le sable peu vaseux forment une bande étroite autour de l'archipel et correspondent aux sables littoraux sans végétation. Le sable vaseux constitue l'ensemble sédimentaire majeur du plateau, lequel est recouvert de prairies mixtes de cymodocées et caulerpes et d'herbiers de posidonies. Ces deux ensembles constituent une protection pour le littoral car ils amortissent les courants et les houles.

**Hydrogéologie**

La faible superficie et la topographie plane ne favorisent pas l'établissement de réseaux hydrographiques importants. Le drainage s'écoule vers les sebkhas qui communiquent avec la mer lors des hautes marées. Les réservoirs souterrains locaux sont constitués d´aquifères superficiels de faible profondeur. La salinité est inférieure à 3 g/l. La nappe profonde ou nappe du Sahel qui alimente aussi Sfax et couvre environ 10.000 $km^2$, atteint l'archipel des Kerkennah.

**Hydrodynamique marine**

La circulation générale dans le Golfe de Gabès est essentiellement conditionnée par le phénomène de marée qui est un phénomène très rare et localisé dans le bassin méditerranéen. L'onde de marée est de type semi-diurne.

La dynamique du Golfe de Gabès est étroitement liée à la circulation générale de la Méditerranée d'une part, et d'autre part, aux propagations des ondes de marée à l'intérieur de ce golfe.

Le Golfe de Gabès est remarquable pour ses pentes douces et par son plus large plateau continental de la Méditerranée qui en fait une caractéristique de cette zone. Les petits fonds sont localisés autour des îles Kerkennah, et se prolongent pour atteindre la côte libyenne.

Cette particularité fait du Golfe de Gabès une zone remarquable par :

a) La diversité biologique ;

b) Les conditions nautiques, où l'on trouve des zones calmes par presque tous les temps ;

c) Une amplitude de la marée unique en Méditerranée.

**Biodiversité des écosystèmes et des communautés**

**1. Le plancton**

**a. Communautés phytoplanctoniques**

Durant les périodes estivales, la densité du phytoplancton dans les zones du Golfe de Gabès (y compris les îles de Kerkennah, les îles de Kneiss et lîle de Djerba), varie entre 200 et $11 \times 10^3$ ind./l.

Les faibles densités de micro-algues sont enregistrées dans les îles de kneiss, variant de 200 à 400 ind./l.

Les dinoflagellés qui sont dominants dans le large du Golfe de Gabès coïncident avec les faibles températures et les concentrations élevées de l'azote. En zones littorales, on note la dominance des diatomées (32% du phytoplancton total) suivi des dinoflagellés (23% du phytoplancton total) dans les îles de Kerkennah, de Djerba et de Kneiss pendant les périodes estivales.

On note, également, la présence des cyanobactéries. La dominance des cyanobactéries dans les îles de Kneiss (29,1 - 81% du phytoplancton total) est due aux températures des eaux élevées variant entre 29 et 30°C et à la faible profondeur de la colonne d'eau (0-14 mètres).

**b. Communautés zooplanctoniques**

- L**es protozoaires ciliés** : La classe des Spirotrichea a représenté des densités les plus importantes par rapport aux ciliés totaux dans la majorité des stations de Kerkennah Ouest et les îles de Kneiss pendant le mois de Juillet 2009 et de Juillet 2010.

**-Le métazooplancton :** La salinité et la température influencent considérablement la composition et la distribution spatiale et temporelle du zooplancton et essentiellement le groupe des copépodes.

Durant les deux campagnes de Juillet 2009 et de Juillet 2010, une nette dominance des copépodes par rapport aux autres groupes zooplanctoniques a été remarquée.

Dans la lagune d'El Bibane, on note que, les valeurs de la température (T° >29,9°C) et de la salinité (> 45,5 PSU) sont plus élevées que celle enregistrées au niveau des autres zones du Golfe de Gabès et ceci durant les deux campagnes estivales. Ce qui témoigne l'importance du confinement et de l'évaporation dans ce milieu particulier lagunaire. Ces conditions lagunaires de température et de salinité paraissent idéales à l'installation et à la croissance du zooplancton (les copépodes) puisque on a noté les valeurs de densités zooplanctoniques les plus importantes qui atteignent 64595 ind. m-3 au cours de Juillet 2010.

Cette richesse en zooplancton, essentiellement les copépodes reflète le rôle de nurserie de la lagune d'El Bibane et explique de sa richesse halieutique.

**2. Le benthos et le Necton**

Malgré l'homogénéité du relief sous-marin et la prédominance des fonds sablo-vaseux du Golfe de Gabès, il faut remarquer la grande variété des communautés benthiques.

**a. Communauté de C*ymodocea nodosa***

Le Golfe de Gabès abrite des herbiers de *Cymodocea nodosa* denses qui ont la particularité d'apparaître à partir de très faibles profondeurs ne dépassant pas 20 cm dans certaines zones.

Les densités les plus élevées ont été enregistrées à Jerba Ajim et Jerba Borj Jelil et Kerkennah Allama.

L'herbier de *Cymodocea nodosa* présente une plus grande vitalité à Kerkennah et Djerba par rapport aux lagunes de Boughrara et Bibane.

Les herbiers de *Cymodocea nodosa* de Kerkennah sont caractérisés par une densité variable et très importante dans certaines zones. Les feuilles sont courtes, avec une moyenne de 13,6 cm de longueur, sous l'effet d'une marée importante.

Les herbiers de Djerba présentent une densité importante et des feuilles allongées atteignant une moyenne de 44 cm, la plante dans ce cas privilège une croissance verticale sur la multiplication de nombre des feuilles par faisceau.

Les herbiers de Boughrara et d'El Bibane sont des herbiers clairsemés, présentant une longueur moyenne des feuilles et un nombre moyen de feuilles intermédiaires comparés à Kerkennah et Jerba.

Au niveau de Kneiss, la cymodocée est remplacée par *Nanozostera noltii*.

**b. L'herbier de *Posidonia oceanica***

Les herbiers étudiés dans le Golfe de Gabès présentent différents états de conservation.

**Kerkennah**

Les herbiers du sud-ouest de Kerkennah présentent, en général, des valeurs faibles de densité et de couverture ainsi qu'un considérable pourcentage de faisceaux plagiotropes, ce qui permet de considérer que les herbiers régressent. Néanmoins, les herbiers du sud-est de Kerkennah se trouvent en bon état.

**Djerba**

C'est le même cas qu'à Kerkennah, dans la zone ouest les herbiers présentent une couverture de *Posidonia* vivante très faible face à la grande quantité de matte morte; en plus, les densités des faisceaux sont très basses. Tandis que dans la zone est on observe, en général, une densité et une couverture plus élevées bien que la surface foliaire est plus faible.

**Kneiss**

Les herbiers sont très homogènes, avec des couvertures élevées mais la densité est faible et le pourcentage des rhizomes plagiotropes est élevée. Ceci peut indiquer que l'herbier de Kneiss présente les premiers symptômes de dégradation.

**c. Autres communautés benthiques importantes**

Il existe d'autres communautés importantes pour la protection. Parmi lesquelles, nous pouvons citer les plus caractéristiques:

**Peuplements lagunaires d'algues rouges et brunes libres**

Dans le secteur est de la lagune de Boughrara, entre 2 et 2,5 m de profondeur, sur un fond sablo-vaseux il y un peuplement d'algues rouges (*Rytiphlaea tinctoria, Hypnea musciformis, Halopitys incurvus*) et brunes (*Cystoseira* cf. *barbata*), avec les chlorophytes *Chaetomorpha linum* et *Ulotrix flacca*. Le poisson protégé *Aphanius fasciatus* est abondant dans ce peuplement.

Ce peuplement végétal est considéré comme menacé par le Livre Rouge «Gérard Vignier» (PNUE/UICN/GIS Posidonie, 1990).

**Bio-concrétions à Serpulidae**

Ce type de concrétions calcaires, à base des Serpulidae, représentent des habitats très complexes sur les fonds meubles.

A part du substrat dur, la présence des crevasses permet d'abriter une diversité élevée d'organismes du benthos sessile et vagile (éponges, cnidaires, polychètes, bryozoaires, crustacés, ascidies, mollusques). Dans le Golfe de Gabès les formations à *Filograna implexa* ont été observéses à Kerkennah, entre 10 et 15 m de profondeur; et les formations à *Hydroides elegans* dans la lagune de Boughrara, entre 4 et 16 m de profondeur.

**Fonds du maërl**

Les rhodolithes, principalement, des espèces *Lithothamnion corallioides* et *Phymatolithon calcareum*, avec *L. minervae* et *Mesophyllum alternans* ont été trouvés entre 21 et 45 m de profondeur. Mais, dans la plupart des cas leur présence a été rare. Néanmoins, il y a quelques secteurs où ils forment les «fonds de maërl», principalement dans le sud de Kerkennah entre 24 et 40 m de profondeur; et l'est de Djerba, entre 24 et 39 m de profondeur.

**Fonds à *Arthrocladia villosa***

Les fonds à *Arthrocladia villosa* sont bien représentés dans le sud de Kerkennah (34-44 m de profondeur) et l'est de Djerba (29-39 m de profondeur). La diversité de macrofaune y est élevée.

Il faut souligner l'importance de cet habitat comme aire de nurserie. A l'est de Djerba, juvéniles de *Spicara smaris, Mullus surmuletus* et *Pagellus erythrinus* ont été trouvés en abondance dans cet habitat.

**Fonds à Synascidies**

En Méditerranée, ce faciès particulier du détritique côtier est caractéristique du Golfe de Gabès, où la dominance des ascidies coloniales est étonnante. Aucun type de fond ne lui ressemble en Méditerranée.

Les espèces dominantes appartiennent aux familles Polyclinidae (*Aplidium spp*.) et Polycitoridae (*Polycitor, Eudistoma spp*.), accompagnées par Didemnidae (*Didemnum, Trididemnum spp*.).

Ces espèces bio-constructrices génèrent des habitats complexes avec une importante biodiversité; comme filtreurs, les ascidies ont besoin des courants vifs (courants de marée) qui transportent la matière organique des herbiers voisins.

Dans le Golfe de Gabès, ces fonds meubles succèdent en profondeur (>30 m) aux herbiers de *Posidonia oceanica*. Ils se trouvent principalement dans le sud de Kerkennah et l'est de Djerba entre -30 et -45 m, plus rarement à grande profondeur. Normalement, l'ochrophyte *Arthrocladia villosa* est présente dans le Golfe de Gabès

**Fonds à échinodermes**

Dans les fonds détritiques envasés, il y a un faciès à dominance des *Antedon mediterranea* et/ou *Psammechinus microtuberculatus*. Ce type de fond se trouve principalement entre 40 et 50 m de profondeur, mais dans quelques endroits peut s'étendre jusqu'à -32 m (ouest de Kerkennah).

**Avifaune**

A mi-chemin entre le Golfe de Gabès et le sud de l'Italie, la zone proposée constitue une importante voie de migration pour les oiseaux traversant la Méditerranée. Les îles Kerkennah sont classées Zone d'Importance pour la Conservation des Oiseaux (ZICO), comme aire d'hivernage pour le Cormoran *Phalacrocorax carbo* (de 1000 à 10000 présents pendant l'hiver) et pour les laridés et sternes (dont *Larus genei, L. fuscus, L. cachinnans, Sterna caspia* et *S. sandvicensis*) ou les flamants roses.

Pour les oiseaux d'eau, Kneiss et ses zones intertidales ont la plus importante capacité d'accueil et le site le plus diversifié en espèces notamment les hivernants.

Pour les salines de Thyna, et malgré une capacité d'accueil plus faible, elles sont équivalentes à Kneiss en valeur biologique pour la diversité en espèces d'oiseaux.

Ceci est en relation avec la diversité des habitats et la disponibilité des ressources alimentaires et la proximité des dortoirs et es aires d'alimentation pour les hivernants. L'archipel de Kerkennah est en troisième position malgré le manque de données sur plusieurs habitats de l'archipel.

Les autres sites (lagune de Boughrara, Ras Rmel et sa lagune d'el Ghizen, et Bhiret el Bibane) sont également peu prospectés dans leur totalité mais renferment selon les données disponibles une diversité d'avifaune assez diversifié (40 à 54 espèces).

On note toujours pour les oiseaux d'eau dans ces six sites, la prépondérance des hivernants, les estivants nicheurs sont les moins fréquents.

**Zones sensibles et aires protégées**

La liste nationale des zones sensibles comporte deux sites aux Kerkennah :

- Les îlots nord-est de Kerkennah : constitués de 5 petites émergences, distantes l'une de l'autre de quelques kilomètres. Elles présentent une faible topographie avec des altitudes variant de 1 à 4 m pour un total de 460 ha de domaine terrestre : Gremdi, Roumadiya, Ramadiya, Sefnou et Charmadia. Le couvert végétal des îlots diffère de l'un à l'autre. On y rencontre une végétation arborée et arbustive dans les parties les plus élevées, une végétation psammophile au niveau des dunes et étendues sableuses et une végétation halophile dans les dépressions. Seule l'île de Gremdi, située en face d'El Attaya a été exploitée pour l'agriculture.

- Le site de Bordj El H'ssar se trouve sur l'île Chargui à l'est du village d'Erramla, sur une superficie

d'environ 350 hectares. Il est situé entre la presqu'île de Founkhal à l'est et la zone touristique de Sidi Fredj à l'ouest. Le fort de Borj El H'ssar se situe sur les vestiges de l'antique Cercina. Le site comporte une cité romaine et son port, des nécropoles puniques et romaines.

**État des caractéristiques et perspectives d'avenir pour la zone**

**Erosion et subsidence :**

L'archipel de Kerkennah, qui se trouve dans la zone proposée, est soumis à des différentes formes d'érosion dues au ruissellement des eaux de surface (pluie) et au vent (érosion éolienne) ainsi qu'à l'érosion marine, qui est manifestement la plus importante. Elle s'attaque à toutes les formes qui caractérisent la morphologie littorale, si bien que ses indices sont reconnaissables dans les différentes parties de la côte. Il est important de préciser qu'outre le phénomène d'érosion dû à l'action mécanique et chimique des vagues, le recul du trait de côte est également du en partie à l'élévation du niveau de la mer, à l'affaissement du sol de l'archipel par subsidence (Oueslati, 1995).

**Atteintes à la mer :**

Depuis la plus haute antiquité, la mer a servi de mère nourricière à l'archipel de Kerkennah aussi bien pour sa consommation propre que pour l'exportation au nord ou à l'est de la Méditerranée. A l'époque moderne, le kerkennien est devenu un véritable «paysan de la mer» puisque celle-ci est « lotie » et que certaines familles possèdent des titres de propriété en mer remontant à plusieurs siècles. C'est pour cette raison que les hauts-fonds qui ceinturent l'archipel ont été exploités par des techniques de piégeage et de capture adaptées à toutes les ressources halieutiques : poissons, mollusques, éponges, etc.

Ces techniques de pêche traditionnelles et ancestrales peuvent être qualifiées d'écologiques, comme la « Charfia », les nasses, les gargoulettes « Karour » ou les pierres creuses. En plus de ces techniques de pêche, la navigation se faisait à la voile. En effet, l'embarcation à voile communément appelée «Loud» ou « Felouque » est caractéristique des îles Kerkennah et son faible tirant d'eau et sa rapidité en font une embarcation très adaptée aux hauts-fonds de l'archipel.

Le diagnostic de la situation socio-économique et environnementale des îles Kerkennah en particulier font apparaître à priori un bilan relativement négatif sur le présent et le futur de cet espace :

- L'utilisation massive de techniques de pêche non conformes ;
- La baisse de la production halieutique indique une perturbation des écosystèmes et des chaînes de production qu'ils supportent, notamment les herbiers de phanérogames ;
- La flotte imposante de chalutiers basés sur la côte (plus de 80% de la flotte nationale).

**Un paysage sauvage de plus en plus ménacé :**

L'archipel des Kerkennah présente 161 km de côtes, dont la partie sablonneuse est de plus en plus fragilisée. Ces plages sont cernées d'un petit cordon de sable de quelques centimètres de hauteur. Or c'est ce sable qui a toujours été recherché pour la construction, bien que cet usage soit interdit. C'est ainsi que la frénésie de la construction balnéaire des trente dernières années a contribué au recul des plages et de l'avancée de la mer. C'est notamment le cas dans la région de Bounouma transformée en presqu'île à chaque coup de vent du nord ou du nord-ouest. Cette frénésie de la construction, conduite de façon anarchique, a modifié complètement le paysage de plusieurs zones littorales. Par le passé, les îles ont approvisionné le continent en calcaire : dans l'antiquité, une carrière bien visible aujourd'hui à l'est de Gremdi, a dû fournir des blocs de calcaire à El Hsar et à Thyna. Aujourd'hui, la situation a complètement changé. Depuis les années 60, les plages, les bords de sebkhas, les murets entourant les vergers, les «hmadhas», les affleurements de la dalle calcaire ont été systématiquement pillés, transformant certains sites en paysages désolés et désolants. L'approvisionnement de l'archipel en matériaux de construction de base (pierres, graviers, sable) pose aujourd'hui un très gros problème. Il n'y a pas très longtemps, chaque maison kerkennienne possédait du côté opposé à la Skifa, une petite sortie vers la «ghaba» devant laquelle s'accumulaient deux tas: celui du fumier, et celui «des ordures», toutes dégradables qui sont utilisées en

automne également comme fumier. Depuis cette époque, les choses ont changé avec l'apparition des emballages non dégradables : métal, carton métallisé et surtout matières plastiques. Ces ordures polluantes, atterrissent dans les sebkhas, à la sortie de chaque village, défigurant les paysages et polluant la nappe phréatique avec laquelle communiquent souvent les puisards utilisés comme lieux d'aisance et réceptacles des eaux usées : le littoral est presque complètement envahi par les emballages en plastique.

**Etat des stocks des poissons démersaux**

La surpêche dont attestent tous les pêcheurs de la zone est confirmée depuis plusieurs années par un bon nombre d'études d'évaluation des stocks des espèces démersales exploitées dans le Golfe de Gabès, qui ont démontré que l'effort de pêche déployé dépasse son niveau optimum. De plus certaines de ces études ont mis en évidence une grande pression de pêche déployée sur les juvéniles qui n'ont pas eu la chance de se reproduire et de participer à la régénération des stocks. Cette pression est plutôt exercée par le chalutage benthique et non par les engins artisanaux. Certaines études initées par le Programme National «Evaluation des Ressources Halieutiques Tunisiennes» (1996-1999), ont confirmé ces appréhensions en s'intéressant, entre autres, à 20 espèces démersales les plus importantes des pêcheries tunisiennes, en particulier celles exploitées dans le Golfe de Gabés. Les principaux résultats sont rapportés dans le tableau suivant :

**Etat d'exploitation des principales espèces commerciales dans le Golfe de Gabès**

| Zones | Sous-exploitées | Exploitation optimale | Surexploitation |
|---|---|---|---|
| Golfe de Gabès | - Marbré<br>- Saupe<br>- Poulpe musqué<br>- Crevette royale | - Sparaillon<br>- Sole (Solea aegyptiaca)<br>- Rouget de roche<br>- Seiche<br>- Saurel | - Pageot<br>- Petit Pagre<br>- Denté<br>- Rouget blanc<br>- Poulpe commun<br>- Daurade<br>- Merlu |

**Évaluation de la zone selon les critères de la CDB**

| **Critères CBD EBSA** (Annexe de la décision IX/20) | **Description** (Annexe I de la décision IX/20) | **Classement de la pertinence du critère** | | | |
|---|---|---|---|---|---|
| | | **Pas d'info** | **Faible** | **Moyenne** | **Élevée** |
| **Caractère unique ou rareté** | Aires contenant des espèces, des populations ou des communautés i) uniques (« la seule du genre »), rares (dans quelques endroits seulement) ou endémiques et/ou ii) des habitats ou des écosystèmes uniques, rares ou distincts; et/ou iii) des caractéristiques géomorphologiques ou océanographiques uniques ou inhabituelles | | | | X |

**Explication de classement**

Le Golfe de Gabès est une écorégion jouissant, de par son histoire géologique et climatique, d'un patrimoine exceptionnel en biodiversité

L'hydrodynamisme dans le Golfe de Gabès est conditionné par le phénomène de marée qui sont un phénomène très rare et localisé dans le bassin méditerranéen. L'onde de marée est de type semi-diurne.

Le Golfe de Gabès est remarquable pour ses pentes douces et par son plus large plateau continental de la Méditerranée qui en fait une caractéristique de cette zone.

Les herbiers à *Posidonia oceanica* dans le Golfe de Gabès, est l'habitat marin le plus caractéristique et le

plus important. Autour des îles Kerkennah, l'herbier à *Posidonia oceanica* se présente sous un aspect très particulier et extrêmement original: des bandes d'herbier de plusieurs dizaines de mètres de longueur, larges d'un à deux mètres, serpentent dans une pelouse à *Cymodocea nodosa* et *Caulerpa prolifera*, entre 0,5 et 3 m de profondeur.

Il y a des habitats très intéressants au vu de leur caractère original et unique en Méditerranée à coté des herbiers de *Posidonia oceanica* tels que les récifs barrières; pelouses de *Zostera noltii* et de *Cymodocea nodosa* ; récifs à Neogoniolithon dans la lagune d'El Bibane; fonds du détritique côtier avec algues rouges (*Osmundaria volubilis*) et/ou brunes (*Arthrocladia villosa*); fonds à spongiaires et sinascidies; et fonds de maërl.

Les fonds à Synascidies constituent un faciès particulier du détritique côtier est caractéristique du Golfe de Gabès, où la dominance des ascidies coloniales est étonnante. Aucun type de fond ne lui ressemble en Méditerranée.

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| **Importance particulière pour les stades du cycle de vie des espèces** | Aires nécessaires à la survie et à l'essor d'une population | | | X | |

**Explication de classement**

Les herbiers de posidonies sont des habitats clés pour les cycles vitaux pour des centaines d'espèces dont les espèces d'intérêt écologique et commercial.

Le Golfe de Gabès représente la zone de pêche la plus importante de la Tunisie (65% des captures) avec des ressources abondantes (poissons, crustacés, céphalopodes, bivalves, éponges), grâce à l'amplitude du plateau continental, l'accès est facile aux zones de pêche et l'importante présence d'herbiers qui constituent des frayères et des nurseries.

Les fonds à *Arthrocladia villosa* sont un important habitat comme aire de nurserie. A l'est de l'île de Djerba, ont été trouvés en abondance dans cet habitat des juvéniles de *Spicara smaris*, *Mullus surmuletus* et *Pagellus erythrinus. Ces fonds sont également* bien représentés dans le sud de Kerkennah (34-44 m de profondeur) et l'est de Djerba (29-39 m de profondeur). La diversité de macrofaune y est élevée.

Au niveau de la Lagune d'El Biban, la richesse en zooplancton, essentiellement les copépodes reflète le rôle de nurserie et explique de sa richesse halieutique de la zone.

La zone du Golfe de Gabès est un habitat pour le poisson *guitare Rhinobatos cemiculus* (Echwikhi et al. 2014) (en danger selon la liste rouge IUCN et inscrit à l'annexe 2 du Protocole ASP/DB de la Convention de Barcelone) et *Rhinobatos rhinobatos* (en danger selon la liste rouge de l'IUCN et inscrit à l'annexe 2 du Protocole ASP/DB de la Convention de Barcelone).

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| **Importance pour les espèces et/ou les habitats menacés, en danger ou en déclin** | Aires contenant des habitats nécessaires à la survie et au rétablissement d'espèces menacées, en danger ou en déclin, ou comprenant d'importants regroupements de ces espèces. | | | | X |

**Explication de classement**

Une zone clé au niveau Méditerranéen pour fréquentation et hivernage de la tortue caouane (*Caretta caretta*). C'est également zone clé pour plusieurs espèces dont les requins, les raies et poisson guitare.

zone clé pour les phanérogames marines qui sont des habitats en régressions dans toute la Méditerranée.

La zone proposée renferme des récifs de la Rhodobionte : *Neogoniolithon brassica-florida,* dans la partie

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| | sud qui constituent des formations fragile et à grande valeur écologique et patrimoniale.<br><br>Les herbiers tigrés de posidonies, unique dans la zone, se développent généralement dans des sites où l'action de l'homme est réduite; l'anthropisation et les pressions environnementales (température, salinité) peuvent générer une régression significative de ces structures (Pergent et al., 2010).<br><br>La zone est caractérisée par une richesse faunistique et floristique de ses fonds, aussi comme aire de ponte et de nurserie, dont la composition qualitative et quantitative semble changer, a cause d'une détérioration (envasement, pèche aux arts traînants, pollution chimique) provoquant la perte de superficies importantes d'herbiers de posidonies.<br><br>- Le Golfe de Gabès représente :<br>i) une importante aire de nourriture et d'hivernation pour la tortue marine *Caretta caretta*;<br>ii) de reproduction et nurserie pour une grande diversité des espèces de requins et raies<br>et iii) les populations de *Tursiops truncatus* sont importantes avec des interactions sur les engins de pêche.<br>- L'introduction progressive d'espèces animales et végétales en provenance de l'Indo-Pacifique et de l'Atlantique tropical, dont ses effets sur les organismes autochtones restent à élucider.<br><br>De plus, le caractère d'affinité chaude du Golfe de Gabès a été remarqué par différents auteurs, en particulier celui de la faune ichthyologique et ses rapports avec la faune tropicale. Une autre caractéristique importante de la région du golfe de Gabès c'est qu'il représente une des aires les plus diversifiées de la Méditerranée pour les fonds meubles.<br><br>Il y a des habitats très intéressants à protéger, soit pour leur importance écologique (biodiversité, nurserie); pour leur caractère original et unique en Méditerranée: herbiers de *Posidonia oceanica*, avec des récifs barrières et herbier tigré ; pelouses de *Zostera noltii* et de *Cymodocea nodosa* ; récifs à Neogoniolithon dans la lagune d'El Bibane ; fonds du détritique côtier avec algues rouges (*Osmundaria volubilis*) et/ou brunes (*Arthrocladia villosa*); fonds à spongiaires et sinascidies ; et fonds de maërl.<br><br>Certaines espèces patrimoniales du Golfe de Gabès deviennent de plus en plus rares. Parmi ces espèces :<br>*Cystoseira foeniculacea*<br>*Hippocampus guttulatus*<br>*Stenella coeruleoalba*<br>*Luria lurida*<br>*Caretta caretta*<br>*Zonaria pyrum*<br>*Chelonia mydas*<br>*Epinephelus marginatus*<br><br>*L'espèce Rhinobatos cemiculus* dont l'aire de ponte est exclusivement située dans la partie sud de l'EBSA Golfe de Gabès est classée en danger selon la liste rouge IUCN et inscrit à l'annexe 2 du Protocole ASP/DB de la Convention de Barcelone)<br><br>*L'espèce Rhinobatos rhinobatos* également présente dans la partie sud de l'air (en danger selon la liste rouge de l'IUCN et inscrit à l'annexe 2 du Protocole ASP/DB de la Convention de Barcelone)<br><br>Dans le secteur est de la lagune de Boughrara, entre 2 et 2,5 m de profondeur, sur un fond sablo-vaseux il y un peuplement d'algues rouges (*Rytiphlaea tinctoria*, *Hypnea musciformis*, *Halopitys incurvus*) et brunes (*Cystoseira* cf. *barbata*), avec les chlorophytes *Chaetomorpha linum* et *Ulotrix flacca*. Le poisson protégé *Aphanius fasciatus* est abondant dans ce peuplement. Ce peuplement végétal est considéré comme menacé par le Livre Rouge «Gérard Vignier» (PNUE/UICN/GIS Posidonie, 1990). | | | | |
| **Vulnérabilité, fragilité, sensibilité ou récupération** | Aires contenant une proportion relativement élevée d'habitats, de biotopes ou d'espèces sensibles, qui sont fragiles sur le plan fonctionnel (hautement susceptibles d'être | | | | X |

| | | | | | |
|---|---|---|---|---|---|
| **lente** | dégradés ou appauvris par les activités humaines ou par des phénomènes naturels) ou dont la récupération est lente | | | | |

**Explication de classement**

- Les poisons cartillagineux presents dans le Golfe de Gabès sont des espèces qui ont une faible capacité de regéneration se trouvent dans une aire clé pour leur cycle biologique.

- Perte de superficies importantes dherbiers de posidonies détérioration (envasement, pèche aux arts traînants, pollution chimique).

- Grandes superficies des fonds marins. Les peuplements denses d'algues photophiles et les herbiers de phanérogames dont *Posidonia oceanica* d´une grande vitalité avec des feuilles de plus de 1 m de long, abritent de nombreuses espèces. Pour les macro-algues: présence de nombreuses espèces : *Cymodocea nodosa, Caulerpa prolifera, Halimeda tuna, Padinia pavonica, Codium tomentosum, Acetabularia mediterranea, Litophylum expansum*).

- Presence d'espèces endémiques tells que *Cystoseira schiffneri*.

- Pour l'espèce d'algue calcaire concrétionnante *Neogoniolithion notarsii* leur édification se fait par un processus très lent qui demande plusieurs siècles. Leur valeur écologique est donc très importante.

- Sur le plan environnemental, la zone du Golfe de Gabes semble être affectée par différentes formes de dégradation des habitats et écosystèmes: la dégradation par érosion hydrique ; par érosion éolienne ; par transformation des écosystèmes naturels; par la salinisation des sols et des eaux souterraines ; par la salinisation des eaux souterraines; par la perte de biodiversité; par l'érosion littorale ; par la pollution et par désertification.

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| **Productivité biologique** | Aires contenant des espèces, des populations ou des communautés dont la productivité biologique naturelle est supérieure à celle des autres aires | | | X | |

**Explication de classement**

La zone du Golfe de Gabès est caractérisée par une importante richesse en zooplancton, essentiellement les copépodes explique de sa richesse halieutique et reflète le rôle de nurserie notamment au niveau de la lagune d'El Bibane.

Les vastes étendues des herbiers de phanérogames confèrent au Golfe de Gabès des habitats idéals pour grand nombre d'espèces et un fort potentiel de productivité biologique.

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|---|---|---|---|---|---|
| **Diversité biologique** | Aires comprenant des écosystèmes, des habitats, des communautés ou des espèces ayant un niveau de diversité biologique supérieur à celui des autres aires, ou qui présentent une diversité génétique plus élevée | | | X | |

**Explication de classement**

Les étendues de posidonies abritent des centaines d'espèces y compris une haute diversité d'éponges, de mollusques, et les poisons cartilagineux.

Le nombre des espèces inventoriées dans le Golfe de Gabès atteint 1658 espèces, ce qui représente 14.8% de l'ensemble des espèces identifiées en Méditerranée. Les invertébrés sont les plus représentées avec environ 68% de la diversité spécifique dans le Golfe de Gabès.

Le Golfe de Gabès comprend 42.5 % des espèces de vertébrés existant en Méditerranée, contre 18.2 % d'espèces macrophytes et 11.7 % d'invertébrés.

La zone proposée constitue une importante voie de migration pour les oiseaux traversant la Méditerranée. Les îles Kerkennah sont classées Zone d'Importance pour la Conservation des Oiseaux (ZICO), comme aire d'hivernage pour le Cormoran *Phalacrocorax carbo* (de 1000 à 10000 présents pendant l'hiver) et

| | | | | | |
|---|---|---|---|---|---|
| pour les laridés et sternes (dont *Larus genei, L. fuscus, L. cachinnans, Sterna caspia* et *S. sandvicensis*) ou les flamants roses. | | | | | |
| **Caractère naturel** | Aires possédant un caractère naturel plus élevé que dans les autres aires, en raison du faible niveau ou de l'absence de perturbations ou de dégradations causées par les activités humaines | | | X | |

**Explication de classement**

La zone proposée renferme des écosystèmes insulaires dont certaines îles non habitées et non fréquentées, des récifs trottoirs de *Neogoniolithon brassica-florida*, herbiers tigrés de Posidonies très sensibles.

Plusieurs zones humides dans la zone du Golfe de Gabès correspondant à des lagunes salées (bahira) et à des sebkhas (dépressions littorales) qui marquent le paysage.

La région du Golfe de Gabès, représentant 33% des côtes tunisiennes, bénéficie de longues façades maritimes et occupe une position stratégique dans le secteur de la pêche en Tunisie.

Le Golfe de Gabès abrite 39 espèces à valeur patrimoniale, qui font l'objet des mesures de protection au niveau international et 27 espèces à intérêt régional pour les chercheurs tunisiens.

**Partage d'expériences et information en appliquant d'autres critères (optionnel)**

| **Autres critères** | **Description** | **Classement de la pertinence du critère** *(veuillez marquer d'un X l'une des colonnes)* | | | |
|---|---|---|---|---|---|
| | | **Pas d'informations** | **Faible** | **Moyenne** | **Élevée** |
| **Ajoutez un/des critères pertinents** | Évaluation rapide de l'état de l'environnement (compagne de 2008) | | | | X |

**Explication du classement**
Inclus dans le tableaus suivant.

**Références bibliographiques**

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**Cartes et Figures**


Figure 1. Carte de l'aire remplissant les critères AIEB.

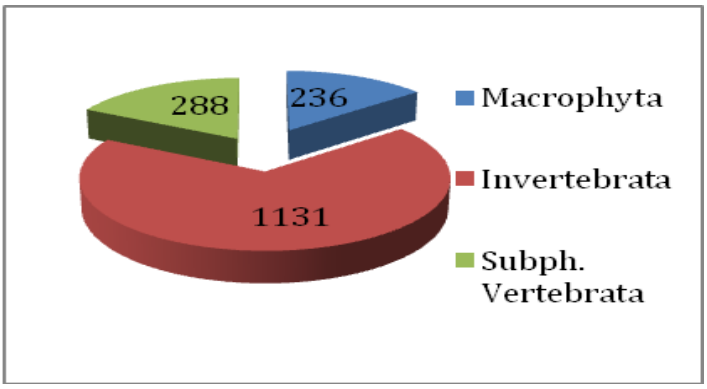



Figure 2. Répartition de la diversité spécifique dans le Golfe de Gabès (Source : Ministère de l'Environnement, 2012).

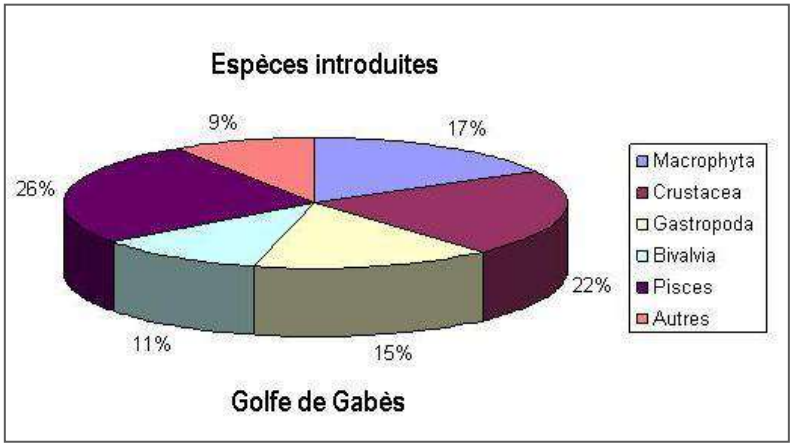



Figure 3. Pourcentage des taxons des espèces introduites dans le Golfe de Gabès. Autres : Cnidaria, Polychaeta, Echinodermata, Ascidiacea. (Source : Ministère de l'Environnement, 2012).

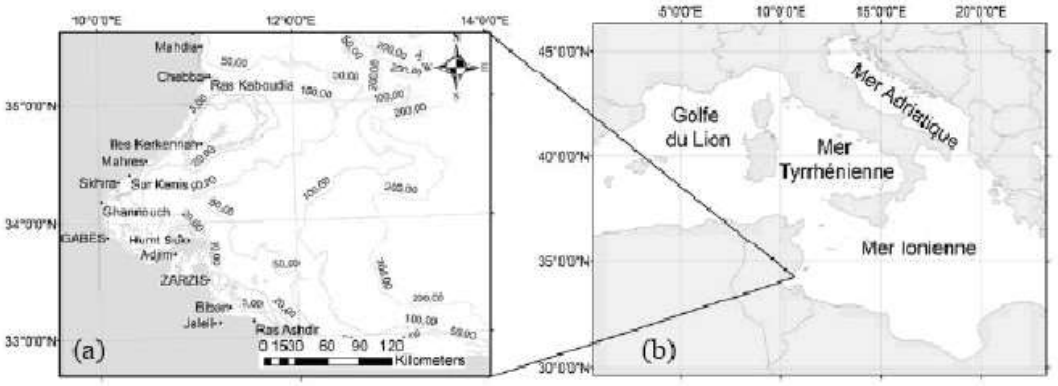



Figure 4. Carte bathymétrique du Golfe de Gabès (à gauche) et carte de la Méditerranée (à droite). Hattour et al, 2010.

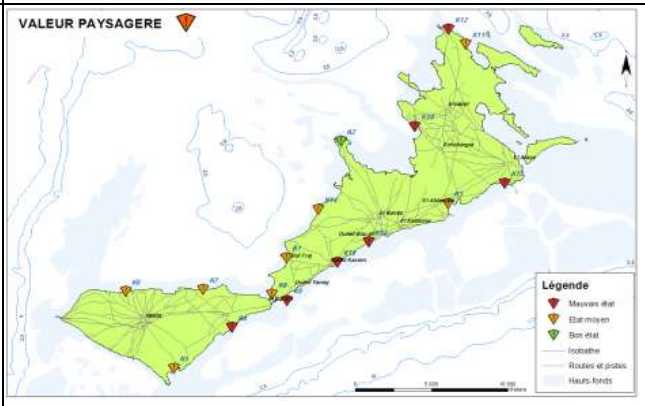
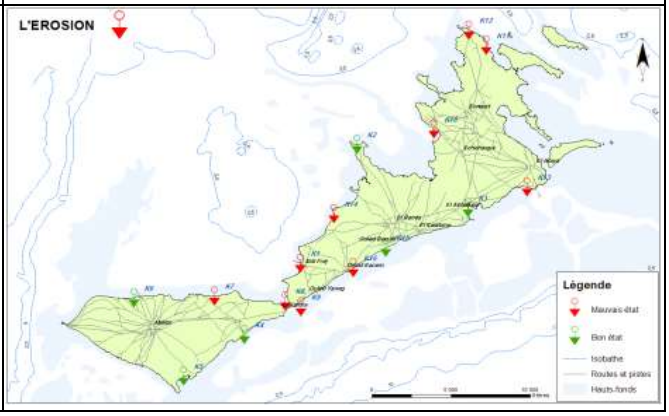
Table 1. Résultats des évaluations rapides de l'environnement dans le Golfe de Gabès (APAL, 2008).

| *Environnement/Écosystèmes/Espèces* | | Evaluation | | | *Environnement/Écosystèmes /Espèces* | | Evaluation | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Valeur paysagère (terre / mer) | | | | 12 | Construction | | | |
| 2 | Banquettes (herbiers) | | | | 13 | Charfia | | | |
| 3 | Phanérogames (posidonie, etc.) | | | | 14 | Barques de pêche | | | |
| 4 | Algues | | | | 15 | Érosion | | | |
| 5 | Végétation halophile | | | | 16 | Rejets liquides | | | |
| 6 | Autre végétation terrestre | | | | 17 | Eutrophisation (algues vertes) | | | |
| 7 | Invertébrés marins | | | | 18 | Hydrocarbures | | | |
| 8 | Poissons | | | | 19 | Déchets solides | | | |
| 9 | Oiseaux | | | | 20 | Épaves et Bois flottés | | | |
| 10 | Tortues marines | | | | | | | | |
| 11 | Mammifères marins | | | | | | | | |

| Principaux enjeux pour les îles de Kerkennah | |
|---|---|
| Rouge | Haute priorité |
| Jaune | Priorité moyenne |
| Vert | Priorité faible |

Table 2. Source Agence de Protection et d'Aménagement du Littoral (2008).

| Priorité | Détails et justificatifs | Illustration |
|---|---|---|
| **1. Oiseaux** | Bien que présent dans la plupart des sites, le score d'abondance moyen pour les oiseaux est seulement de 1 (c'est-à-dire 1-10 individus/250.000 m²). Les seuls sites où les oiseaux sont présents avec des densités assez élevées (abondance = 2, c'est-à-dire 10-100 individus/250.000 m²), étaient Sidi Khalfoun (K11) et Ouled Bou Ali (K15). |  |

| | | |
|---|---|---|
| **2. Poissons** | Le poisson a été trouvé dans plus que 70 pour cent des sites examinés. Cependant, bien qu'un score d'abondance de 4 ait été enregistré pour Ras Esmoum (K5) et le port de Kraten (K12), le score d'abondance moyen au niveau des Kerkennah était seulement de 2.<br><br>La faible densité ainsi que l'abondance des poissons de petite taille témoignent d'une surexploitation des ressources halieutique |  |
| **3. Valeur paysagère** | La valeur paysagère est un outil utilisé pour appréhender le potentiel écotouristique de chaque site.<br>Un seul site (K2, Sidi Founkhal) a obtenu un score élevé, alors que 2 sites ont obtenu des valeurs de 0 ou 1, correspondant à un paysage très dégradé (K12, Port de Kraten et K16, Ouled Kacem). |  |
| **4. Érosion** | L'érosion a été relevée dans plus de 60% des sites, tandis qu'un engraissement des plages a été enregistré dans 30% des sites prospectés. Les deux processus sont naturels, mais semblent être renforcés par les infrastructures et ouvrages réalisés sur la côte. |  |

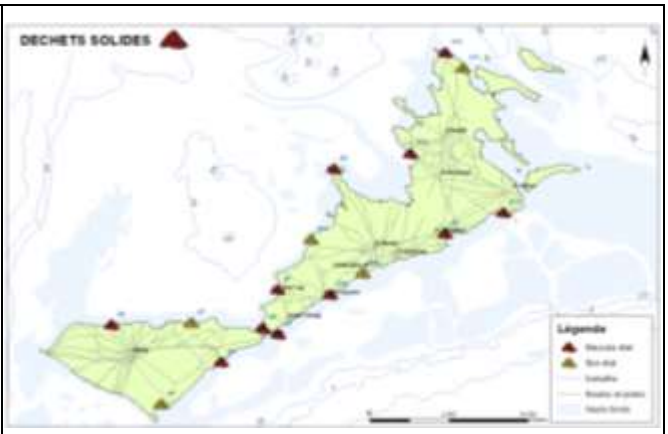
| | | |
|---|---|---|
| **5. Déchets solides** | Les paysages côtiers sont dégradés par les grandes quantités de déchets solides. Les déchets solides ont été observés dans tous les sites examinés, avec un score moyen de 5 (c'est-à-dire 10.000 – 100.000 articles dans la partie terrestre du quadra inspecté soit 125.000 m²). En plus des impacts paysagers de ces déchets, certains d'entre eux peuvent être physiquement ou chimiquement nuisibles pour la faune et la flore, côtières. |  |


Figure 5. Carte synthétique de la vulnérabilité dans les différentes zones du golfe de Gabes (Ministère de l'Environnement, 2012).

## Area No. 10: Gulf of Sirte

**Abstract**

The Gulf of Sirte is a very large natural area in the southern Mediterranean coast, entirely located in Libya's national jurisdiction. Its naturalness provides excellent coastal habitats for the reproduction of several endangered or threatened species such loggerhead turtles (*Caretta caretta*) and lesser crested terns (*Sterna bengalensis emigrata*). The area is of great importance for life-history stages, conservation and productivity of large numbers of pelagic species such bluefin tuna (*Thunnus thynnus*) and many Chondrichthyan fishes species, including many of the ones listed in the endangered and threatened species within the Barcelona Convention Annex II. One of the six spawning areas of bluefin tuna is included in this area.

**Introduction**

The Gulf of Sirte (figure 1) is located in the middle of the Libyan coastline. It gives its name to the city of Sirte situated on its western side. The area has few human settlements and maintains a high naturalness that allows the presence of many species that have disappeared or are declining in many areas of the Mediterranean.

**Location**

The Gulf of Sirte comprises around 750 km of coastline and includes the marine area between Misurata and Benghazi, which hosts the southernmost sandy beaches in the Mediterranean Coast.

**Feature description of the area**

The sea bottoms of the littoral zone of the Gulf of Sirte include important habitats such Posidonia meadows (*Posidonia oceanica*). Pelagic ecosystems are of great importance for species such as tuna (*Thunnus thynnus*), cartilaginous fishes and cetaceans, among others. Saied et al. (2012) stressed the unique nature of the Libyan nesting population of loggerhead turtle (*Caretta caretta*) in the Gulf of Sirte. The protection of this nesting stock is fundamental to managing the Mediterranean loggerhead turtle population.

**Feature condition and future outlook of the area**

There are important populations of cartilaginous fish, such as sharks, skates, rays and chimaeras, in the Gulf of Sirte. These fish, mainly sharks, guitarfish and some species of stingrays, have traditionally been consumed in Libya. Although no fishery data are available, cartilaginous fish are a component of by-catch of fisheries targeting swordfish, tuna, and demersal fish. However, in the Gulf of Sirte, a seasonal artisanal fishery targets sharks. Also, it has been recently observed that some longline fishing tends to target sharks because of the economic value of their meat on the national market and of their fins on the international market. The importance of this area for Elasmobranchs has given place to elaboration of a tailored research programme on this taxonomic group in Libya by the UNEP/MAP Regional Activity Center for Specially Protected Areas (Seret, 2005).

**Assessment of the area against CBD EBSA criteria**

| **CBD EBSA criteria** (Annex I to decision IX/20) | **Description** (Annex I to decision IX/20) | **Ranking of criterion relevance** (please mark one column with an X) | | | |
|---|---|---|---|---|---|
| | | **No information** | **Low** | **Medium** | **High** |
| **Uniqueness or rarity** | Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) | | | X | |

| | | | | | |
|---|---|---|---|---|---|
| | unique or unusual geomorphological or oceanographic features. | | | | |
| *Explanation for ranking*<br>The Mediterranean subspecies of lesser crested tern (*Sterna bengalensis emigrate)* is a priority species of the Mediterranean Seabirds Action Plan (coordinated by RAC/SPA) and the Mediterranean Small Island Initiative (PIM). This is one of the most significant species of the Libyan avifauna. The number of breeding pairs in Libya, and the Mediterranean region as a whole, does not exceed 2,400 pairs. The population that breeds in Libya is the only reproductive population in the Mediterranean (Hamza et al., 2007). Four breeding colonies are known (Hamza et al., 2012), several of which are recognized as Important Bird Areas on the basis of the presence of this species (BirdLife, 2014).<br><br>Garah island, located within the Gulf of Sirte, about 12 km off the coast (30°48'N 19°54'E) is the main breeding site for the species in the Mediterranean. It hosts a unique area in the Mediterranean for *Sterna bengalensis emigrata* reproduction. It is also considered as one of the most important breeding sites for lesser crested tern in the Mediterranean (IUCN, 2011). | | | | | |
| **Special importance for life-history stages of species** | Areas that are required for a population to survive and thrive. | | | | X |
| *Explanation for ranking*<br>This area hosts one out of the only three Mediterranean reproduction sites for *Sterna bengalensis emigrata*, as well as an important concentration of loggerhead turtle (*Caretta caretta*) breeding sites (Hamza, 2010).<br><br>Several endangered Elasmobranch Mediterranean species reproduce and thrive in this bay.<br><br>The Gulf of Sirte was also recently shown to host one of the six only spawning areas of bluefin tuna (*Thunnus thynnus*) of the Eastern Atlantic stock in the Mediterranean (Druon et al, 2011).<br><br>This site hosts important areas for the reproduction of:<br>*Sterna bengalensis emigrate*<br>*Caretta caretta*<br>Elasmobranches<br>Bluefin tuna (*Thunnus thynnus*) | | | | | |
| **Importance for threatened, endangered or declining species and/or habitats** | Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species. | | | | X |
| *Explanation for ranking*<br>The area is important for loggerhead turtle (*Caretta caretta*) nesting. About 650 nest/year are monitored along a coastal strip of this Gulf (21.33% of the total length).<br><br>Eastern Atlantic stock of Bluefin tuna have suffered a big depletion after increasing overfishing in recent decades and the few existing spawning areas are of vital for their recovery of this population.<br>Several species of Elasmobranches in this area are listed as endangered or threatened populations in the Mediterranean under the Biodiversity protocol (UNEP-MAP-RAC/SPA, 1995). | | | | | |
| **Vulnerability, fragility,** | Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **sensitivity, or slow recovery** | are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery. | | | | X |
| *Explanation for ranking*<br>The Elasmobranches are species with a very low recovery capacity and this bay provides for a protection allowing the improvement of stocks in the wider area (UNEP-MAP-RAC/SPA, 2005). This area is one out the only six breeding areas for the East Atlantic stock of Bluefin tuna (Druon et al, 2011). | | | | | |
| **Biological productivity** | Area containing species, populations or communities with comparatively higher natural biological productivity. | | | | X |
| *Explanation for ranking*<br>The Gulf of Sirte has a higher degree of biological productivity compared to its surrounding areas. It is included in a large recognized spawning and nursery area for species of high ecological relevance in the Mediterranean trophic chain, such as bluefin tuna and cartilaginous fishes like sharks and rays (UNEP-MAP-RAC/SPA, 2005). | | | | | |
| **Biological diversity** | Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity. | | | | X |
| *Explanation for ranking*<br>Some Elasmobranches species like the guitarfishes (*Rhinobatos rinobatos* and *Rhinobatos cemiculus*), spiny butterfly ray (*Gymnura altavela*) and the angel sharks (*Squatina spp.*) are still relatively common in the Libyan waters, while they are very rare or even non-existent in the rest of the Mediterranean Sea (UNEP-MAP-RAC/SPA, 2005). | | | | | |
| **Naturalness** | Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation. | | | | X |
| *Explanation for ranking*<br>The Gulf of Sirte has a very low degree of human activity and the longest sandy beach in the Mediterranean. The Gulf of Sirte has a low level of human development, with only three cities and few industrial facilities along around 750 km of its coast. Ship trafficis very low and mainly related to well-defined oil loading shipping routes. It shows a high level of naturalness with scarce human presence both at sea and in coastal areas. | | | | | |

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**Maps and Figures**

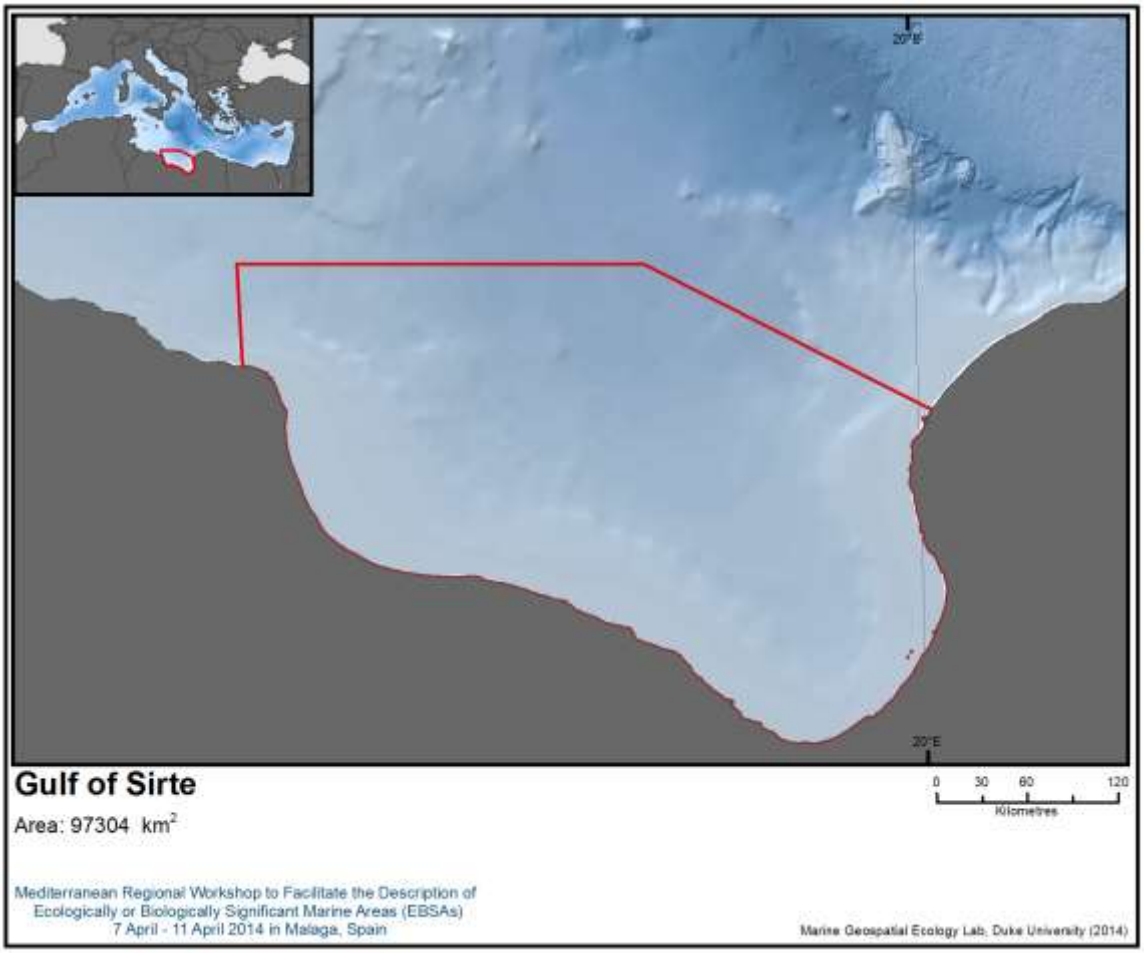


Figure 1. Area meeting the EBSA criteria.

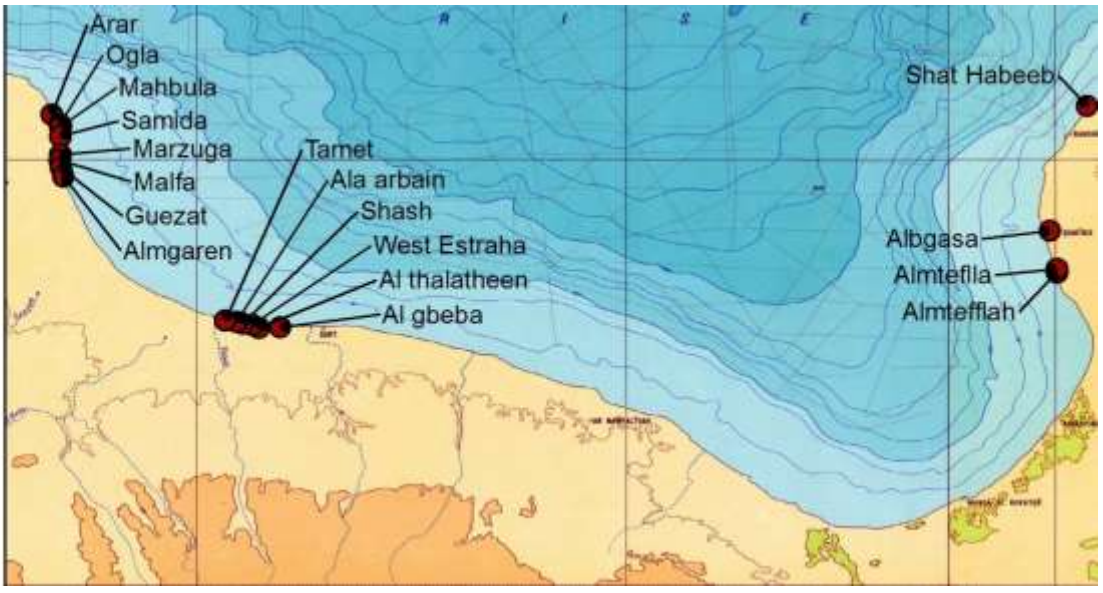


Figure 2. Map of turtles nesting areas in the Gulf of Sirte.

Table 1. Documented breeding population size (number of pairs) of lesser crested terns in Libya. After (a) Moltoni (1937); (b) Baker (1984); (c) Meininger *et al*. (1994); (d) Gaskell (2005); (e) EGA and RAC/SPA surveys; (f) A. Hamza (unpublished data). (Reproduced from Hamza, A., Azafzaf, H., and J. Yahia, 2012).

| Sites | 1937 (a) | 1978 (b) | 1993 (c) | 2005 (d) | 2006 (e) | 2007 (e) | 2008 (e) | 2009 (f) | 2010 (f) |
|---|---|---|---|---|---|---|---|---|---|
| Garah | 1000 | | 1700 | | 1920 | 1800 | 2000 | 2100 | 2000 |
| Ulbah | | | | | 29 | 24 | 14 | 24 | 16 |
| Julyanah | | 164 | | 50 | 200 | 125 | 120 | 140 | 70 |
| Ftiha | | | | | | | | | 12 |
| Totals | 1000 | 164 | 1700 | 50 | 2149 | 1949 | 2134 | 2264 | 2098 |

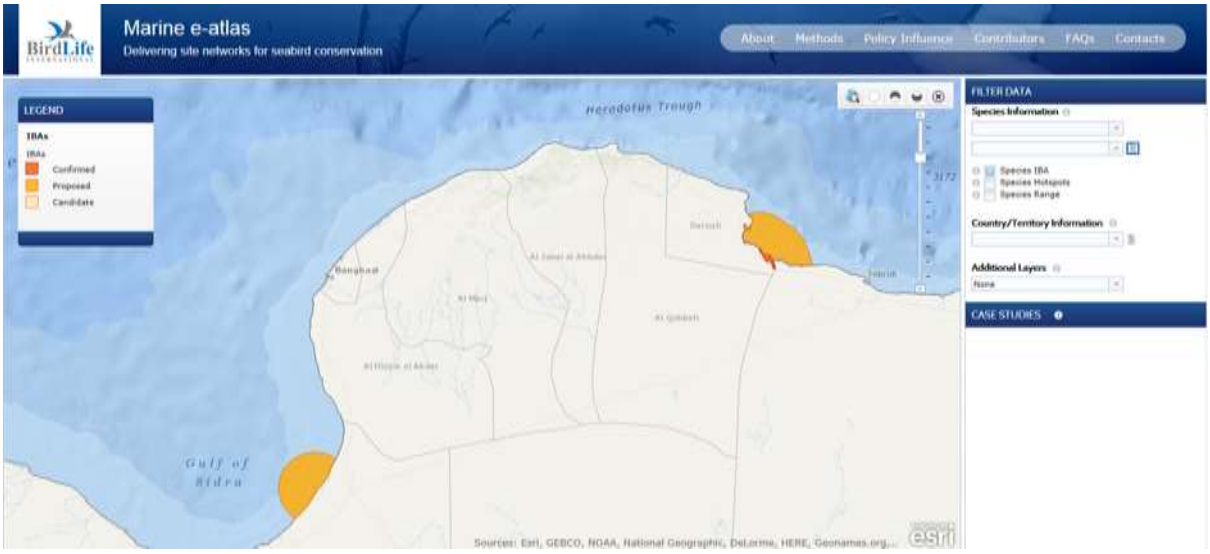


Figure 3. Map showing location of Important Bird Areas for this species in Libya, including predicted foraging areas (BirdLife International, 2014).

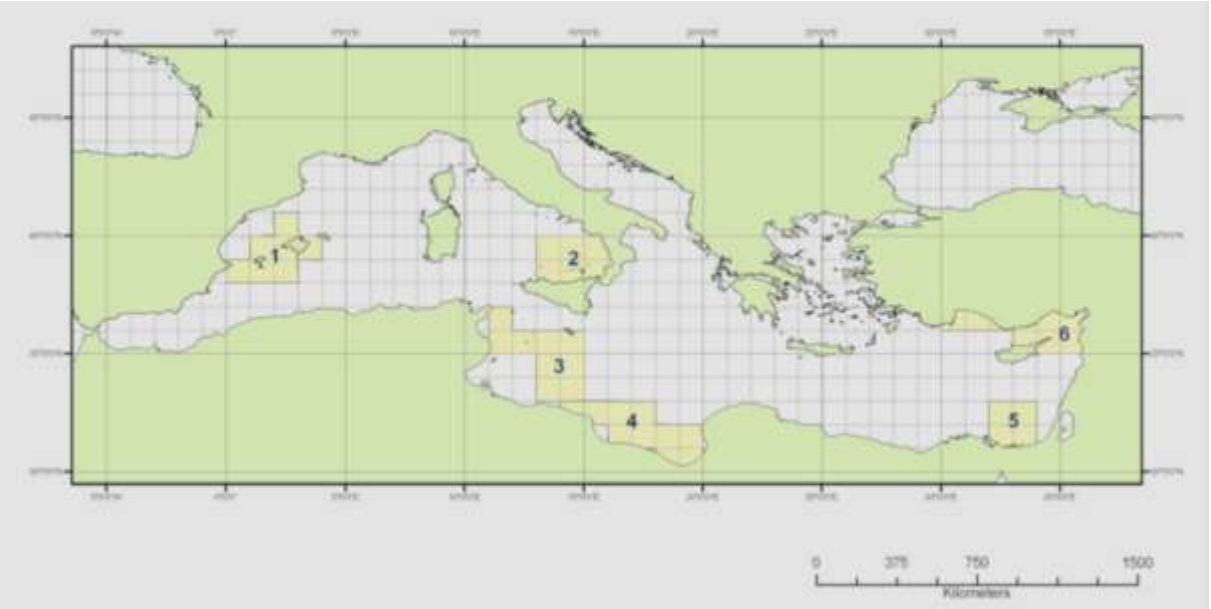


Figure 4. Spawning areas of *Thunnus thynnus* identified through analysis of VMS data used in the 2010 GBYP aerial survey program for surveying spawning biomass in the Mediterranean. These areas are consistent with current scientific knowledge of the main spawning locations (ICCAT, 2010).

## Area No. 11: Nile Delta Fan

### Abstract

The ecological and biological significance of the Nile Delta Fan (NDF) in the Eastern Mediterranean Sea stems from the area's geological features and natural phenomena (Nile silt sedimentation, physical and biological oceanographic and climatic characteristics). Important geomorphological features are also located in the area, including highly active cold seeps, canyons (Alexandria canyon), a fan, an escarpment and a continental shelf. Knowledge of deep-sea benthic habitats in this area is scarce, however it is known that there are unique habitats related to gas hydrocarbon chemiosymbiotic communities in this area. The area is home to vulnerable ecosystems composed of endemic molluscs and polychaete species. In addition, deep-sea corals communities are also predicted to be present in the area. Biodiversity index in the area is quite high (38 out of 50), as the area is home to major components of pelagic and benthic communities. Small pelagic fisheries are very important, as is the bluefin tuna fishery. Furthermore the NDF is known as one of the few spawning grounds in the Mediterranean Sea for bluefin tuna (BFT). Furthermore due to its productivity, pelagic species and marine turtles aggregate in feeding grounds in the shelf portion of the area, which are also used as breeding areas for birds.

### Introduction

The area (figure 1) is influenced by the Libyan-Egyptian current and the surface current flowing eastward along the continental slope off Egypt and northward along Israel and Lebanon (Taupier-Letage, 2007; Guerin et al., 2009). The geostrophic circulation of the eastern Mediterranean waters demonstrates a considerable stability in winter and autumn and is mainly characterized by a vast cyclonic gyre in the Levantine Sea, also enclosing an anti-cyclonic gyre near the Egyptian coast (El-Geziry and Bryden, 2010). The depth range in the area varies from the coastline to over 1700 meters depth and it contains very different types of ecosystems (e.g., from seagrass meadows to deep-sea chemosynthetic communities).

The Egyptian continental shelf and deep-sea surrounding areas are also very unique due to the occurrence of many cold seeps (mud volcanoes and pockmarks). Cold seeps are unique structures and used to harbor rare biological communities. These kind of geomorphological features have a high biological significance not only within the Mediterranean basin but also at global level. The region is known as spawning area for BFT and it possibly hosts cetacean habitat (e.g. Common dolphin - *Delphinus delphis*). According to MEDISEH project, it is a persistent habitat for several small pelagic species such as sardine and anchovy, among others. Furthermore, models have been used for predicted the occurrence of coralligenous bottoms in the area.

### Location

Located in the southern of the Levantine Sea, the area includes the continental shelf and slope off the Nile Delta and Sinai Peninsula.

### Feature description of the area

#### *Cold seeps*

The Eastern Mediterranean Sea is subject to widespread seabed fluid seepage activity associated with mud volcanoes, authigenic carbonates and pockmarks (Loncke et al., 2004; Dupré et al., 2008; Omoregie et al, 2008; Huguen, 2009). Offshore northern Egypt, the mud volcanoes are clearly dominated at present by gas expulsion and sub vertical mud breccia extrusion. The occurrence of gas hydrocarbon seeps harbor chemosymbiotic communities which are well documented. In the area's cold seeps, new species of mollusc and polychaetes have been recently described, such as the vestimentiferan *Lamellibranchia anaximandri* (Southward et al., 2011) or the Amphinomid *Cryptonome conclava* (Borda et al., 2012). *Lamellibranchia anaximandri* is the first tubeworm species to be described from the Mediterranean (Galil, no date.).

According Dupré et al. (2008) two highly active mud volcanoes (Amon and Isis) located at depths of 990–1,265 m have been mapped on the area. The associated seep area corresponds to a hot spot in terms of mud eruption, gas concentrations, temperatures and microbial activity. The seafloor is particularly chaotic and its sediments are highly disturbed and gas-saturated. Restricted to relatively narrow and subcircular surfaces (maximum 125 and 150 m in diameter for the centres of Amon and Isis, respectively), these hot spots are connected at depth to gas expansion conduits of similar dimensions. Long-term release of gas along some of these faults contribute to the precipitation of methane-derived carbonates and the construction of metre-scale hard ground edifices that attract chemosynthetic fauna. This type of seep activity occurs at the surface and off the flanks of the mud.

Data regarding associated fauna are still scarce, however two bivalve species associated with carbonate crusts and reduced sediment have been identified. The specimens are closely related to *Myrtea spinifera* and *Thyasira flexuosa*, two species previously documented at various depths from other regions, but not yet reported in the eastern Mediterranean. Both species harbor abundant gammaproteobacterial endosymbionts in specialized gill epithelial cells. The Myrtea-associated bacterium is closely related to lucinid symbionts from both deep-sea and coastal species, whereas the Thyasira-associated bacterium is closely related to the symbiont of a *T. flexuosa* from coastal waters off the U.K. An epsilonproteobacterial sequence has also been identified in *Thyasira* which could correspond to a helicoid-shaped morphotype observed by electron microscopy, but this was not confirmed using fluorescent in situ hybridization. Virus-like particles were observed within some symbionts in *Thyasira*, mostly in bacteriocytes localized close to the ciliated zone of the gill filament. Overall, results indicate that very close relatives of shallow species *M. spinifera* and *T. flexuosa* occur at cold seeps in the Eastern Mediterranean and harbour chemoautotrophic symbioses similar to those found in their coastal relatives (Brissac et al., 2010)

A living specimen of a solemyid bivalve has been also collected at bathyal depths near a pockmark in the Nile Deep-sea Fan. Both taxonomic and molecular results suggest a *Solemya* species but due to the small size of the animal and the lack of molecular data for other solemyid species the species cannot be determined. This is the first record of a living solemyid from deep-sea cold seeps in the Mediterranean Basin. The majority of *Solemya* species have been found in shallow depths. With the discovery of the first living solemyid at a depth of 1697 m in a cold seep in the eastern Mediterranean, the known distribution of this bivalve family has been extended. More research is needed to explore the deep richness of the Mediterranean Sea where there are a number of potentially suitable habitats for solemyids (Rodrigues et al, 2010).

Because of the occurrence of cold seeps in the area, GFCM designated a Fishery Restricted Area (FRA) due to the existence of such Vulnerable Marine Ecosystems (VMEs) (GFCM, 2006). According to that, bottom trawling activities were forbidden, however the last assessment of the FRAs shows a lack of enforcement in the area (GFCM, 2014).

***Primary productivity***

The richest marine biodiversity in the area are phytoplankton (661 species), consisting mostly on diatom, dinoflagellates and to a much lesser extent chlorophytes and cyanophytes. Marine algae and seagrasses are mostly *Posidonia oceanica, Zostera* sp, *Sargassum* sp, *Caulerpa prolifera*, *Halimeda* sp and other green algae. Zooplankton is represented by 184 species, mostly copepods, whereas macro benthic fauna (annelids, mollusks, echinoderms, arthropods, ascidians) are not abundant in biomass but high in species diversity. For example, a total of 51 sponge species, 126 polychaete species, 57 crustacean species, 7 bryozoan species, more than 100 mollusk species and 350 fish species have been recorded from the coastal waters of the Mediterranean.

Although the Mediterranean is considered oligotrophic, some areas are more productive due to bathymetric, hydrographical and meteorological conditions, such as the presence of a wide shelf, river runoff and wind mixing. These areas are important fishery zones because they are potential preferred spawning areas for many fish (Lloret et al., 2004). There is evidence showing impacts on phytoplankton

blooms in the area due to the construction of man-made structures (e.g., Aswan High Dam and the Suez Canal), with potential impacts on fisheries in the area (Caddy, 2013; McCall, 2008).

***Posidonia and other phanerogams***

The southern limit of *Posidonia* along the eastern Mediterranean is associated with the delta influence of the Nile at the Egyptian coastline. Current knowledge shows that meadows are absent along the eastern Egyptian coast (Giakoumi et al., 2013). In fact, along the northern African coasts (i.e. Algeria, Libya, Egypt) information on *Posidonia* is relatively scarce (MEDISEH, 2013).

Along the Egyptian Mediterranean coast, five phanerogam species have been recorded, among which, *Cymodocea nodosa* and the endemic species *Posidonia oceanica* are the most common and abundant. Whereas the other recorded species *Zostera marina*, *Zostera noltii* and the immigrant species *Halophila stipulacea* are scarcely represented and have been recorded previously at restricted sites (El Din and El-Sherif, 2013).

***Coralligenous***

This is an important habitat to be taken into account from the fisheries perspective but is also significant from the biodiversity point of view. According to the MEDISEH project (2013) the occurrence of coralligenous formations is predicted in the area (Samy et al., 2011).

***Sharks and rays***

The Mediterranean Sea is a relatively overlooked area of research for blue shark and sharks in general including about 50 species of sharks and rays in the area. Blue sharks constitute a major portion of by-catch of long line fisheries targeting swordfish or tuna, much of which is rarely incorporated into national and international catch statistics. In the western area of the NDF, blue sharks (*Prionace glauca*) have been documented. The blue shark is listed among the "protected fauna species" of the Bern Convention and is categorized as "Near threatened" under the IUCN Red List assessment for Mediterranean chondrichthyans. The UNEP RAC/SPA Action Plan for the Conservation of Cartilaginous Fishes in the Mediterranean Sea lists the blue shark among the main commercial species for which it primarily recommends the development of sustainable management programmes for fisheries catching this species both as target or by-catch (Megalofonou et al., 2009).

Giant devil ray (*Mobula mobular*) has been also observed aggregating at the surface in the area. On the other hand, the presence *of Squalus acanthias*, *Oxynotus centrina*, *Squatina squatina*, *Scyliorhinus canicula*, *Scyliorhinus stellaris*, *Mustelus mustelus*, *Mustelus punctulatus* and *Carcharhinus altimus* have been demonstrated in the Egyptian waters off Alexandria (Moftah et al., 2011).

***Tuna-like species and small pelagics***

*Small pelagics*

In the south part of the basin along the North African coast where information on small pelagic nursery grounds is generally lacking however persistent areas are indicated in the coastal waters of the Nile Delta. These areas match the distribution grounds of sardine, as landings information from local fisheries confirms (El Haweet, 2001). These findings agree with the general argument that pelagic fish nurseries are located in areas of favorable food concentrations where oceanographic factors combine favorably within an optimal environmental window. Moreover, similarly to large upwelling ecosystems, the juvenile grounds of sardine are mainly situated in inshore, coastal waters (MEDISEH, 2013).

According to the horse mackerel models of the MEDISEH project (2013), persistent habitat of nursery grounds of *Trachurus trachurus* and spawning grounds of *Trachurus mediterraneus* are predicted. Regarding chub mackerel (*Scomber colias*), potential nursery areas were located along the coast of Egypt.

*Bluefin tuna*

According to ICCAT (2010), the Nile Delta has been identified as spawning area for this species. Spawning of BFT in the eastern Mediterranean and in the Levantine sea usually occurs slightly earlier, starting in the first part of May, when the sea temperatures in this area increase well before than in all other parts of the Mediterranean Sea and when favourable weather situations allows the formation of an upper stratum with relatively high temperatures and a stable thermocline at the proper depth. According to the evolution of the hot water masses, this situation possibly occurs also along the south-eastern part of the Mediterranean Sea, along the eastern Egyptian coast (Piccinetti et al., 2013).

*Albacora*

A pelagic long line fishery targeting albacore in the Eastern Mediterranean Sea off Egypt has been documented. This fishing method was found to be highly selective for albacore, where its catch represented about 93.5% of the total landed catch (Gabr and El-Haweet, 2012).

***Turtles***

All three of the marine turtle species occurring in the Mediterranean also regularly occur in the Egyptian Mediterranean waters. These include *Caretta caretta* (loggerhead turtle), *Chelonia mydas* (green turtle) and *Dermochelys coriacea* (leatherback turtle). Loggerhead and green turtles nest in the Egyptian Mediterranean coast, although important nesting sites have not been documented in Egypt. In the area between Alexandria and Port Said, the highest density of dead loggerhead turtle strandings has been observed, suggesting that turtles congregate here to feed on the inshore continental shelf. Egypt probably hosts important foraging areas or migratory corridors for *Chelonia mydas*, as suggested by satellite-tracked nesting turtles from northern Cyprus and Syria. This is supported by the high by-catch level. Regarding the *Dermochelys coriacea* this is the rarest among the sea turtles because of its scarce occurrence (Casale and Margaritoulis, 2010). The coasts of the Sinai Peninsula are commonly used as nesting areas by loggerhead and green turtles.

The aforementioned three turtle species are under the Annex II to the SPA/BD Protocol, although they also appear in the IUCN Red List under the "Endangered" (*Caretta caretta* and *Chelonia mydas*) and "Critically Endangered" (*Dermochelys coriacea*) categories. Despite this, a high pressure from human activities (by-catch, black market) exists which is jeopardizing these populations. The declared catch rates and official fishing fleet statistics suggest that captures of loggerhead *Caretta caretta* and green turtles *Chelonia mydas* are in the order of several thousands per year, possibly 7,000 per year, mainly from trawling, longlining and set nets (Nada and Casale, 2011).

***Seabirds***

Seabirds breeding and wintering at five Important Bird Areas (IBAs) within the site, and travel from colonies to feed within the marine area, primarily within 15 km of the coast. The IBAs are the Lake Burullus Protected Area, Lake Manzala, El Malaha, Lake Bardawil, and Zaranik Protected Area (BirdLife, 2014). Several of these IBAs are already protected areas and recognised as Ramsar sites. Three species breed in globally significant numbers that exceed IBA criteria and thresholds including little gull (800 individuals), slender-billed gull (5,700 individuals) and little tern (1200 individuals). Four species winter in globally significant numbers that exceed IBA criteria and thresholds including little gull (up to 51000 individuals), slender-billed gull (up to 4200 individuals), black-headed gull (45000 individuals), great cormorant (62800 individuals).

Seabird species listed on Annex II of the Barcelona Convention include little tern (*Sterna albifrons*) and gull-billed tern (*Sterna nilotica*).

***Cetaceans***

Information on cetacean species in very scarce in the Levantine Sea and it is hardly limited to few sightings off the Lebanese coast (Dede et al., 2012). According to UNEP-MAP-RAC/SPA (2010), the area is a likely habitat for the common dolphin (*Delphinus delphis*). This species is under Annex II to the

SPA/BD Protocol to the Barcelona Convention and also classified as Endangered in the Mediterranean by the IUCN Red List. However, based on several sightings off the coast it is likely that more cetacean species occur in the region.

**Feature condition and future outlook of the area**

In the area described, marine resources have been used extensively and human impacts (habitat fragmentation, overfishing, destructive fishing practices, by-catch, pollution, deep sea mining, invasive species, and additionally climate change) with large projects such as the Suez Canal have affected the natural patterns, resulted in several of habitats and species lost and hence there are urgent needs for sustainable development of marine resources and their valuable habitats.

Changes in conditions are apparent in the last decade, including visible improvements in water quality in many places (thanks to strategic efforts to reduce pollutant loading) and declining quantities of hazardous substances such as DDT and heavy metals in most areas. Nevertheless, new issues are emerging which warrant attention, such as desalination and its negative effects; aquaculture and, cumulative risks due to reduced access and availability of space for multiple conflictive uses.

Furthermore, the expected impact of climate change on the Nile Delta and its coastal lakes are alarming., As well, the recent increase of sea water temperature, increased frequency of extreme events, and the coastal erosion of the Nile Delta, will likely make many millions of people vulnerable (UNEP-MAP RAC/SPA, 2009).

Regarding the planning of research activities, Egypt is updating its national biodiversity strategy and action plan, in accordance with the CBD Strategic Plan for Biodiversity 201-2020, where targets dealing with climate change and biodiversity, marine protected areas, ecosystems restoration, mainstreaming of biodiversity into all developmental sectors, will be taken into consideration. Contacts have been made with GEF/UNDP to develop concept notes on these important issues, and later will be developed into projects for funding from different sources including national, bilateral, and multilateral arrangements.

**Assessment of the area against CBD EBSA criteria**

| **CBD EBSA criteria** (Annex I to decision IX/20) | **Description** (Annex I to decision IX/20) | **Ranking of criterion relevance** (please mark one column with an X) | | | |
|---|---|---|---|---|---|
| | | **No information** | **Low** | **Medium** | **High** |
| **Uniqueness or rarity** | Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features. | | | | X |
| *Explanation for ranking*<br>NDF is a unique ecosystem in the Mediterranean Sea, due to the multiple effects of Nile sediments, mud volcanoes, and anti-cyclonic currents, as well as canyons and benthic chemo-symbiotic communities (Lloret et al., 2004; Dupré et al., 2008; Omoregie, 2008; Brissa et al., 2010; Rodrigues et al., 2010; El-Geziry and Bryden, 2010). | | | | | |
| **Special importance for life-history stages of species** | Areas that are required for a population to survive and thrive. | | | | X |
| *Explanation for ranking*<br>The area is well known as a feeding ground for marine turtles and sea birds as well as spawning grounds | | | | | |

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| for the BFT, other large and small fishes such as sardine and anchovy. It is also known to be a nursery ground for juvenile fishes (Clarke et al., 2000; McCall, 2008; ICCAT, 2010; Nada and Casale, 2011; MEDISEH, 2013; BirdLife International, 2014). | | | | | |
| **Importance for threatened, endangered or declining species and/or habitats** | Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species. | | | | X |
| *Explanation for ranking*<br>Invertebrates and fishes (many of which are endemic species), marine turtles, sea birds, marine mammals (either threatened or endangered species) inhabit sensitive shallow coastal and deep sea habitats in this area (IUCN Red Data Book, 2010, MEDISEH, 2013; Gabr and Hareed, 2012; Giannoulaki et al., 2013; Moftah et al., 2013; Piccinetti, 2013; RAC/SPA GIS database, 2014). Species under Annexes II or III to the SPA/BD Protocol and IUCN Red List are listed as follows: *Caretta caretta* (Annex II; Endangered); *Chelonia mydas* (Annex II; Endangered); *Delphinus delphis* (Annex II; Endangered in the Mediterranean Sea); *Thunnus thynnus* (Annex III; Endangered in the Mediterranean Sea); Sterna albifrons (Annex II); *Sterna nilotica* (Annex II); *Prionace glauca* (Annex III); *Mobula mobular* (Annex II; Endangered); *Squalus acanthias* (Annex III; Endangered in the Mediterranean Sea); *Oxynotus centrina* (Annex II; Endangered in the Mediterranean Sea); *Squatina squatina* (Annex II; Critically Endangered); *Scyliorhinus stellaris* (Near Threatened); *Mustelus mustelus* (Annex III; Vulnerable); *Mustelus punctulatus* (Annex III; Data Deficient)**.** | | | | | |
| **Vulnerability, fragility, sensitivity, or slow recovery** | Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery. | | | | X |
| *Explanation for ranking*<br>Deep sea benthic habits and species are vulnerable to many human activities such as mining exploration (which has increased in recent years), pollution, underwater noise, dredging of commercial species, overfishing, and other factors. Similarly, many introduced tropical species via the Suez Canal are already threatening native species and habitats (Brissa et al., 2010; RAC/SPA GIS database, 2014). | | | | | |
| **Biological productivity** | Area containing species, populations or communities with comparatively higher natural biological productivity. | | | | X |
| *Explanation for ranking*<br>The area is well known for the high chlorophyll A concentration during summer (18.5) and winter (22.2), as well as high primary productivity (5551.7 mg C/$m^2$/day). The algal bloom due to Nile nutrients are used by small pelagic fish which are in turn preyed upon by large pelagic fish such as BFT, sharks and other fishes. Marine turtles and sea birds aggregate in feeding grounds, and BFT spawn in the area (UNEP/CBD/EBSA/WS/2014/3/3, 2014; Moftah et al., 2013; Piccinetti, 2013). | | | | | |
| **Biological diversity** | Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity. | | | | X |
| *Explanation for ranking*<br>The area is known for its high biodiversity index (38 out of 50 for both shallow and deep habitats and species), with many pelagic and benthic (both shallow and deep) and species are endemic in major groups such as plankton (more than 800 species), sponges (51 species) mollusks (more than 100 species), polychetes (126 species), crustaceans (57 species), fishes (about 350 species), and other groups of turtles | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| seabirds and mammals. The area is known as one of the most important habitats for sea birds, marine turtles and mammals. On the other hand, unique deep-sea habitats and species associated to cold seeps (mud volcanoes, pockmarks, brine pools) occurred in the area (Dupré et al, 2008; UNEP/CBD/EBSA/WS/2014/3/3; Southward et al, 2011; Borda et al, 2012; Fouda, 2014). | | | | | |
| **Naturalness** | Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation. | | | X | |
| *Explanation for ranking*<br>Although naturalness is quite medium due to human activities, the area still harbors many pelagic and benthic communities and species, as well as spawning grounds for BFT and feeding grounds for turtles and sea birds. Predicted coral species indicate deep sea corals are not yet exploited. Similarly, endemic mollusks and polychate species still live in symbiotic relation with deep-sea gas producing bacteria (Brissa et al., 2010; UNEP/CBD/EBSA/WS/2014/3/3). | | | | | |

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**Maps and Figures**

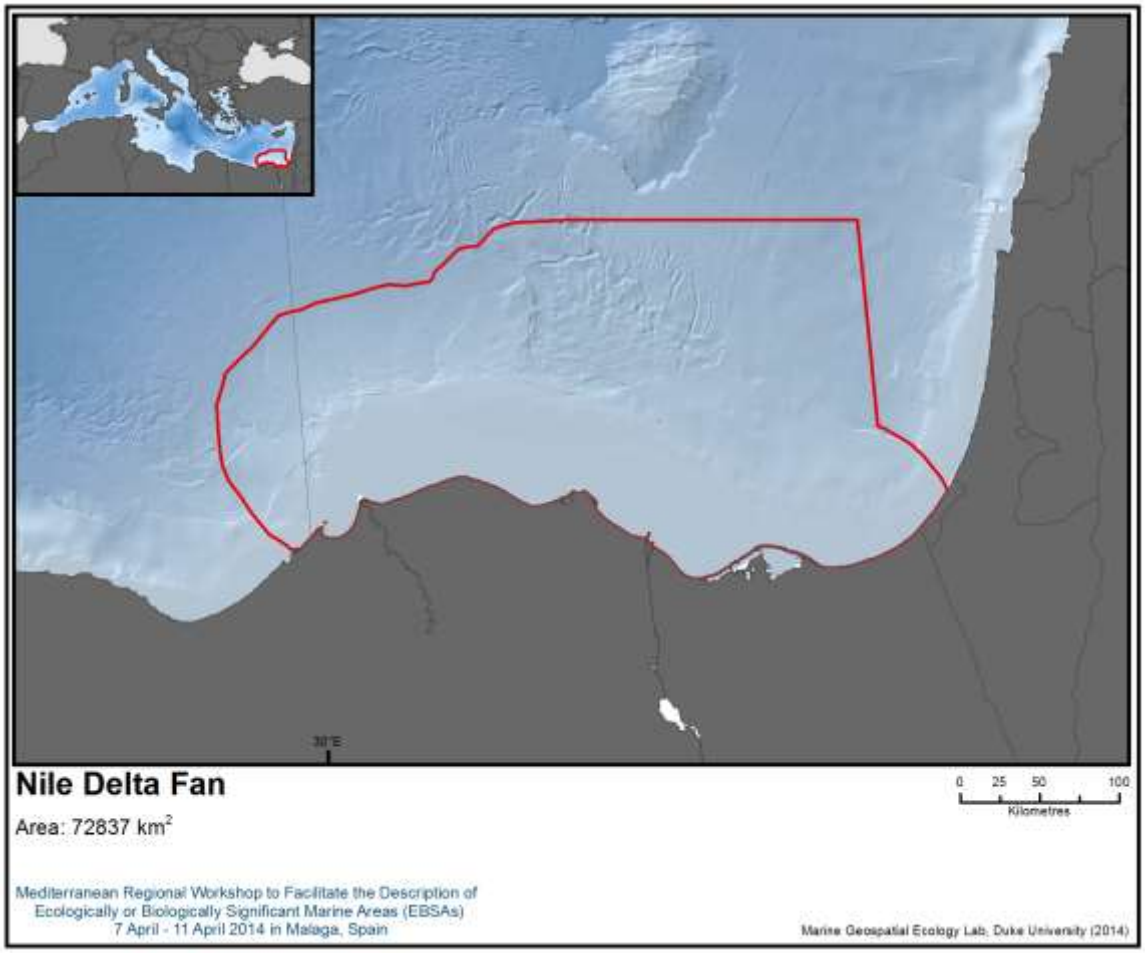


Figure 1. Area meeting the EBSA criteria.

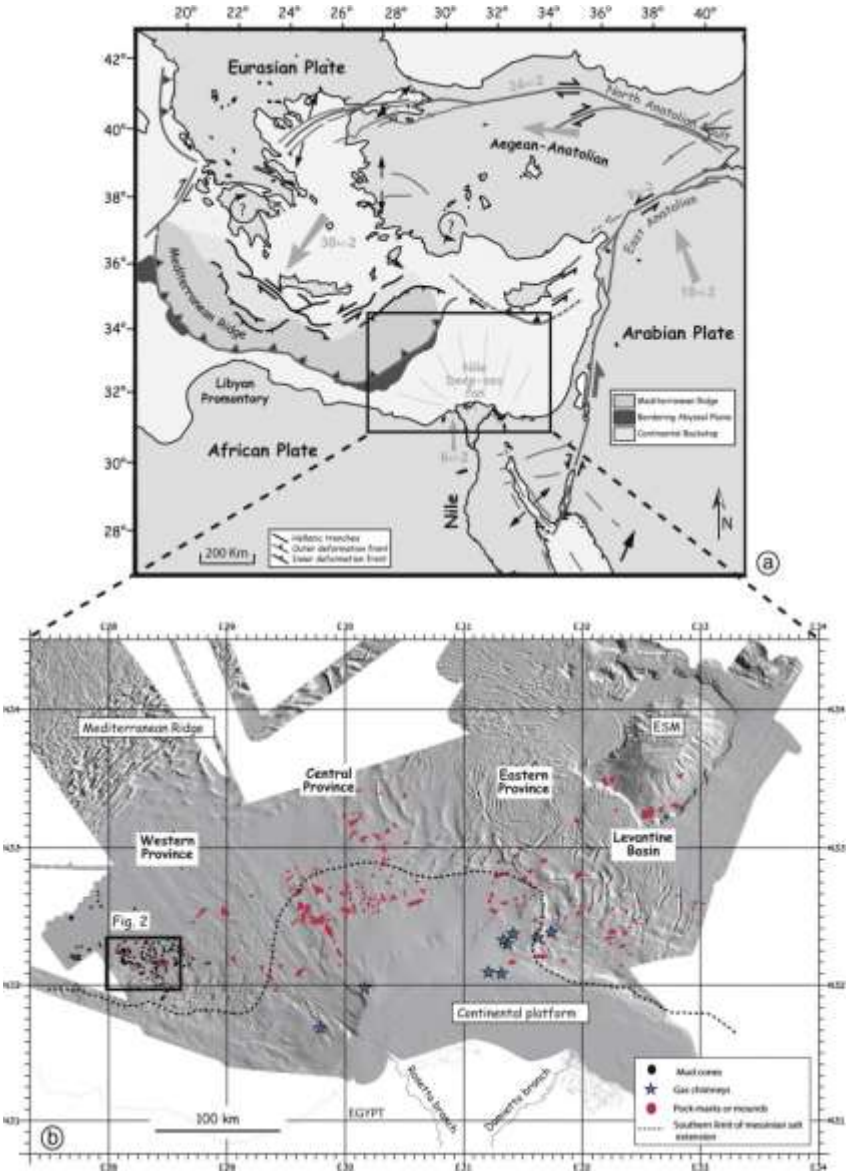


Figure 2. Morphostructural provinces and different types of fluid escape structures in the Eastern Mediterranean basin (Huguen, 2009).

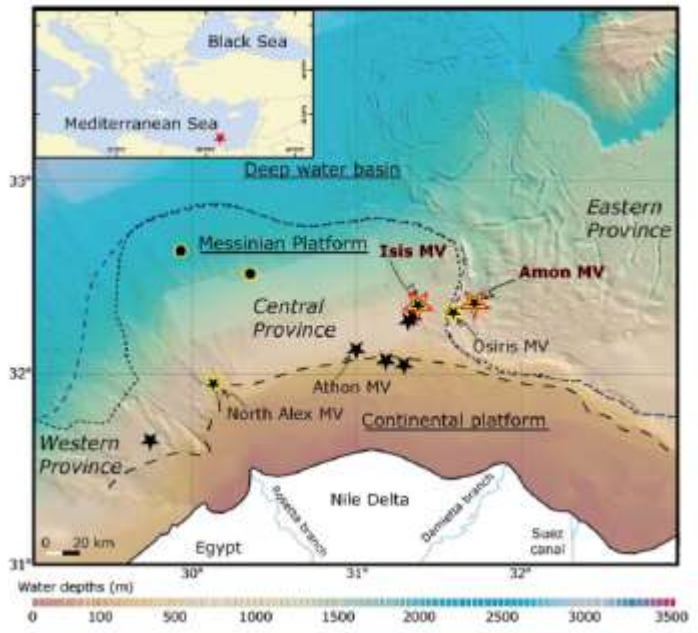


Figure 3. Large mud volcanoes off the Nile Delta (Dupré et al., 2008).


Figure 4. Location of the four GFCM FRAs, from left to right: the FRA in the Gulf of Lion, the FRA off Santa Maria di Leuca, the FRA above the Eratosthenes Seamount, and the FRA off the Nile Delta area (Source: © MAPAMED, the database on Mediterranean Marine Protected Areas, MedPAN, RAC/SPA, 2013).

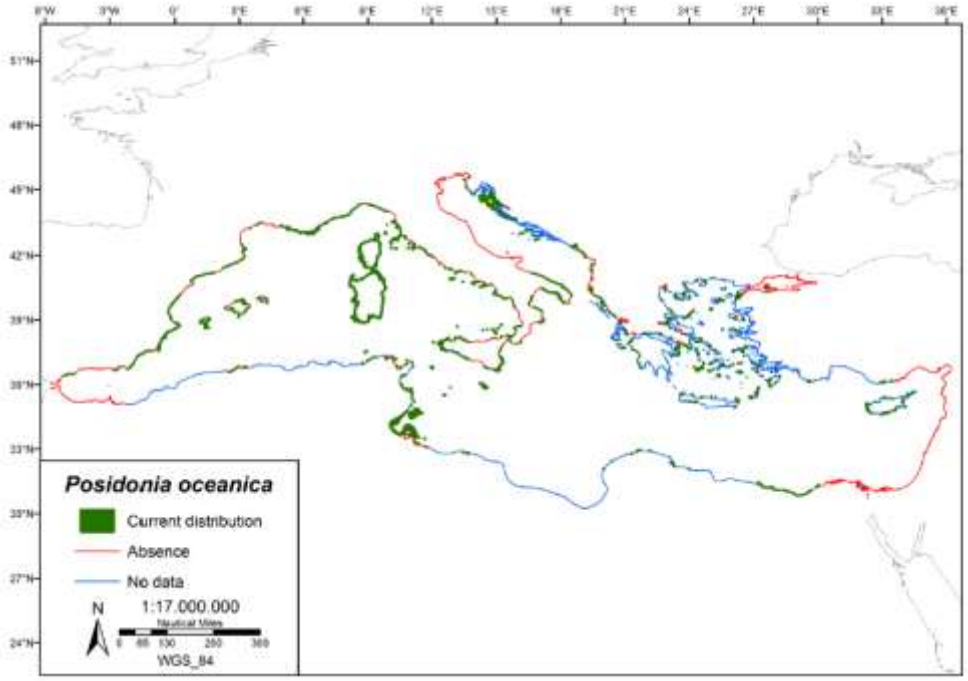


Figure 5. Current distribution of P. oceanica across the Mediterranean Sea (MEDISEH, 2013).

## Area No. 12: East Levantine Canyons Area (ELCA)

**Abstract**

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

**Introduction** (Based on Würtz (ed.), 2012).

The area (figure 1) contains a number of submarine canyons, which are nutrient "super highways", where mixing rates could reach 1000 times the rates measured in the open ocean. Upwelling associated with canyons enhances local primary productivity with the effects extending up the food chain to include birds, chondrichthyes and marine mammals.

Almost 518 large submarine canyons have been identified in the Mediterranean Sea. They can be considered as key structures in the Mediterranean due to their role in ecosystem functioning. Submarine canyons are steep-walled, sinuous valleys, with V-shaped cross sections, and relief comparable even to the largest of land canyons. Tributaries are found in most of the canyons and rock outcrops abound on their walls. Because they play a fundamental role in "deep oceans-shelf exchanges", submarine canyons can be defined as "super highways", allowing the energy turnover to speed up by reducing the time and the distances covered by water masses, organic and inorganic sediments, benthonic and nektonic organisms during their active or passive movements from shallow to deeper waters and vice-versa. Recent interest has focused on the role of submarine canyons in the exchanges between the deep ocean and continental shelf, as well as in the functioning of the benthic and pelagic ecosystem. Mixing rates inside canyons could be as much as 1000 times greater than rates measured in the open ocean, and upwelling associated with canyons enhances local primary productivity with the effects extending up the food chain to include birds and marine mammals. Consequently, commercially important pelagic and demersal fisheries as well as cetacean feeding grounds are commonly located at the heads of submarine canyons. In addition, unique benthic habitats are associated with submarine canyons, particularly the heads of shelf-incising canyons that are characterized by steep bedrock exposures upon which biologically diverse communities may occur. Submarine canyons that extend across the continental shelf and approach the coast are known to intercept organic-matter-rich sediments being transported along the inner shelf zone. This process causes organic-rich material to be supplied and transported down-slope, where it provides nourishment to feed a diverse and abundant macro fauna. The report "The Mediterranean deep-sea: highly valuable ecosystems in need of protection" published in 2005 by the IUCN and WWF, led the Parties of the General Fisheries Commission for the Mediterranean (GFCM) to prohibit the use of towed dredges and trawl net fisheries at depths beyond 1000 m and in areas called "Deep Sea Fisheries Restricted Areas", such as the Lophelia reef off Capo Santa Maria di Leuca, the Nile delta area cold hydrocarbon seeps, and the Eratosthenes Seamount (south of Cyprus). Based on the results of studies completed by the French Marine Protected Areas Agency and the Spanish Superior Council for Scientific Research (CSIC), in 2009, the GFCM added the submarine canyons of the Gulf of Lion to the list of fisheries restriction zones (Toropova et al., 2010). Conservation of deep-sea features, such as canyons, requires an improved understanding of the biological and ecological role of these ecosystems, threats and conservation issues, limits and chances of national and international jurisdictions. The following document described the East Mediterranean titled East Levantine Canyons Area (ELCA) as an area meeting the EBSA criteria.

**Location**

The East Levantine Canyons Area (ELCA) is located all along the Lebanese and Syrian coastline.

**Feature description of the area**

The East Levantine Canyons Area (ELCA) is characterized by its deep canyons all along the Lebanese and Syrian coasts (Würtz (ed.), 2012; Elias, 2007; figure 2), several hydrothermal vents (Shaban, 2013), submarine freshwater springs (Bakalowicz M., 2014; Jihad G., 1998). The area is of particular biological importance (IUCN 2012; Nader, 2012; Bariche, 2007). For example, the Turgut Reis Seamount that lies between Turkey, Syria, Lebanon and Cyprus, is still a host for virgin stocks of deep sea shrimp such as *P. longirostris, Plesionika martia, Aristaeomorpha foliacea* and *A. antennatus* (Würtz (ed.), 2012). Furthermore, this area is part of the migration routes of bluefin tuna and tunalike species. Furthermore, several key species have been identified as residing on the ELCA (Nader, 2012; Bariche, 2007). Also, the eastern Mediterranean coasts host one the largest areas in the Mediterranean of Opisthobranch formations (Crocetta, 2013) dominated by the threatened *Dendropoma* platforms (IUCN Red List of endangered species, Annex II, SPA/BD Protocol). Furthermore, the region experiences the highest winter temperatures (~ 20$^{o}$C; figure 3) in the Mediterranean allowing it to act as a refuge and spawning ground for an array of biologically important species such as the giant devil ray (*Mobula mobular)* that was recorded in front of the Gaza Strip, Palestine (Couturier et al., 2013). These warm temperatures also allow lessepsian species to survive the cold winter temperatures experienced in other areas of the basin. Today, more than 300 Indo-Pacific species, including fish, macrophytes, and invertebrates, have entered the Eastern Mediterranean through the Suez Canal. The relatively shallow water of the Canal with an average depth of around 10 m is considered to be a major physical barrier for the migration of deep water species. Accordingly, most of the invasive species can be found at depths of less than 70 m in the Eastern Mediterranean (Nader, 2012). Many other marine species, some on the IUCN threatened/endangered Red List, have also been reported in the area, including the following: monk seal (*Monachus monachus*), several species of sharks like the smalltooth sandtiger shark (*Odontaspis ferox)* (Walker, 2005), the cape shark/piked dogfish/spurdog (*Squalus acanthias)* (Fordham, 2006), the common guitarfish/violinfish (*Rhinobatos rhinobatos)* (Notarbartolo di S., 2007), and marine mammals (*Physeter macrocephalus, Stenella coeruleoalba, Grampus griseus, Delphinus delphis, Tursiops truncates)* Ayhan, 2012*)* amongst others. The region is also recognized as one of the most important nesting grounds in the Mediterranean for two marine turtles, *Chelonia mydas* and *Caretta caretta* as well as visiting grounds for *Dermochelys coriacea*. Within the area, two Marine Protected Areas have been declared, the Palm Island Nature Reserve (PINR) and the Tyre Coast Nature Reserve (TCNR), with the PINR classified as an Important Bird Area (IUCN, 2012).

**Assessment of the area against CBD EBSA criteria**

| **CBD EBSA criteria** (Annex I to decision IX/20) | **Description** (Annex I to decision IX/20) | **Ranking of criterion relevance** (please mark one column with an X) | | | |
|---|---|---|---|---|---|
| | | **No information** | **Low** | **Medium** | **High** |
| **Uniqueness or rarity** | Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features. | | | | X |
| *Explanation for ranking*<br>• Very large concentration of canyons (Wurtz, 2013; Elias, 2007; figure 2)<br>• Largest conglomeration of Opisthobranch platforms around the Mediterranean (Crocetta, 2013)<br>• Habitat for several vulnerable/endangered shark species (IUCN Red List) i.e.: *Rhinobatos* | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| *rhinobatos* (Notarbartolo di S., 2007); *Odontaspis ferox* (Walker P., 2005); *Squalus acanthias* (Fordham, 2006)<br>• Nesting grounds for *Chelonia mydas* and *Caretta caretta* (IUCN, 2012)<br>• Region of survival for invasive species from the Red Sea due to high temperature regimes in the winter months (Nader, 2012; Bariche, 2007; figure 3)<br>• Spawning/wintering grounds for the giant devil ray, *Mobula mobular* (Couturier C.I.E, 2013)<br>• The only two marine protected areas in the region, PINR (also an IBA) and the TCNR (IUCN, 2012)<br>• Presence of hydrothermal vents and submarine fresh water springs (Bakalowicz, 2014; Amin, 2013; Jihad, 2013) | | | | | |
| **Special importance for life-history stages of species** | Areas that are required for a population to survive and thrive. | | | | X |
| *Explanation for ranking*<br>• Opisthobranch mollusks reproduce on the platforms (Crocetta, 2013)<br>• Nesting grounds for *Chelonia mydas* and *Caretta caretta* (IUCN, 2012)<br>• Feeding grounds for sharks and marine mammals and reptiles (Walker, 2005; Ayhan, 2012; Notarbartolo di S., 2007; Walker, 2005; Fordham, 2006; IUCN, 2012) | | | | | |
| **Importance for threatened, endangered or declining species and/or habitats** | Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species. | | | | X |
| *Explanation for ranking*<br>• Grounds for *C. caretta*, *C. mydas* and *Dendropoma* sp., all on the IUCN Red List of endangered species, Annex II, SPA/BD Protocol | | | | | |
| **Vulnerability, fragility, sensitivity, or slow recovery** | Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery. | | | | X |
| *Explanation for ranking*<br>• *Dendropoma* sp., on the IUCN Red List of endangered species, Annex II, SPA/BD Protocol where habitats are being degraded/lost due to artificialization of the coastlines (Crocetta, 2013; Nader, 2012)<br>• Reproductive and foraging grounds for *Chelonia mydas* and *Caretta caretta* (IUCN, 2012) | | | | | |
| **Biological productivity** | Area containing species, populations or communities with comparatively higher natural biological productivity. | X | | | |
| *Explanation for ranking* | | | | | |
| **Biological diversity** | Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity. | | | | X |

| | | | | | |
|---|---|---|---|---|---|
| *Explanation for ranking*<br>• High rates of invasive species from the Red Sea adding extensively to the endemic biological diversity of the region (Nader, 2012; Bariche, 2007) | | | | | |
| **Naturalness** | Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation. | | | X | |
| *Explanation for ranking*<br>• Absence of proper conservation measures (Nader, 2013)<br>• Weak sustainable management initiatives (Nader, 2013)<br>• Invasion by indo-pacific species through the Suez Canal (Nader, 2012; Bariche, 2007) | | | | | |

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**Maps and Figures**

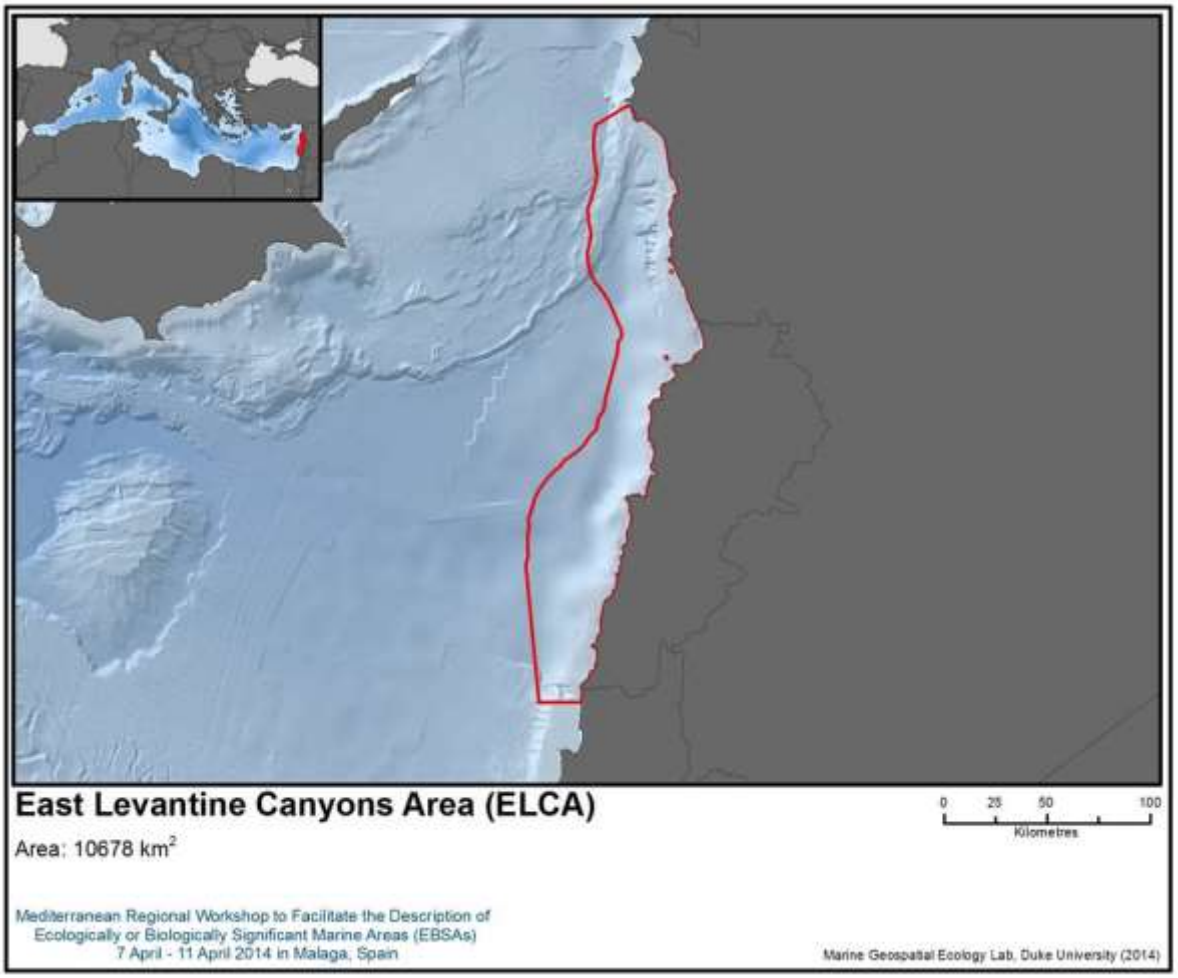


Figure 1. Area meeting the EBSA criteria.

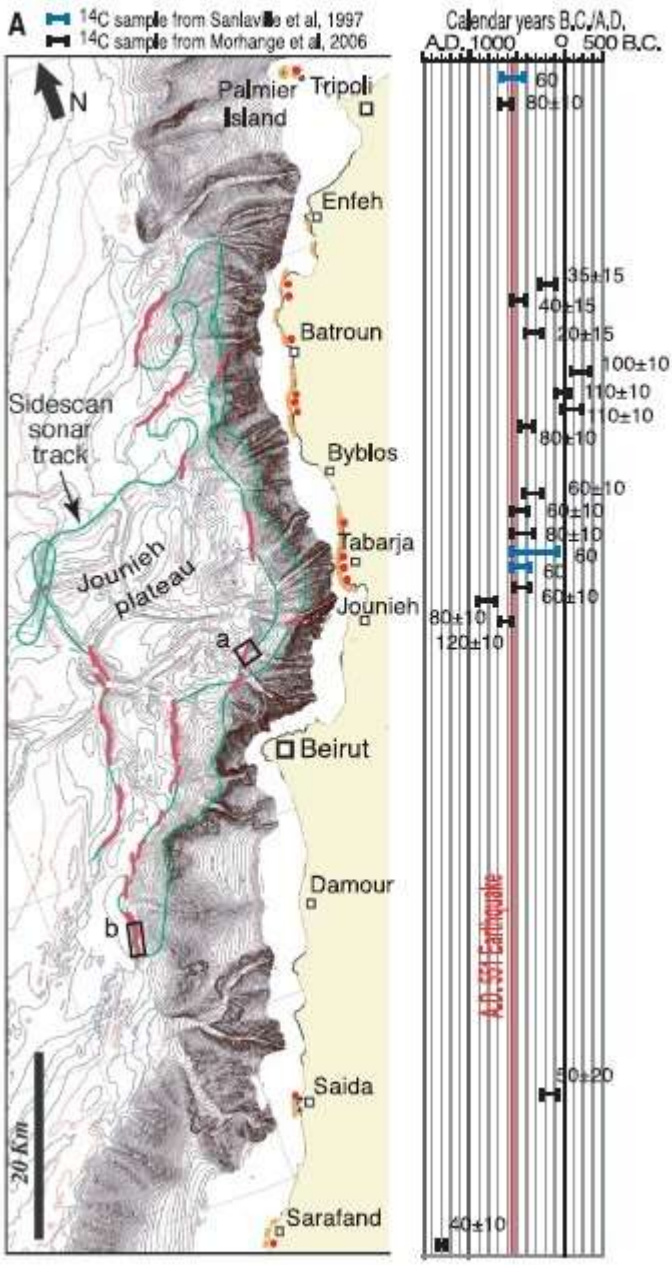


Figure 2. Deep sea canyons off the Lebanese Coast (Source: Shalimar Mission, 2003).

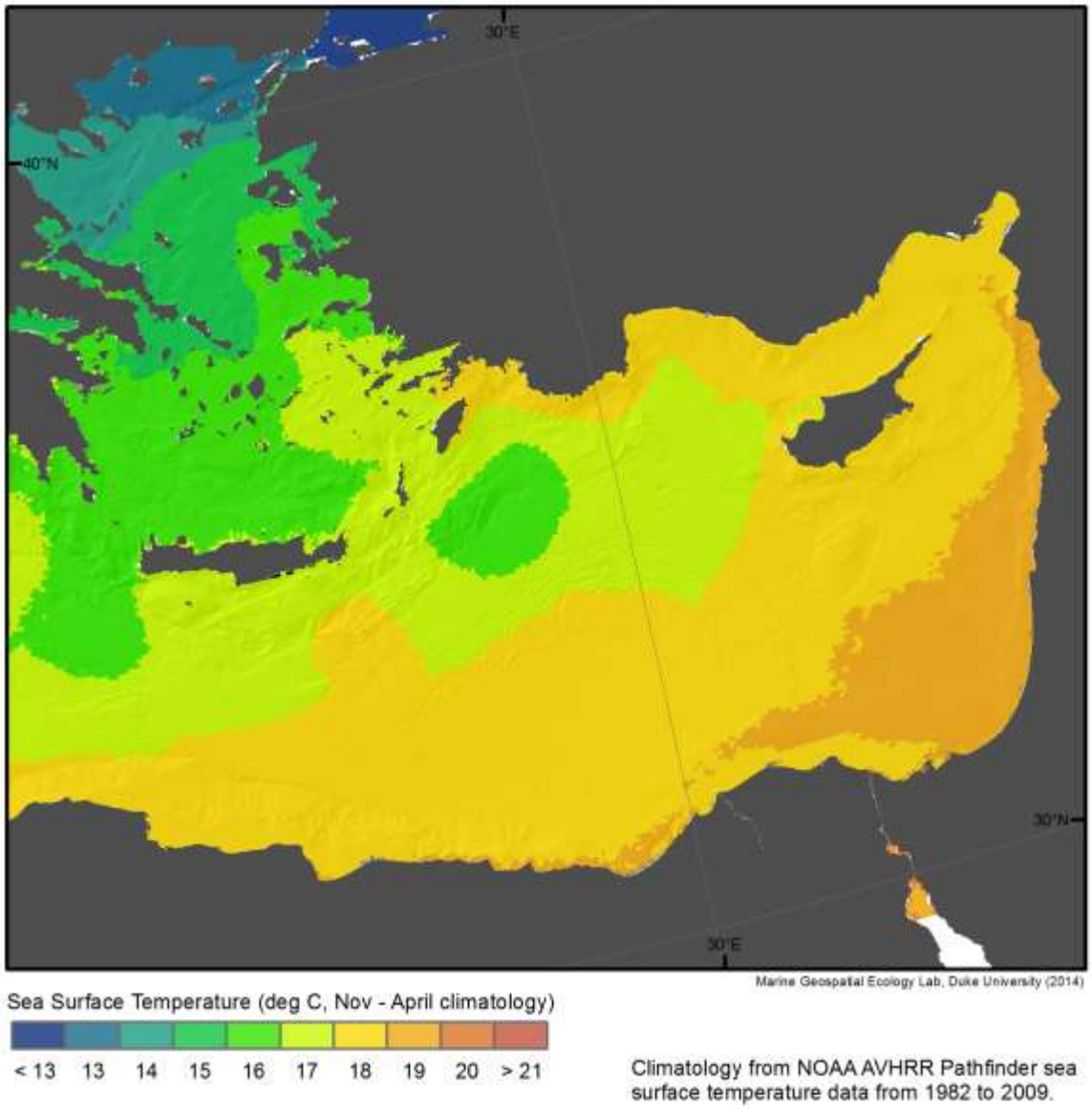


Figure 3. Winter months surface temperature for the East Mediterranean (Data from NOAA) (map produced by Marine Geospatial Ecology Lab, Duke University, 2014).

## Area No. 13: North-East Levantine Sea

**Abstract**

The area of the North-East Levantine Sea includes important biological features. It contains spawning grounds of bluefin tuna (*Thunnus thynnus*), endangered species such as loggerhead (*Caretta caretta*) and green turtles (*Chelonia mydas*) and the Mediterranean monk seal (*Monachus monachus*). The near threatened Audouin's gull (*Larus audouinii*) and the endemic Mediterranean subspecies of European shag (*Phalacrocorax aristotelis desmarestii*) are also present in the area.

**Introduction**

The area (figure 1) lies in the north-eastern part of the Levantine Sea, comprising the Finike Ridge, Antalya Basin, Adana Trough, Cicilian and Latakia Basins. The area ranges from shallow waters to 2700 m depth in some parts south of Latakia Basin. The area is within a warm part of Levantine Basin and includes some of the warmest temperatures in the eastern part of the Latakia Basin. This may allow for winter survival of thermophilous alien species from the Red Sea and species of more tropical affinities such as the green turtle.

This area is of high importance due to the spawning grounds for bluefin tuna (*Thunnus thynnus*) (figure 2, ICCAT area no. 6) and falls within the distribution range of Mediterranean monk seal (*Monachus monachus*). In fact, there are breeding and resting sites for the species in the southern part of Turkey (Cicilian basin) and in the northern part of Cyprus. This allows the presence of adults and juveniles also in the wider area. Moreover, the endangered Mediterranean populations of green (*Chelonia mydas*) and loggerhead (*Caretta caretta*) turtles occur in the area, and there are important nesting sites on the adjacent beaches (Casale and Margaritoulis, 2010).

**Location**

The area is located in the North-East Levantine Sea, between Greece, Turkey, Cyprus and Syria.

**Feature description of the area**

| **KEY SPECIES IN THE AREA** | |
|---|---|
| *Thunnus thynnus* | |
| *Monachus monachus* | |
| *Caretta caretta* | |
| *Chelonia mydas* | |
| *Larus audouinii* | |
| *Phalacrocorax aristotelis desmarestii* | |

### 1. Bluefin tuna (BFT)

The most important large pelagic fish in the area is the bluefin tuna (BFT) (*Thunnus thynnus*). One of the major spawning grounds of the species is located within the area (ICCAT, 2010) (figure 2). In a study carried out by Karakulak et al. (2004) the largest concentration of BFT larvae was found in the Taseli strait (figures 3 and 4). There is an trend of increasing larvae size from east to west. The size of the BFT egg and the larvae hatched from the egg is very small compared to the adult size of the species and, development of the larvae is very fast. A larvae is usually hatched within 24 hours after spawning. Therefore, the occurrence ofthe larvae of the species in an area indicates that the egg is also spawned in close vicinity.

### 2. Small pelagics

Ichthyoplankton surveys carried out in the area of the North-East Levantine Sea show a diversified composition of small pelagics. Within the Taseli Strait alone, a total of 125 larval fish taxa belonging to 39 families have been recorded (Ak, 2004; Ak and Uysal, 2008). Among them, small pelagics (mainly

anchovy) are the most commonly observed species (figure 5). It seems that productivity in the lower trophic levels provides suitable spawning and nursery areas for small pelagics in theTaseli Strait.

Despite their slight commercial importance in the Taseli Strait, small pelagics are among the dominant fish. Although present in summer, they do not form dense schools in the summer as they do in winter. Dispersed aggregations are not suitable for exploitation, but nevertheless provide an important food source for the larger fish such as juvenile bluefin tuna and hake (CIESM, 2011).

**3. Demersal species**

Among the demersal species, hake is important in this area. This species undergoes ontogenetic migration between the continental slope and upper shelf area and juvenile hake migrate to the upper shelf to fulfill their changing dietary requirements (Carpenteri et al., 2005). A trawl survey carried out in the area showed that the majority of hake sampled were juveniles (95% of the samples ranged between 12 to 28 cm, representing the 0 and 1 year class). This group probably comprises those changing their feeding behavior from bentivorous to piscivorous and hence in search of small pelagic fishes inhabiting the shallow waters. The sudden increase in the density of juvenile hake in the area may indicate that the spawning and nursery grounds of the species are located within the Taseli strait (Gucu, 2006).

**4. Mediterranean monk seal**

The Mediterranean monk seal is perhaps the most critical element of the ecosystem. The occurrence of the species within the North-East Levantine Sea has been studied and important breeding habitats have been identified in the Taseli strait, west coast of Mersin (Gucu et al., 2004) and the northern part of Cyprus (Gucu et al., 2009a). It was estimated that the seals inhabiting the area are around 40 individuals (Gucu et al., 2009b) with an average fecundity of 0.22 (Gucu and Ok, 2006)

The area has been set aside for conservation in 1997. The surroundings of the identified breeding caves, and the foraging area has been designated as "No-take-zone" in the sea and on the land as "1$^{st}$ Degree Natural Asset".

**5. Marine turtles**

Marine turtles are important elements of the conservation value of the Taseli strait. The area provides important nesting sites to *Chelonia mydas* and *Caretta caretta* (Figs 6-9). The pelagic area is also important for foraging of both species, while the area between Cyprus and Turkey is part of a migratory corridor of green turtle (figure 10) (Casale and Margaritoulis, 2010).

In addition to the nesting beaches, turtles, especially sub-adult green turtle (*Chelonia mydas*) are also observed in the shallow waters rich with seagrass meadows. The *Cymodocea nodosa* beds are the major feeding grounds of the species. The dense meadow off Babadıl creek is therefore a favorable fishing ground for the species. The juveniles are observed frequently on the meadow (CIESM, 2011).

**6. Marine birds**

An Important Bird Area (IBA) has been identified in the north-eastern part of Cyprus, Karpasia Peninsula (figure 12). In this area, there is a regular presence of globally near threatened Audouin's gull (*Larus audouinii*), the most easterly breeding locality for the species, with up to 30 breeding pairs. Birds are thought to forage within 15 km of the coast. The site is also of regional importance for the endemic Mediterranean subspecies of European shag (*Phalacrocorax aristotelis desmarestii*) with up to 25 breeding pairs occurring (BirdLife International, 2014).

Audouin's gull also nests on the Gilindire islands in Aydıncık, which are located at the southern part of Turkey. The nesting occurs in spring and the hatchings turns to juveniles in summer and feed in the region before they migrate off in late summer. The main accumulations of feeding juveniles are observed in flocks around Sancak cape and Beşparmak island. The position of the Audouin's gull sightings are given in figure 13 (Sakınan, 2008).

### 7. *Posidonia oceanica* meadows

The meadows of *Posidonia oceanica* meadows are well-developed in the western part of the area and particulatrly, in the Natura site of Kastellorizo island complex. To the contrary, the distribution of the meadows reaches to an end on the north coast of Taseli strait (Gucu and Gucu, 2002a). The historical records (Cirik, 1990) shows that the meadow has regressed almost 10 km towards the west within the last 25 years. Temperature, salinity and mechanical stress by bottom trawlers seems responsible of the absence of *Posidonia oceanica* in the Levant Sea (Celebi et al., 2006). Surprisingly, this north-eastern limit of the species coincides with remarkable gradient in the distribution of Lessepsian fishes (figure 14) (Gucu and Bingel, 1994; Gucu and Gucu, 2002b).

**Feature condition and future outlook of the area**

Bluefin tuna are highly migratory pelagic fish that range across most of the North Atlantic and its adjacent seas, particularly the Mediterranean Sea. The spawning areas in the Mediterranean are the only ones for the eastern Atlantic bluefin tuna stock. The ICCAT is the responsible multilateral body in charge for the management of this migratory species.

As regards the management of the key endangered species in the area, namely monk seal and marine turtles, there are Regional Action Plans developed by Regional Activity Centre (RAC/SPA) for the Specially Protected Areas of UNEP/MAP.

**Assessment of the area against CBD EBSA criteria**

<table>
<tr><td rowspan="2">CBD EBSA criteria<br>(Annex I to decision IX/20)</td><td rowspan="2">Description<br>(Annex I to decision IX/20)</td><td colspan="4">Ranking of criterion relevance<br>(please mark one column with an X)</td></tr>
<tr><td>No information</td><td>Low</td><td>Medium</td><td>High</td></tr>
<tr><td>Uniqueness or rarity</td><td>Area contains either (i) unique (“the only one of its kind”), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features.</td><td></td><td></td><td>X</td><td></td></tr>
<tr><td colspan="6">Explanation for ranking<br>The area is home to a major spawning ground for Thunnus thynnus, one of only 6 in the Mediterranean which support the entire eastern Atlantic and Mediterranean bluefin tuna stock (Karakulak et al., 2004; ICCAT, 2010).<br><br>Nesting and migratory routes of green turtle (Chelonia mydas) (Casale and Margaritoulis, 2010; CIESM, 2011).<br><br>Nesting sites for loggerhead turtle (Caretta caretta) (Casale and Margaritoulis, 2010; CIESM, 2011).<br><br>Breeding sites and distribution range of monk seal (Monachus monachus) (Gucu et al., 2004, 2009a, 2009b; Gucu and Ok, 2006).</td></tr>
<tr><td>Special importance for life-history stages of species</td><td>Areas that are required for a population to survive and thrive.</td><td></td><td></td><td></td><td>X</td></tr>
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</table>

| | | | | | |
|---|---|---|---|---|---|
| ICCAT, 2010).<br><br>Spawning and nursery grounds of hake (Gucu, 2006).<br><br>Regular presence of globally near threatened Audouin's gull, the most easterly breeding locality for the species, with up to 30 breeding pairs. Birds are thought to forage within 15 km of the coast. The site is also of regional importance for the endemic Mediterranean subspecies of European shag (*Phalacrocorax aristotelis desmarestii*) with up to 25 breeding pairs occurring (BirdLife International, 2014). | | | | | |
| **Importance for threatened, endangered or declining species and/or habitats** | Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species. | | | | X |
| *Explanation for ranking*<br>Nesting and migratory routes of green turtle *(Chelonia mydas)* (Casale and Margaritoulis, 2010; CIESM, 2011).<br><br>Nesting sites for loggerhead turtle *(Caretta caretta)* (Casale and Margaritoulis, 2010; CIESM, 2011)<br><br>Breeding sites and distribution range of monk seal *(Monachus monachus)* (Gucu et al., 2004, 2009a, 2009b; Gucu and Ok, 2006).<br><br>Temperature, salinity and mechanical stress by bottom trawlers seems to be responsible of the absence of *Posidonia oceanica* in the Levant Sea (Celebi et al., 2006).<br><br>Audouin's gull is listed by IUCN as near threatened, and is included within Annexes to the European Union Birds Directive and the Barcelona Convention. Mediterranean subspecies of European shag (*Phalacrocorax aristotelis desmarestii*) is included within Annexes to the European Union Birds Directive and the Barcelona Convention (BirdLife International, 2014). | | | | | |
| **Vulnerability, fragility, sensitivity, or slow recovery** | Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery. | | | X | |
| *Explanation for ranking*<br>Nesting and migratory routes of green turtle *(Chelonia mydas)* (Casale and Margaritoulis, 2010; CIESM, 2011).<br><br>Nesting sites for loggerhead turtle *(Caretta caretta)* (Casale and Margaritoulis, 2010; CIESM, 2011).<br><br>Breeding sites and distribution range of monk seal *(Monachus monachus)* (Gucu et al., 2004, 2009a, 2009b; Gucu and Ok, 2006). | | | | | |
| **Biological productivity** | Area containing species, populations or communities with comparatively higher natural biological productivity. | X | | | |
| *Explanation for ranking* | | | | | |
| **Biological diversity** | Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity. | X | | | |
| *Explanation for ranking* | | | | | |
| **Naturalness** | Area with a comparatively higher degree of | X | | | |

| | | | | | |
|---|---|---|---|---|---|
| | naturalness as a result of the lack of or low level of human-induced disturbance or degradation. | | | | |
| *Explanation for ranking* | | | | | |

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**Maps and Figures**

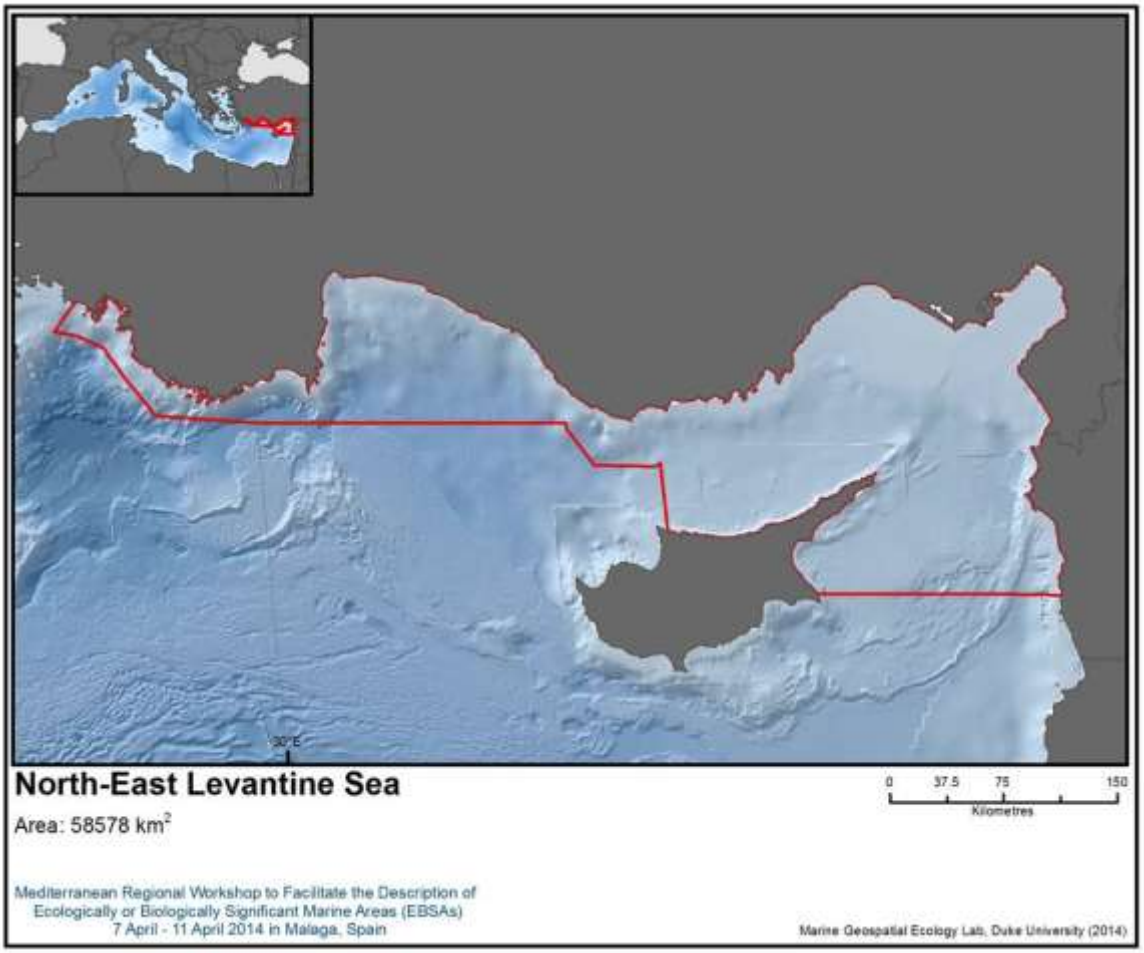


Figure 1. Area meeting the EBSA criteria.

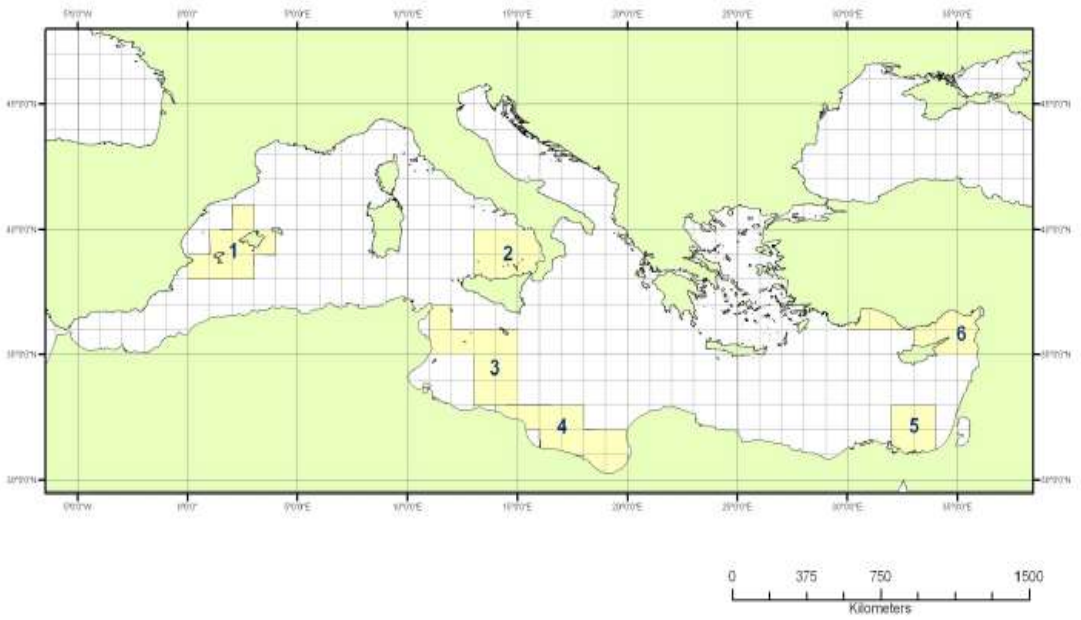


Figure 2. Spawning areas identified through analysis of VMS data used in the 2010 GBYP aerial survey program for surveying spawning biomass in the Mediterranean. These areas are consistent with current scientific knowledge of the main spawning locations (ICCAT, 2010).


Figure 3. Most important spawning ground of bluefin tuna (*Thunnus thynnus*) in the Mediterranean Sea. Numbers in grey circles are the spawning ground located in the western Mediterranean Sea, the black spot pointed by the black arrow is the major spawning ground of the species (taken from Karakulak et alk., 2004).

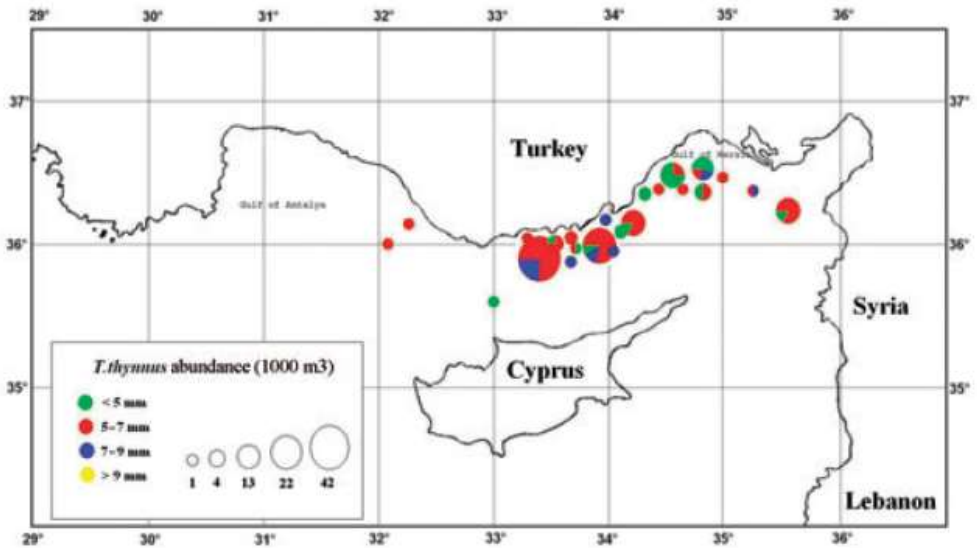


Figure 4. The position, abundance and length composition of BFT (Thunnus thynnus) larvae samples in the Levant Sea (Oray ve Karakulak, 2005).

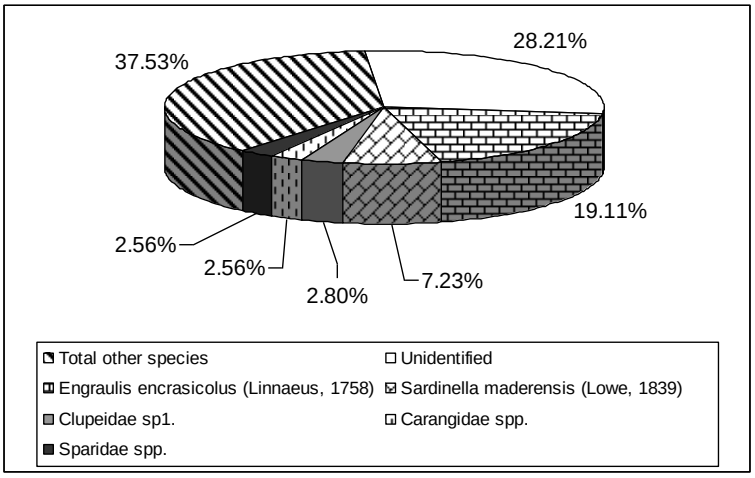


Figure 5. Per cent density by the dominant yolk sac larval fishes occurred during the study periods (Ak and Uysal, 2008).

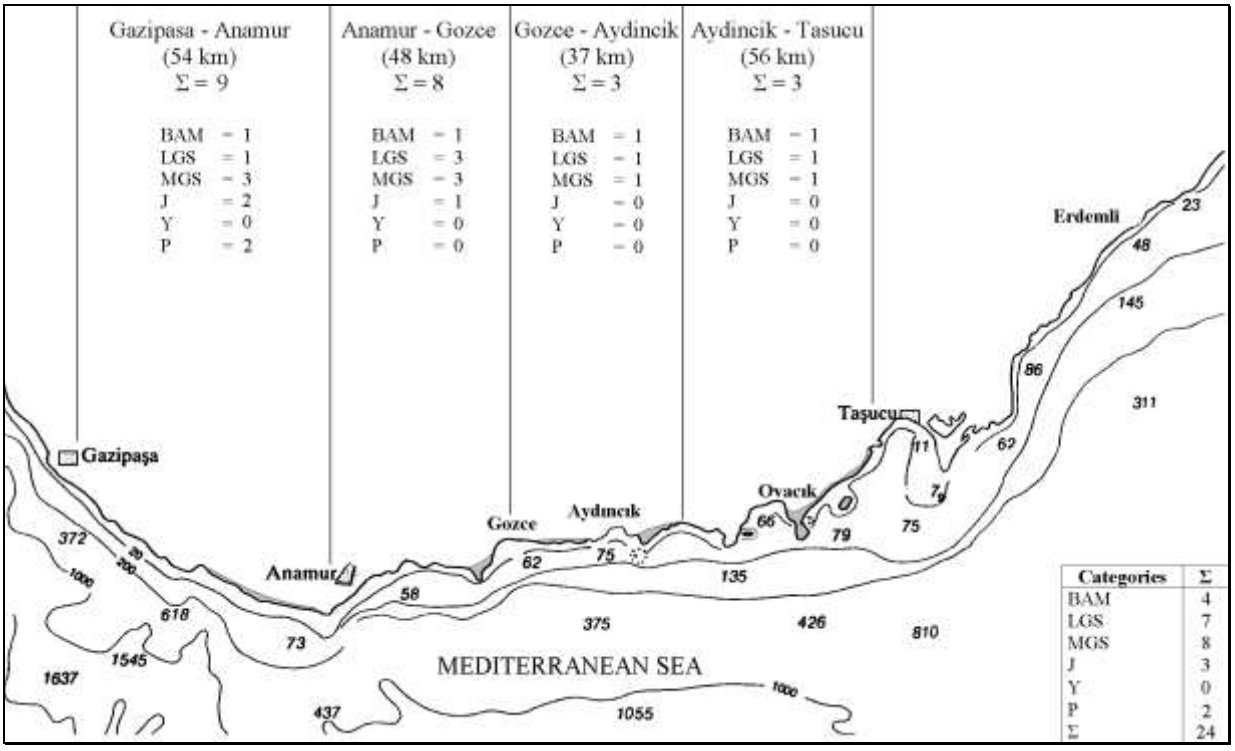


Figure 6. Distribution of the seals along the Cilician Basin with the arbitrary ranges of the subregions, the total number of seal individuals using each subregion and the subgroup category compositions. The data presented on the bottom right corner summarizes the total numbers of seals in each category (from CIESM, 2011).


Figure 7. Nesting beaches of the green turtle, *Chelonia mydas*, in the Mediterranean (Venizelos et al. 2005; CIESM, 2011).

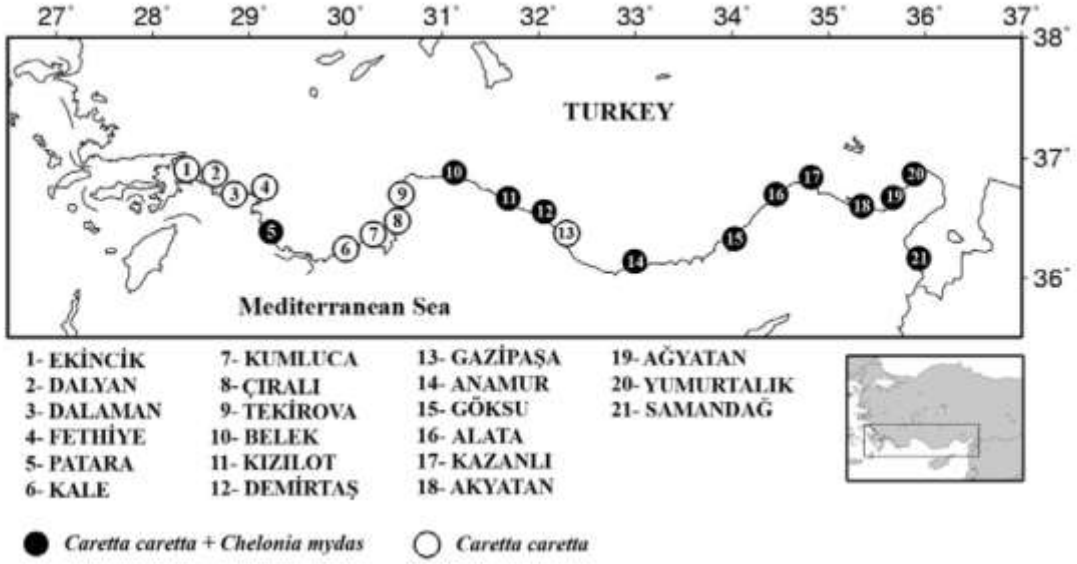


Figure 8. Nesting sites of loggerhead and green turtles in Turkey (Casale and Margaritoulis, 2010).

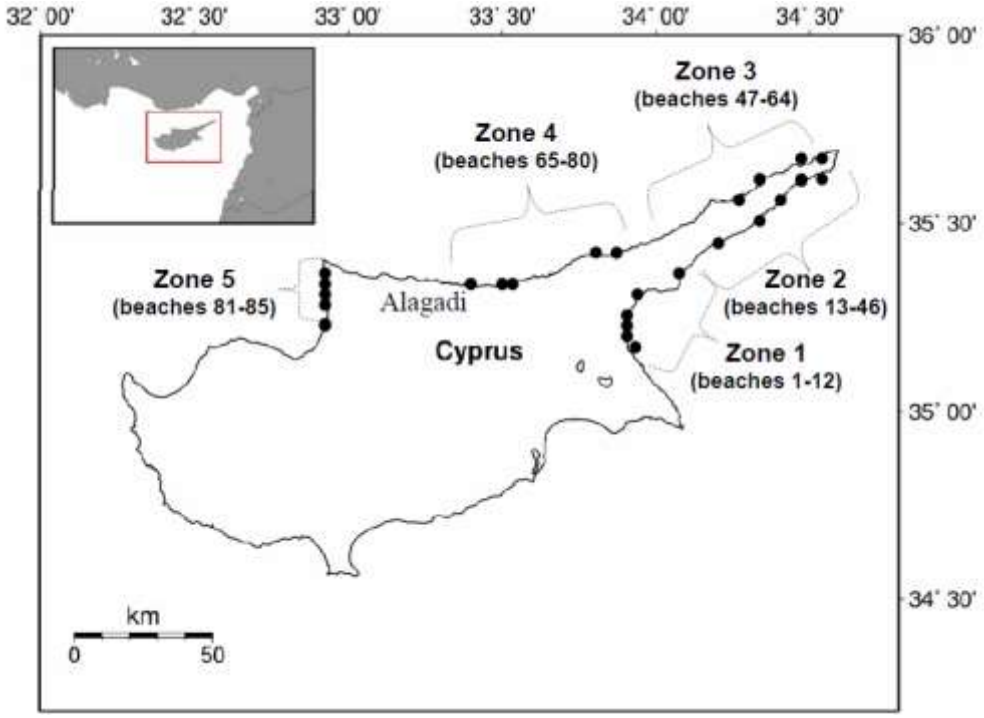


Figure 9. Map of survey zones and nesting beaches of loggerhead in the north-eastern part of Cyprus (Casale and Margaritoulis, 2010).

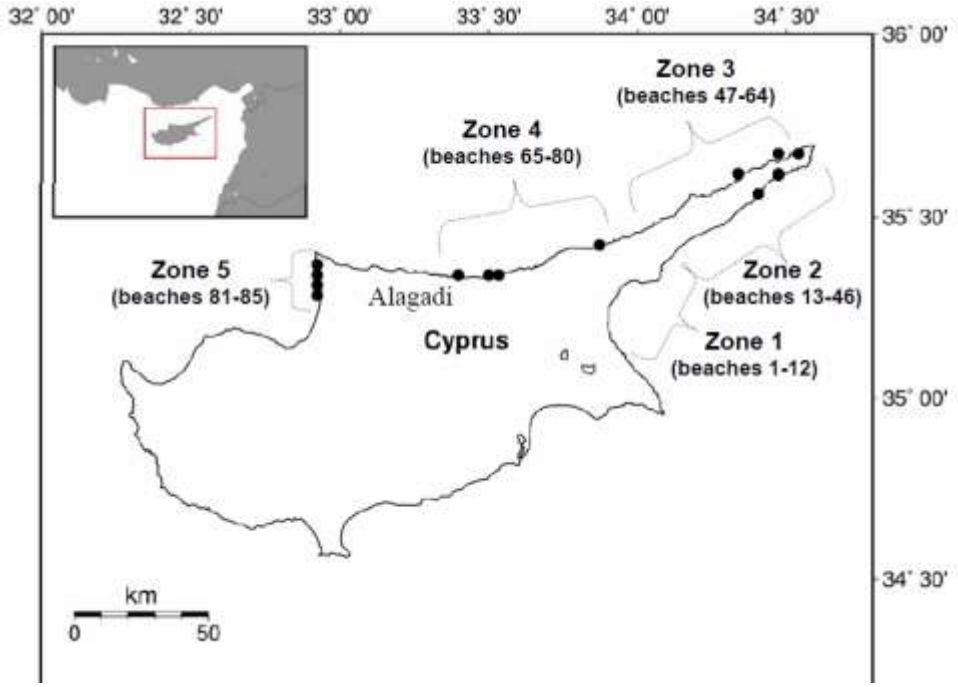


Figure 10. Map of survey zones and nesting beaches of green turtle in the north-eastern part of Cyprus (Casale and Margaritoulis, 2010).

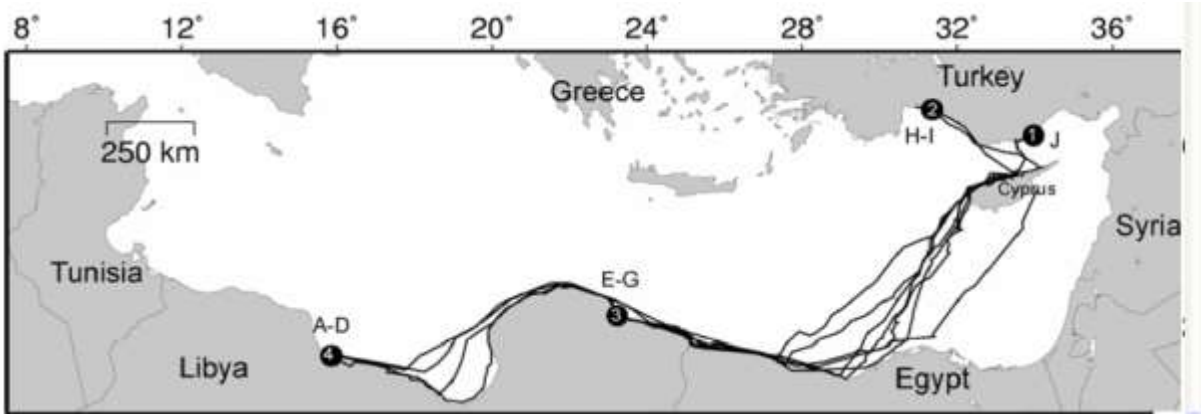


Figure 11. Migratory corridors and foraging grounds of ten female green turtles, tracked from Cyprus to their foraging sites (Casale and Margaritoulis, 2010).

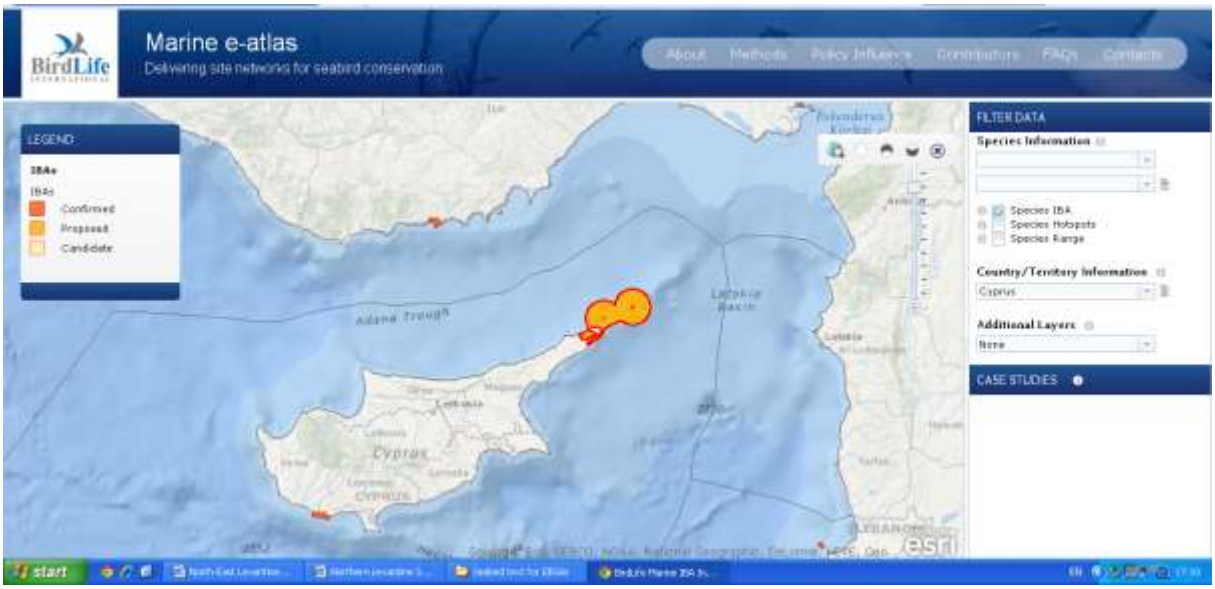


Figure 12. IBA in Karpasia Peninsula for the Audouin gull and the Mediterranean subspecies of European shag (BirdLife International, 2014).

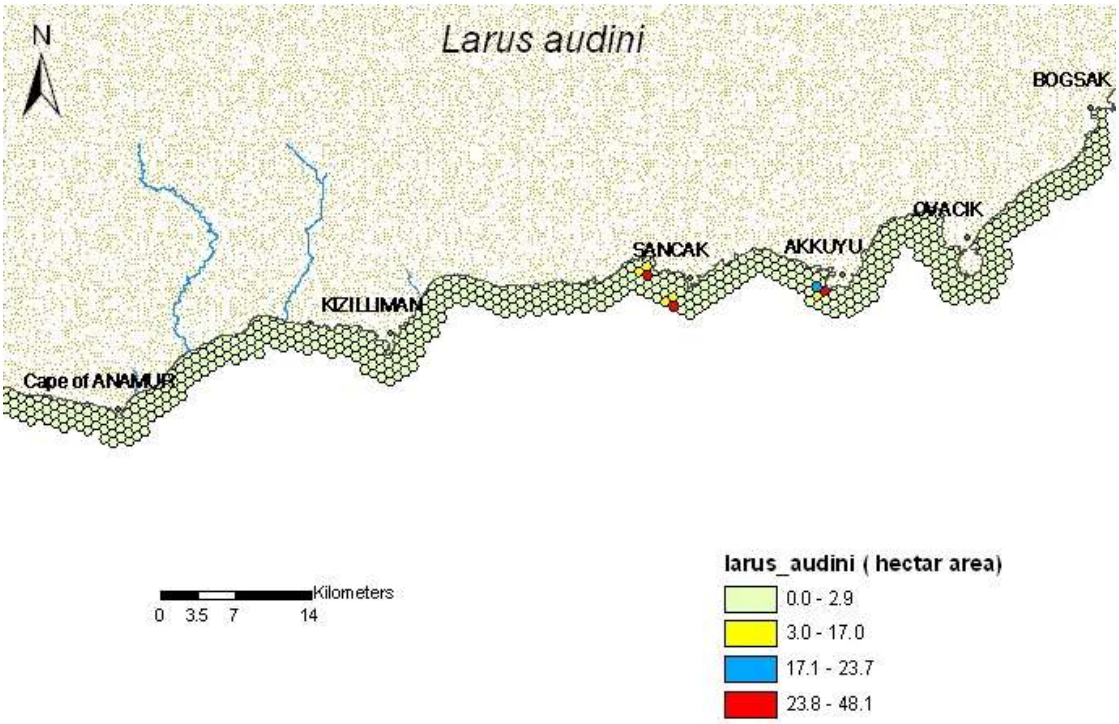


Figure 13. The sightings of Audion's gull (Larus audionii) in the area between Taşucu and Anamur (Sakinan, 2008).

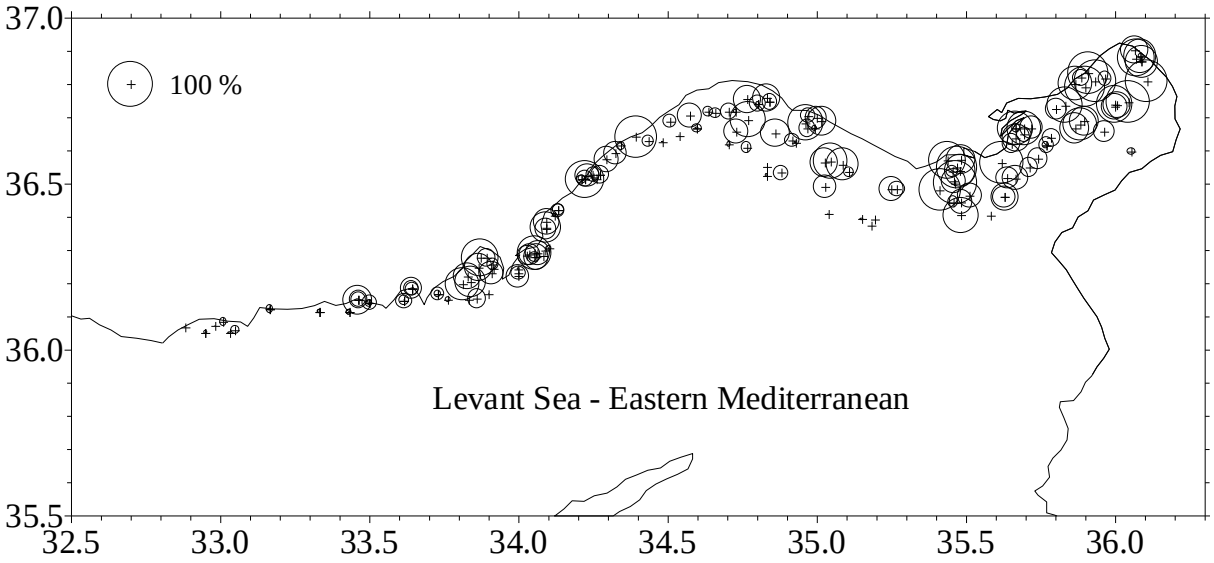


Figure 14. Percentage of Lessepsian fishes in the total catch (Gucu and Bingel, 1994).

## Area No. 14: Akamas and Chrysochou Bay

### Abstract

The Akamas is an area that includes important nesting beaches for green and loggerhead turtles and the adjacent caves on the rocky shore in which monk seals rest and breed. It includes *Vermetus (Dendropoma)* reefs and extensive *Posidonia* meadows. The Lara/Toxeftra Turtle Reserve, on the west coast of the island, is within a Natura 2000 site, and is a SPAMI area under the Barcelona Convention. The Chrysochou Bay, which includes the Polis-Yialia Natura 2000 site is important for loggerhead turtle mating and nesting, for mating and for foraging of juvenile and adult green turtles, as well as for the existence of extensive *Posidonia* meadows.

### Introduction

The area is shown in figure 1. The water down to the 50 m isobath is included in both sites. Both include many important turtle nesting beaches, with stretches of rocky shores with sea caves in the Akamas site, which also has extensive rocky bottoms. Long-shore currents on the west coast and in Chrysochou Bay as a whole are dependent on a number of factors, including the time of year, and nature of the winds in the area, among others Prevailing winds from the west cause frequent spells of rough seas on the west coast. The Akamas beaches are very important nesting areas for green and loggerhead turtles. There are data on nesting since the 1980s when the Cyprus Turtle Conservation Project started. The monk seal caves in Akamas have been mapped and have intermittently been monitored over the last 12 years. The Posidonia meadows in the area have recently been accurately mapped. The site also includes coastal and deeper water reefs and small islands.

The Chrysochou Bay, which includes the Polis-Yialia Natura 2000 site, stretches from a practically uniform sandy or sandy/pebbly beach to the 50 m isobaths. This is in deeper waters than the Posidonia meadows. The sea bed in shallow waters is composed of fairly fine sand with pebbles in parts with larger stones off the estuaries of several (seasonal) rivers. The prevailing winds are westerly, so exposure to wave action increases towards the east in the Bay. Currents are variable often depending on wind direction. There are long-term data series on nesting in the site and in adjacent beaches in the Bay. There are also data on the distribution of turtles at sea.

### Location

The coastal stretch of the Akamas site is on the west and north-west coast of the island. There is a SPAMI located in the area that is about 10 km long, of which about 4 km are sandy beaches. The Polis-Yialia site is about 11 km long along coastal areas composed of nesting beaches. In the middle of the area, there is a coastal town and a fishing harbor.

### Feature description of the area

The western shores are exposed to the westerly winds and waves and exhibit the ecological characteristics of exposed shores, whereas the northern shores and the adjacent Chrysochou Bay and the Polis-Yialia site are more sheltered. The Akamas shore is generally rocky with sandy beaches, some of which are in bays. The beaches of the Lara-Toxeftra area are high profile, high energy beaches which provide nesting grounds to the green and loggerhead turtles (habitat type CY05). On some beaches, Ocypode cursor can be found. In some areas further north, the beaches are fringed, on the seaward side, by low slabs of rock in the surf zone. The extensive rocky shores gently slope towards and into the sea in some areas, while in other areas the slope characterized by cliffs. In some areas, these rocky shores are high and some have partly submerged sea caves (EU habitat type 8330). The seabed is generally rocky with patches of Posidonia (habitat type 1120) growing between them. Further offshore, the seabed, where it is not rocky, is of coarse sand, which often gives way to finer sediments. More extensive Posidonia beds are found south of Lara and further north as well as on the northern coast in much of the area. They are found generally at depths between 10 and 30 m, but may extend to a depth of over 40 m. Apart from the Posidonia beds, the most prominent, widely distributed and well-developed habitat is that of the reefs (EU

habitat type 1170). It is characterized, in shallow waters, by dense Cystoseira forests harboring a rich invertebrate fauna. A noticeable feature, mainly in the limestone areas at the north of the peninsula and including Halavron as well as in the Lara peninsula, are the vermetid reefs, formed by the calcareous tubes of the gastropods Vermetus spp., and by *Dendropoma petraeum* etc. (EU habitat type CY04). The sea caves (EU habitat type 8330) offer resting and breeding habitats for the monk seal.

There are very extensive Posidonia meadows in the area. Mating of both loggerhead and green turtles takes place in the surface waters of the site and in the waters of the Bay adjacent to the Polis-Yialia Natura 2000 site. Foraging of green turtles of various sizes above about 30 cm is very common.

**Feature condition and future outlook of the area**

Nesting of loggerhead turtles has significantly increased from about 50-60 nests per year on the west coast of Akamas between 1980 to 2006 to well over 250 in the 2012 to 2014. Increases in the number of green turtle nests have also been observed but definitive confirmation on whether these changes are just fluctuations or whether there is a real trend has yet to be provided. There is, in any case, an obvious increase in the number of juvenile and sub-adult green turtles in the Bay, as is clear from the number of strandings of such turtles on the shores of the Bay. Regular monitoring of strandings takes place within the Turtle Conservation Project in the whole area – including all the beaches in the area.

The Cyprus Turtle Conservation Project covers all the nesting beaches on the island between Limassol on the south and Pyrgos on the north coast and the nesting on the beaches Chrysochou Bay. Nesting sites on all of the beaches are protected in situ by cages. There are also occasional surveys of the distribution of turtles at sea in the Polis-Yialia site. There have been very large increases in the amount of nesting in the site and significant increases of turtles foraging in the marine area of the site. There are, however, imminent pressures for development, including offshore breakwaters, that could upset the current situation both on the beaches and in the sea. The number of nest per year in the Chrysochou Bay has increased from about 200 nests per year until 2006 and reaching about 750 in 2013.

It should be noted that, genetically, the population of turtles in the Mediterranean is not uniform with several recent studies focusing on the genetic differences that characterize the different rookeries and their relationships. The lifestyle of turtles, including imprinting on their natal beaches, has management implications as each rookery needs to be managed individually. The implication is that protecting one rookery will not benefit another rookery (Ref. 4, 8, 9, 10, 13).

**Assessment of the area against CBD EBSA criteria**

| **CBD EBSA criteria** (Annex I to decision IX/20) | **Description** (Annex I to decision IX/20) | **Ranking of criterion relevance** (please mark one column with an X) | | | |
|---|---|---|---|---|---|
| | | **No information** | **Low** | **Medium** | **High** |
| **Uniqueness or rarity** | Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features. | | | | X |
| *Explanation for ranking*<br>Sea caves for monk seal breeding. The population of the species is now at a critical stage. There are only a handful of breeding caves on the island that were located in the monk seal surveys carried out (Ref. 5 and 6). | | | | | |
| **Special importance for life-history** | Areas that are required for a population to survive and thrive. | | | | X |

| | | | | | |
|---|---|---|---|---|---|
| **stages of species** | | | | | |
| *Explanation for ranking*<br>The ranking was deemed to be high due to the very high importance of the Akamas marine sites for the mating and reproductive grounds of both green and loggerhead turtles, for the mating and reproduction of loggerheads in the Polis-Yialia site, as well as for the existence of the foraging grounds of juvenile green turtles in this site (Ref. 1, 2, 3, 4). | | | | | |
| **Importance for threatened, endangered or declining species and/or habitats** | Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species. | | | | X |
| *Explanation for ranking*<br>Both green and loggerhead turtles are endangered (IUCN red-listed) and are listed as priority species for conservation in the Habitats Directive, in Annex II (Ref. 11). The monk seal is also listed a Priority species in the Habitats Directive of the EU (Ref. 11) and is a critically endangered species in the IUCN Red List (Ref. 12). | | | | | |
| **Vulnerability, fragility, sensitivity, or slow recovery** | Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery. | | | | X |
| *Explanation for ranking*<br>Turtles are long-lived species, taking 20-35 years to reach maturity which makes the recovery of their populations very slow (Ref. 4, 13). | | | | | |
| **Biological productivity** | Area containing species, populations or communities with comparatively higher natural biological productivity. | X | | | |
| *Explanation for ranking* | | | | | |
| **Biological diversity** | Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity. | | | X | |
| *Explanation for ranking*<br>The coastline and waters contain several important habitats, including for *Ocypode cursor*, turtles, monk seals, Posidonia meadows and *Cymodocea nodosa* beds on which green turtles feed at different stages of their life-history (Ref. 14). | | | | | |
| **Naturalness** | Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation. | | | X | |
| *Explanation for ranking*<br>Parts of the area are difficult to access and have retained much of their naturalness (Ref. 14). | | | | | |

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**Maps and Figures**

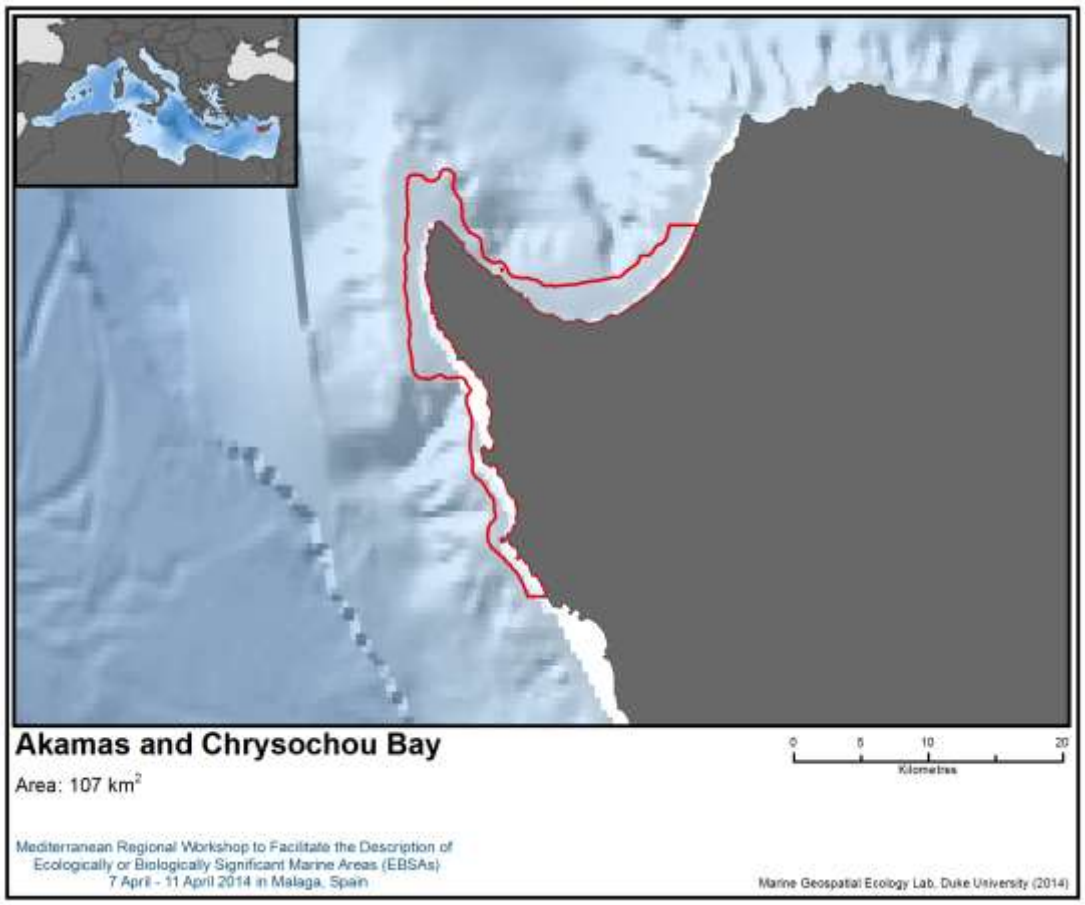


Figure 1. Area meeting the EBSA criteria.


Figure 2. Map of the Lara/Toxeftra Turtle Reserve, a SPAMI site (UNEP-MAP-RAC/SPA, no date).

## Area No. 15: Hellenic Trench

### Abstract

The Hellenic Trench, starting from the Greek Ionian islands to the south of Crete and further north-east towards the SW coast of Anatolia, is a major feature of the seafloor connecting the Central to the Eastern Mediterranean. Due to a number of environmental features, including its geomorphological conditions, this area is important for the survival of threatened, deep-diving marine mammals in the eastern Mediterranean Sea, including both deep-diving cetaceans (sperm and Cuvier's beaked whales), and coastal marine mammals (monk seals and common dolphins). Benthic biodiversity hot spots are also present along the area's steep continental slope south of Crete. Additionally, the oceanographic conditions of the eastern part of the area (Rhodes Gyre) contributes to the biological productivity of the North-East Levantine Sea, which has an extremely oligotrophic background.

### Introduction

The features of the area (figure 1) include:

- A deep trench in the seafloor with a particularly steep slope, extending as an arch around Greece from west to east, starting from the Greek Ionian islands, around the Peloponnese, to the south of Crete and further north-east, past the southern coast of the island of Rhodes towards the south-west coast of Anatolia. The depths included in the area range from 200 to 2000 m. Long-term observations have shown that the Hellenic Trench contains critical habitat of deep-diving cetaceans, such as sperm whales and Cuvier's beaked whales. Presence of the latter species is also supported by a modelling effort undertaken under the auspices of ACCOBAMS's Scientific Committee (Cañadas et al., 2011);
- A cyclonic feature of the eastern Mediterranean circulation (Rhodes Gyre) characterized by constant upwelling whereby nutrient-rich deep water is brought up to the surface, enabling higher primary production than in surrounding areas. No systematic observations of cetaceans have been conducted in the Rhodes Gyre, although this feature's oceanographic characteristics, with higher levels of primary productivity than those of the surrounding waters, indicate that the area may be particularly important for secondary consumers in this area;
- Coastal hot spots of biodiversity including seagrass (Posidonia) meadows, brown algae (Cystoseira) forests, coralligenus concretions are present in the area. A number of Natura-2000 sites have been designated in the coastal areas of Crete, Rhodes and smaller islands of the Dodecanese (see figure 2);
- Coastal biodiversity hot spots within the Inner Ionian Sea, in the waters between the islands of Lefkada, Kefallonia and Zakynthos and mainland Greece. The area hosts a breeding nucleus of the critically endangered Mediterranean monk seal, and is a feeding and breeding area for the endangered short-beaked common dolphin and the vulnerable common bottlenose dolphin.

### Location

The area is contained in part in the Central Mediterranean subregion (Eastern Ionian Sea), and in part in the Eastern Mediterranean subregion (Levantine Sea).

### Feature description of the area

Based on available information (e.g., direct observations, models, inference), the area can be subdivided as follows, from west to east:

- Inner Ionian Sea, between the islands of Lefkada, Kefallonia and Zakynthos and mainland Greece, which is important for bottlenose dolphin and contains critical habitat for monk seals and common dolphins;

- Western portion of the Hellenic Trench, from its western boundary to roughly the midpoint of Crete. This is a critical habitat for sperm whales;
- Observed and modelled critical habitat of Cuvier's beaked whales throughout the Hellenic Trench;
- Rhodes Gyre, which is a habitat for large pelagic mammals and fishes.

**Feature condition and future outlook of the area**

The deep area is frequently subjected to naval activity. This includes the use of high energy sonar, which is known to have lethal effects on deep-diving cetaceans. Several atypical mass stranding events of Cuvier's beaked whales, which have been connected to simultaneous navy exercises with both direct and circumstantial evidence, have taken place in the area.

**Assessment of the area against CBD EBSA criteria**

| **CBD EBSA criteria** (Annex I to decision IX/20) | **Description** (Annex I to decision IX/20) | **Ranking of criterion relevance** (please mark one column with an X) | | | |
|---|---|---|---|---|---|
| | | **No information** | **Low** | **Medium** | **High** |
| **Uniqueness or rarity** | Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features. | | | | X |
| *Explanation for ranking*<br>The Hellenic Trench contains the deepest parts of the Mediterranean(>5,000 m). Furthermore, the Rhodes Gyre, being located in one of the most oligotrophic portions of the region, has a higher level of productivity than its surroundings (ECO-Ocean, 2009)). | | | | | |
| **Special importance for life-history stages of species** | Areas that are required for a population to survive and thrive. | | | | X |
| *Explanation for ranking*<br>This is the only area in the eastern Mediterranean where sperm whales are consistently found (Frantzis, 2009; Frantzis and Cebrian, 1998; Frantzis et al., 2008), and where social units (made of adult females with their young) are found to be sympatric with adult males and bachelor groups (Notarbartolo di Sciara et al., 2012). Furthermore, this is one of the few areas in the Mediterranean where Cuvier's beaked whales can be predictably found (Frantzis et al., 2003; Cañadas et al., 2011, Frantzis, 2009). Monk seals, as philopatric species, reproduce, rest and molt permanently in the area shores using the marine part as feeding grounds (Cebrian, 1998). Additionally, the Inner Ionian Sea is an important breeding and feeding area for three threatened marine mammals (Notarbartolo di Sciara et al., 2009; Piroddi et al., 2011) | | | | | |
| **Importance for threatened, endangered or declining species** | Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species. | | | | X |

| | | | | | |
|---|---|---|---|---|---|
| **and/or habitats** | | | | | |
| *Explanation for ranking*<br>The Mediterranean subpopulation of sperm whales is classified as endangered in IUCN's Red List (Notarbartolo di Sciara et al., 2012). The Mediterranean subpopulation of Cuvier's beaked whales is classified vulnerable in IUCN's Red List. Short-beaked common dolphins are endangered, common bottlenose dolphins are vulnerable, and Mediterranean monk seals are classified critically endangered in IUCN's Red List, monk seals reproduce, rest and molt in the area coast using the marine part as feeding grounds (Cebrian, 1998). | | | | | |
| **Vulnerability, fragility, sensitivity, or slow recovery** | Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery. | | | | X |
| *Explanation for ranking*<br>Marine mammals in the area, including sperm whales (which is likely the largest proportion of such species in the eastern Mediterranean), are vulnerable to a number of anthropogenic threats such as noise (Frantzis and Cebrian, 1998), ship strikes, fisheries interactions, etc. Due to their longevity and low reproductive potential, cetaceans have a slow rate of recovery when depleted (Notarbartolo di Sciara et al., 2012; Bearzi et al., 2008). The monk seal population in the Ionian sea is important in supporting the recovery rate of the broader population, which extends to the Aegean Sea and into the Adriatic (Cebrian, 2005) | | | | | |
| **Biological productivity** | Area containing species, populations or communities with comparatively higher natural biological productivity. | | | | X |
| *Explanation for ranking*<br>The Rhodes Gyre is characterized by outstanding primary productivity compared to surrounding waters (P. Malanotte-Rizzoli et al., 2013).<br><br>Dinitrogen fixation and primary productivity were measured during the thermally-stratified summer period in different water regimes of the oligotrophic eastern Mediterranean Sea, including the Cyprus Eddy and the Rhodes Gyre. Generally, there is a low dinitrogen fixation rate in the area, not considering the very high rates in the Rhodes Gyre and Cyprus Eddy. The corresponding productivity increases from east to west, with relatively higher productivity in the Rhodes Gyre and Cyprus Eddy (Rahav et al., 2013). | | | | | |
| **Biological diversity** | Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity. | X | | | |
| *Explanation for ranking* | | | | | |
| **Naturalness** | Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation. | X | | | |
| *Explanation for ranking* | | | | | |

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**Maps and Figures**

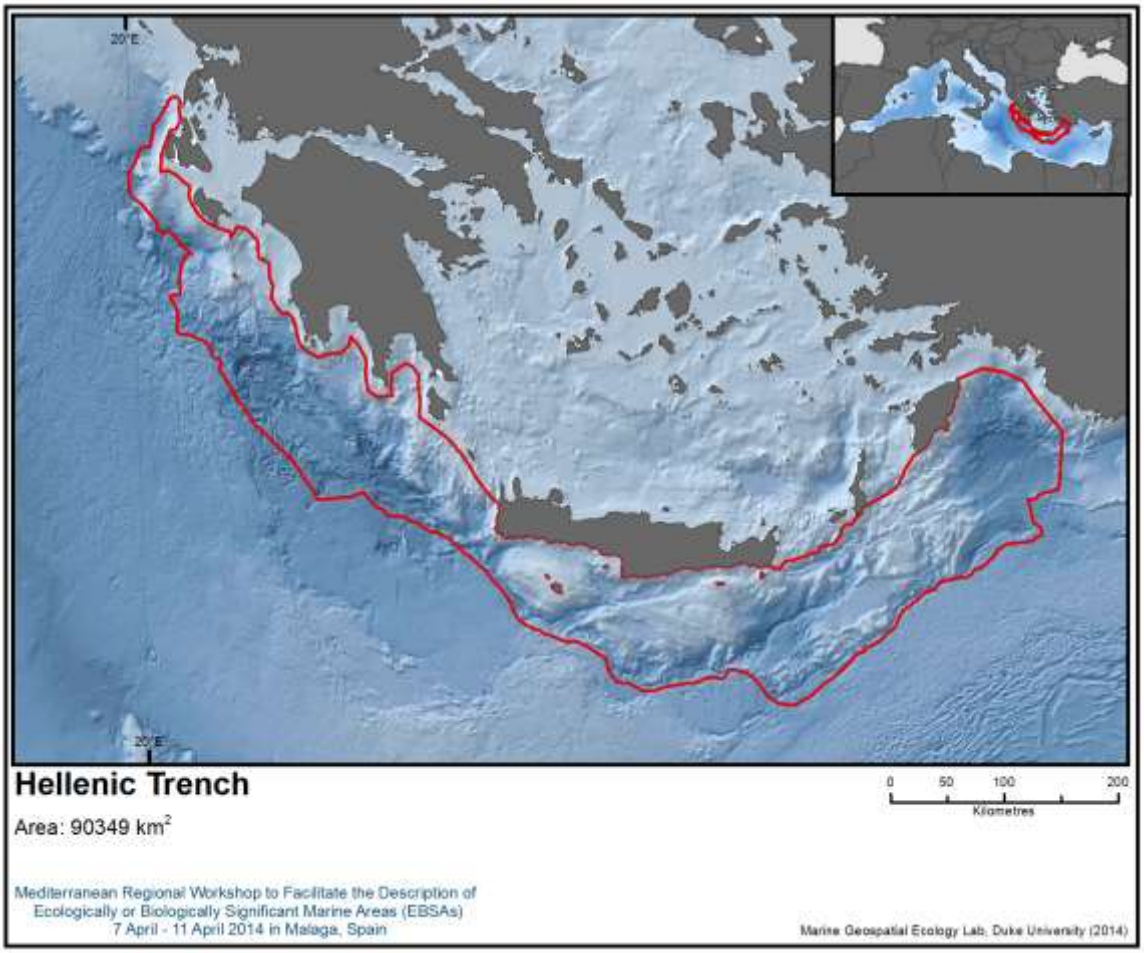


Figure 1. Area meeting the EBSA criteria.


Figure 2. Natura 2000 sites in Crete (map produced using the Natura 2000 network viewer, http://natura2000.eea.europa.eu).

## Area No. 16: Central Aegean Sea

### Abstract

The Central Aegean Sea is characterized by an extensive archipelago of hundreds of small islands and bays which form a variety of habitats hosting a rich biodiversity. Important biological and ecological characteristics include the presence of vulnerable habitats such as seagrass beds and coralligenous grounds, which provide habitats and highly important reproduction areas for a number of rare or vulnerable species (e.g., monk seal, various bird species, cetaceans, and sharks). Unique geomorphological features include hydrothermal vents, brine seeps, and submarine volcanoes. Owing to the area's high biodiversity and the presence of many vulnerable species, many sites are legally protected protected.

### Introduction

The area (figure 1) is bordered by Turkey and Greece and is characterized by an extensive archipelago of hundreds of small islands and islets (both inhabited and uninhabited), and peninsulas and bays, and thus hosts many different habitats. The area lies on a plateau and is comparatively shallow (ca. 150 m on average). Seismic activity in the area is high. The southern border of the area is limited by the South Aegean Volcanic Arc, which contains a number of active volcanoes, including the submarine volcano of Kolumbo and the volcanic vents surrounding Santorini. Water circulation patterns in the area are complex, influenced by the seabed topology, seasonal variability, and different interacting water masses, but overall the circulation pattern in the area is cyclonic (Fric et al., 2012). Cold water masses from the northern Aegean and the Black Sea influence the northern part of the area, whereas the southern part is influenced by warm water masses from the Levantine basin. The area is generally classified as oligotrophic, though abundant seagrass meadows create local hotspots of productivity and biodiversity. Due to its fragmented nature, the area is generally characterized by a large variety of habitats and host a very high number of species (UNEP-MAP RAC/SPA, 2010). The area is generally well studied. Data on a number of key species and habitats as well as oceanographic data are available through various reports and databases (e.g., http://iobis.org, http://hnodc.hcmr.gr, http://mareaproject.net/medviewer/), although there is generally less data on benthic species and habitats compared to other areas of the Mediterranean. Overall, the area is characterized by a diversity of habitats (Posidonia beds, bays, long coastlines, many islands, coralligenous grounds, small sandy beaches), the presence of rare or vulnerable species (e.g., monk seal, bird species, cetaceans, important areas for life histories of species (shark nursery area, bird breeding sites), rare geomorphological features (e.g., hydrothermal vents, brine seeps, submarine volcanoes) and many sites with already recognized biological importance, such as Important Bird Areas, marine protected areas and Natura 2000 sites.

### Location

The area extends from Babakale, Turkey across the Aegean Sea to the west, including the island of Skiros. The western limit of the area extends southward along the Attica shoreline to the uninhabited island of Falkonera, then follows the southern islands of the Kyklades archipelago, along the Hellenic Volcanic Arc until Rhodes. It follows the northern shoreline of Rhodes until the Turkish coastline, which forms the eastern limit of the area.

### Feature description of the area

### 1. Already identified areas of special importance:

#### a. *Important Bird Areas (IBAs)*

The area comprises hundreds of small islands and islets, both inhabited and uninhabited, and the islands' surrounding waters host important habitats for a number of endangered or threatened sea bird species. Data on the distribution and life history of a number of these species have led to the designation of 34 Important Bird Areas in the area (Fric et al., 2012; BirdLife International, 2014). These sites have been

designated for 9 bird species and together hold at least 50,000 individuals. Distribution in the area varies between species, colonies and life-history stages, but taken together encompass much of the area defined.

***b. MPAs and Natura 2000 areas***

A number of locations in the area have been identified as being of special importance for biodiversity and have been placed under legal protection (figure 3).

The area hosts three MPAs along the Turkish coastline (an overview of these can be found in Bann & Başak, 2011): (1) Foça Special Environmental Protection Area (SEPA), which contains essential habitats for monk seals (taking its name from "fokia" - Greek for "seal"). Moreover, the delta Gediz located inside this protected site is also an important habitant for many bird species, as well as an important site for many fish species; (2) Datca-Bozburun SEPA, which is an important area for birds, monk seals, *Pinna nobilis*, marine turtles, sponges and healthy *Posidonia* meadows; and (3) Gokova SEPA, including the Boncuk Bay, which is an important site for birds (especially *Larus audoinii*, *Phalacacorax aristotelis*) and sandbar sharks. Additionally, Boncuk Bay is one of the few nursery grounds for sandbar sharks (*Carcharinus plumbeus*) in the Mediterranean.

A number of sites in the area have been declared as Natura 2000 areas (detailed information available at: http://www.ekby.gr/ekby/en/EKBY_Natura2000_en.html), many of them falling under the Birds Directive. Notable areas including marine areas and falling under the Habitat Directive include:

- Area around the island of Yaros, which is an important site for monks seals, birds and marine biodiversity;
- Area of Fourni/ Ikaria, which is important for birds, seagrass beds and marine biodiversity;
- Large seagrass beds between the island of Chios and the Turkish mainland; and
- Waters surrounding the Milos-Kimolos and the Koufonissia islands, which are important breeding grounds for monk seals.

**2. Species of importance**

***a. Birds***

The area includes a number of seabirds that are endemic to the Mediterranean, as well as some of the key breeding sites and feeding areas for 45% of the global population of Yelkouan shearwater. The area is also used extensively by Audouin's gull (4% global population, about 350-500 breeding pairs in the area (Fric et al., 2012) and Scopoli's shearwater (2% global population) and the Mediterranean endemic subspecies of European shag and European storm petrel (the area contains the only two colonies in Greece, with about 10-30 breeding pairs) (Fric et al., 2012).

***b. Cetaceans***

The deep area between the Cyclades and the Dodecanese archipelagos constitutes an important corridor for sperm whales migrating between the northern Aegean Sea and rest of the Mediterranean Sea (Cebrian, 1998). The area also hosts also populations of bottlenose, striped and common dolphins. (Cebrian, 1998; ACCOBAMS 2004; ACCOBAMS 2010a; ACCOBAMS 2010b).

***c.* Mediterranean monk seal (*Monachus monachus*)**

The Mediterranean monk seal (*Monachus monachus*) is labeled as a critically endangered species in the Mediterranean by the IUCN, with an estimated number of 220 to 270 individuals thought to exist in the Aegean Sea (reliable estimates only available up to the year 2000). These individuals are usually scattered in low numbers throughout the region, although many breeding sites have been identified in the Kyklades archipelago, the Dodecanese Islands and Central Aegean Islands (Cebrian, 1998). The central Aegean population of the monk seal concentrates in the central belt of the Cyclades islands from Milos island in the west to the Small Kyklades (Koufonissia) in the east (Cebrian, 1998). A second area of concentration

comprises the islands Yaros, Andros, Tinos, and Mykonos (Cebrian 1998). Other areas of interest include a range of sites along the Turkish Aegean coastline, notably the Foça Special Environment Protection Area (Kıraç and Güçlüsoy, 2008). The area still hosts the biggest population of monk seals in the Mediterranean. The biggest threat to the population is interactions with small-scale fisheries. However, the area hosts a large number of critical whelping, resting and feeding sites for the species which provide a high potential for the recovery of the species, provided appropriate management measurements are taken (Cebrian, 2005).

***d. Sandbar shark (Carcharhinus plumbeus)***

Sharks constitute an important component of the marine ecosystem. Their position in the trophic web and their reproduction strategies they are vulnerable to anthropogenic activities such as fisheries (Ferretti et al., 2008), and the bioecology of sharks and rays of the Mediterranean is still understudied (Bilecenoğlu, 2008). The proposed area comprises the area of Boncuk Bay, which is a known nursery ground of the Sandbar shark (*Carcharinus plumbeus*) (Bilecenoğlu, 2008), which is classified as vulnerable by the IUCN. In the whole Mediterranean basin, only two to three areas have been identified as nursery grounds for the sandbar shark: the Gulf of Gabes (Bradaï et al., 2005) and Boncuk Bay (Bilecenoğlu, 2008). Nursery grounds may also exist also in the northern Adriatic, but exact locations have yet to be identified (Costantini and Affronte, 2003).

**3. Habitats of importance**

***a. Seismic features (hot vents, volcanoes, mud volcanoes, cold seeps)***

The area is highly seismically active. Its southern boundary is formed by a volcanic arc which is associated with the subduction of the Africa plate beneath the Aegean Sea plate, in the Dodecanese and Cyclades Islands This results in a number of sites with hydrothermal activities in the area (Dando, 1995a, IEAGHG, 2009) (figure 4). The most active areas with hydrothermal activity are the brine seeps and vents around Milos, the vents around Santorini, including the Kolumbo volcano, the Nisyros/ Kos area and the vents around Lesbos. Several sites have been well studied (Dando et al., 1995b, 1999, 2000; Fitzsimons et al., 1997; Sakellariou et al., 2010, Kilias et al., 2013) and host a very high diversity of prokaryotes (e.g., archea and bacteria) including sulphur and sulphate reducers, methanogens and iron oxidisers, among others, including a large number of new taxa, some of which are expected to be of biotechnological potential (Dando et al., 1999). Most vents are shallow and do not host the typical vent macrofauna known to commonly exist at deep-water vents. Generally, only the most tolerant shallow water macrofaunal species survive the conditions on these sites (Dando et al., 1995b; Fitzsimons et al., 1997), although a few species occur in great abundance (e.g., Nematoda, Nassarid gastropods, Polychaetes) and the larger vent sites are areas of settlement for thermophilic species (IEAGHG, 2009).

***b. Maerl beds and coralligenous grounds***

Coralligenous formations and maerl beds are coralline algal frameworks that grow in dim light conditions (Ballesteros, 2006). These habitats are important both for fisheries and carbon dioxide regulation (Fraschetti et al., 2013), and are often the basis of biodiversity 'hotspots' (Boudouresque, 2004; Ballesteros, 2006). They are important habitats for mollusks and crustaceans of economic importance and form nursery grounds for a variety of species (Hall-Spencer et al., 2010). Under the European Council regulation EC 1967/2006, these habitats are defined as vulnerable and destructive fishing techniques are banned in these sites. In the eastern Mediterranean, these formations usually occur below 70 m deep and therefore their exact distribution is not known. The deep areas between the Cyclades islands are known to host coralligenous and maerl grounds (e.g., Georgiadis et al., 2009; Fraschetti et al., 2013). However, predictive models (Fraschetti et al., 2013) show a high probability for the occurrence of these habitats in certain parts of the area (figure 5).

***b. Posidonia oceanica meadows***

*Posidonia oceanica* is one of the most important habitat-forming species in the Mediterranean. These seagrass meadows are highly complex, diverse and productive (Buia et al., 2003; Belluscio et al., 2013),

hosting a large diversity of invertebrates and serving as nursery grounds for many fish species (Kalogirou et al., 2010). *Posidonia* meadows have often become fragmented and endangered by illegal and destructive fishing practices, damage from fish farm waste and anchoring boats, as well as by impacts from invasive algal species, such as Caulerpa sp. (Holmer et al., 2008; Holmer et al., 2009; Okudan et al., 2011). Regulation EC 1967/2006 defines seagrass beds as vulnerable habitats and bans all destructive fishing practices in these areas. Comprehensive maps of *Posidonia oceanica* distribution do not exist for large-scale areas. However, in this area, almost all areas along the coast and shallower than ca. 50 m have a very high potential for the presence of *Posidonia oceanica* (Belluscio et al., 2013).

**Feature condition and future outlook of the area**

The area and its species are not imminently threatened by anthropogenic forcing. However, the coastal portions of this area are generally subjected to increased anthropogenic impacts such as habitat destruction through urbanization and tourism, commercial and recreational ship traffic, underwater noise and ship anchorage, marine litter, pollution and impacts from destructive fishing practices (Azzellino et al., 2011; Claudet and Fraschetti, 2010; Katsanevakis and Katsarou, 2004; MED POL, 2011). Additionally, the area hosts a number of vulnerable species and habitats. Furthermore, the area hosts a consistently increasing number of Lessepsian migrant species, which, in combination with rising sea temperatures, could potentially have unexpected impacts on species composition and ecosystem function (Zenetos et al., 2010; Raitsos et al., 2010).

**Assessment of the area against CBD EBSA criteria**

| **CBD EBSA criteria** (Annex I to decision IX/20) | **Description** (Annex I to decision IX/20) | **Ranking of criterion relevance** (please mark one column with an X) | | | |
|---|---|---|---|---|---|
| | | **No inform.** | **Low** | **Medium** | **High** |
| **Uniqueness or rarity** | Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features. | | | X | |
| *Explanation for ranking*<br>The area includes a number of seabirds that are endemic to the Mediterranean. The area includes some of the key breeding sites and feeding areas for 45% of the global population of Yelkouan shearwater. The area is also used extensively by Audouin's gull (4% global population) and Scopoli's shearwater (2% of the global population) and the Mediterranean endemic subspecies of European shag and European storm petrel (BirdLife International, 2014; Fric et al., 2012).<br><br>The area hosts the densest Mediterranean population of the rare monk seal (Cebrian, 1998; Kıraç and Güçlüsoy, 2008).<br><br>The area is very seismically active, and a large number of hydrothermal vents, brine seeps, submarine volcanoes with unique microbial communities exist in the area (Dando, 1999).<br><br>Only two to three sandbar shark nursery area are known to exist in the Mediterranean, one of which is located the area (Bilecenoğlu, 2008; Bradaï et al., 2005; Costantini and Affronte, 2003). | | | | | |
| **Special importance for life-history stages of species** | Areas that are required for a population to survive and thrive. | | | | X |

*Explanation for ranking*

**Birds:**

*Breeding*

The area is important for the vulnerable Yelkouan shearwater (which is endemic to the Mediterranean), with the breeding sites in the area collectively hosting up to 45% of the global population of this species (6600 pairs). Birds have been studied at sea using tracking devices from one colony (Fric et al., 2012). In addition, the area is home to numerous breeding sites for the near threatened Mediterranean endemic Audouin's gull, and contains up to 4% (800 pairs) of the global population of this species. A total of 32 birds (53 trips) have been tracked using GPS, GLS (global locating system) and radio tags from 6 colonies to better understand their at-sea distribution (Fric et al., 2012). These studies showed that the birds forage mainly at sea, feeding primarily on fish caught at the sea surface, travelling up to 60 km from the colony but general within 15 km. The area also holds 2% of the global population (3000 pairs) of the Mediterranean endemic and near threatened Scopoli's shearwater. A total of 24 birds have been tracked using GPS, GLS and PTT (platform terminal transmitter) devices from four colonies and have been shows to travel extensively throughout the region (Fric et al., 2012). Predicted foraging areas around breeding colonies have been identified in this area for Caspian tern (*Sterna caspia*), and Mediterranean subspecies of European shag and Audouin's gull. The distances for these are based on published studies of the at-sea distribution of these species in other localities (BirdLife International, 2013). Scopoli's shearwater and Yelkouan shearwater have been shown to group together to form rafting flocks on the surface of the water in the evening before returning to their colonies at night to avoid predators. Based on analysis of seabird tracking data, these rafts generally occur within 7 km of the colony, hence predicted buffers have been applied to all colonies for these species to capture these potential rafting areas for the importance to the life-history of these species.

*Migration and non-breeding*

Tracking data of Yelkouan shearwater shows that the majority of the Mediterranean population (up to 30,000 pairs) pass through the Aegean during their migration, stopping to feed, before continuing their journey to wintering areas in the Black Sea (Raine et al., 2012). Some species, including up to 5000 Mediterranean gull, 3000 great cormorant and 100 Caspian tern, also travel to the Mediterranean from other areas during the non-breeding season (Fric et al., 2012).

**Sharks:**

The area contains Boncuk Bay, which is a known nursery ground of the Sandbar shark (*Carcharinus plumbeus*) (Bilecenoğlu, 2008). Throughout the Mediterranean basin, only two or three areas have been identified as nursery grounds for the sandbar shark, including the Gulf of Gabes (Bradaï et al., 2005) and Boncuk Bay (Bilecenoğlu, 2008). Nursery grounds may also exist in the northern Adriatic, although exact locations have yet to be identified (Costantini and Affronte, 2003). Furthermore, juvenile white sharks have been reported in the area, indicating possible reproduction activities and regular presence of the species in the area (Kabasakal and Özgür Gedikoglu, 2008; Kabasakal et al., 2009).

***Posidonia oceanica* meadows:**

*Posidonia oceanica* is one of the most important habitat-forming species in the Mediterranean, forming highly complex, diverse and productive meadows (Buia et al., 2003, Belluscio et al., 2013) that host a large diversity of invertebrates and function as nursery grounds for many fish species (Kalogirou et al., 2010).

**Cetaceans:**

The deep area between the Cyclades and the Dodecanese archipelagos constitutes an important corridor for sperm whales migrating between the Northern Aegean Sea and remaining Mediterranean Sea (Cebrian, 1998).

| | | | | | |
|---|---|---|---|---|---|
| **Importance for threatened,** | Area containing habitat for the survival and recovery of endangered, | | | | X |

| | | | | | |
|---|---|---|---|---|---|
| **endangered or declining species and/or habitats** | threatened, declining species or area with significant assemblages of such species. | | | | |

*Explanation for ranking*

The Yelkouan shearwater is listed as vulnerable by IUCN and is included on Annex I of the EU Birds Directive and the Annex of Barcelona Convention. Audouin's gull (*Larus audouinii*) is listed as near threatened by the IUCN and is included on Annex I of the EU Birds Directive and the Annex of Barcelona Convention. Scopoli's shearwater (*Puffinus diomedea diomedea)* is about to be given full species status and is likely to be listed as near threatened by IUCN, and is already included on Annex I of the EU Birds Directive and the Annex of Barcelona Convention. Other species found here listed under the EU Birds Directive and Barcelona Convention include the Caspian tern, European shag, Mediterranean gull, European storm petrel, and Yellow-legged gull.

The Mediterranean monk seal (*Monachus monachus*) is ranked as critically endangered in the Mediterranean by the IUCN with an estimated number of 220 to 270 individuals thought to exist in the Aegean Sea (reliable estimates only available up to the year 2000). These individuals are usually scattered in low numbers throughout the region, although many breeding sites have been identified in the Kyklades archipelago, the Dodecanese Islands and Central Aegean Islands (Cebrian, 1998).

The importance of this area for cetaceans is supported by the ACCOBAMS Resolution 4.15 presenting a map of areas of special importance for cetaceans (ACCOBAMS 2010a).

The area hosts populations of the dolphin species *Tursiops truncatus, Stenella coeruleoalba and Delphinus delphis* (Cebrian, 1998), classified by the IUCN as vulnerable, vulnerable, and endangered, respectively, in the Mediterranean Sea.

The area contains Boncuk Bay, which is a known nursery ground of the Sandbar shark (*Carcharinus plumbeus*) (Bilecenoğlu, 2008), which is classified as vulnerable by the IUCN.

| | | | | | |
|---|---|---|---|---|---|
| **Vulnerability, fragility, sensitivity, or slow recovery** | Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery. | | | X | |

*Explanation for ranking*

The area is home to a number of vulnerable species, as follows:

- Shearwaters are long-lived species and, therefore, immediate threats to this species directly affect adult mortality rates. Birds are susceptible to by-catch in fisheries (Anderson et al., 2011).
- There is evidence that the breeding population of Audouin's gull in Greece has declined during the last decade from 700-900 to 350-500 pairs. By-catch in demersal longlines is known to kill at least 2.5% of the local breeding population annually (Saravia Mullin et al., 2012).
- Monk seals face potential impacts from small-scale fishing (Cebrian, 2005).
- Regulation EC 1967/2006 defines seagrass beds as vulnerable habitats and bans all destructive fishing practices from these areas, yet *Posidonia* meadows have often become fragmented and endangered by illegal and destructive fishing practices, damage from anchoring boats, as well as impacts from invasive algal species (e.g. Caulerpa sp.) (Holmer et al., 2009; Okudan et al., 2011).
- Maerl and coralligenous grounds, which are classified as vulnerable habitats according to regulation EC 1967/2006, are sensitive to physical disturbance, sedimentation, temperature increase, species invasion and water degradation (Fraschetti et al., 2013 and references therein).

| | | | | | |
|---|---|---|---|---|---|
| **Biological** | Area containing species, populations | | X | | |

| | | | | | |
|---|---|---|---|---|---|
| **productivity** | or communities with comparatively higher natural biological productivity. | | | | |
| *Explanation for ranking*<br>The Aegean Sea, with the exception of the northern part, is generally classified as oligotrophic (UNEP-MAP RAC/SPA, 2010). Although primary production in the area is known to be low, other types of productivity (e.g., benthic or pelagic species) in the area are understudied. Nevertheless, the area hosts extensive areas of seagrass beds, which constitute local hotspots of high productivity (Fraschetti et al., 2013). | | | | | |
| **Biological diversity** | Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity. | | | | X |
| *Explanation for ranking*<br>On a global scale, the Mediterranean is a hotspot of biodiversity (Bianchi and Morri, 2000), and the area is representative of this. A series of biogeographic studies published recently show that the Aegean is the second richest area in number of species among the Mediterranean and Black Sea regional seas. It has also been shown that the biodiversity indices in the Aegean are higher than expected and that this extreme biodiversity richness can be partially attributed to the number and total surface of the Aegean islands. The pattern of both species diversity and abundance exists in both the north and south Aegean (UNEP-MAP RAC/SPA, 2010 and references therein). | | | | | |
| **Naturalness** | Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation. | | | X | |
| *Explanation for ranking*<br>The area contains a very high number of islands and peninsulas and is strongly influenced by anthropogenic activities in coastal areas such as marine traffic and pollution. However, many of the small islands and islets in the area are uninhabited and remote, providing important sites for breeding and foraging for a large number of species such as the monk seal (Cebrian, 2005) and many bird species (BirdLife International, 2013, 2014). | | | | | |

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**Maps and Figures**

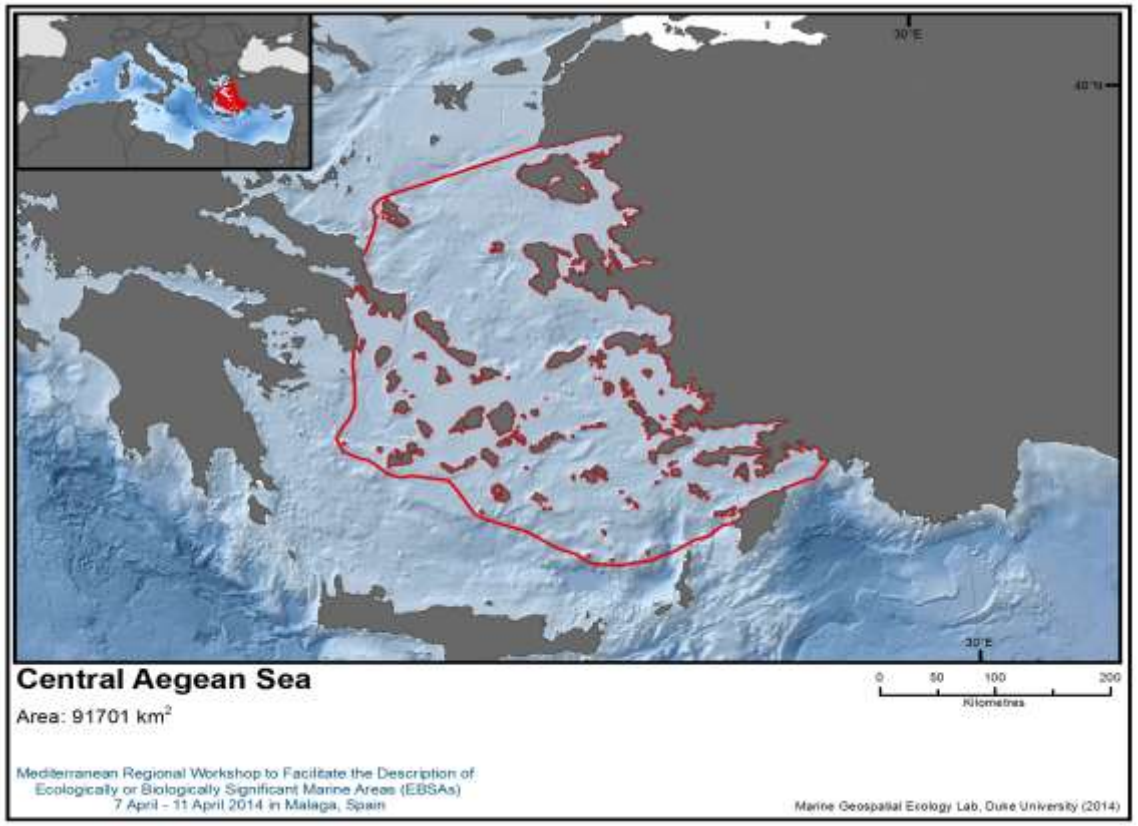


Figure 1. Area meeting the EBSA criteria.

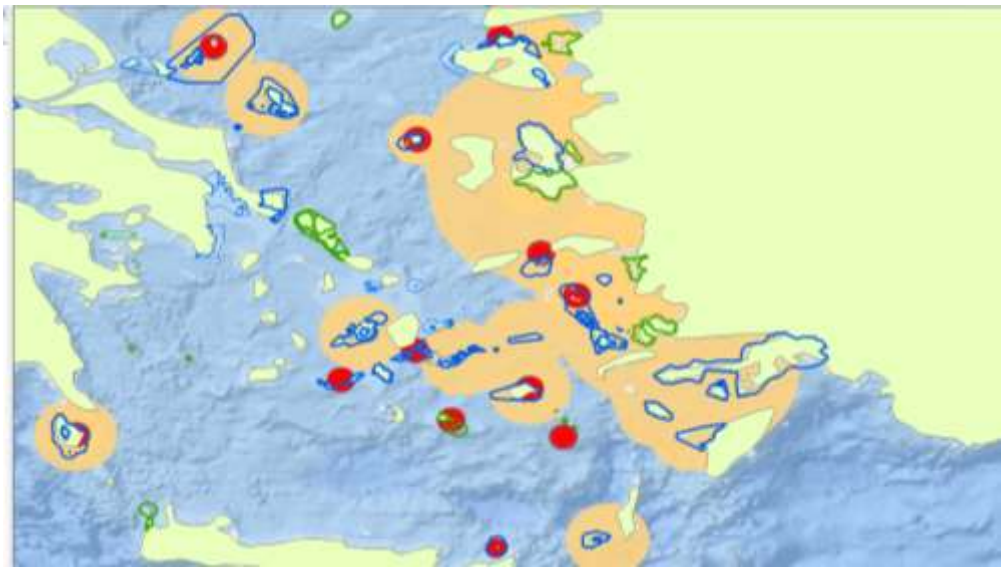

Figure 2. Important Bird Areas and key foraging sites for seabirds in the Central Aegean. Key: Blue polygons = IBAs of global importance; Green polygons = IBAs of regional importance; Beige areas = predicted feeding areas (BirdLife International, 2014).


Figure 3. Map of Natura 2000 sites in general vicinity of the area. (Red: Natura 2000 site (Birds Directive); Blue: Natura 2000 site (Habitat Directive); Green: Marine Protected Area) (map produced using the Natura 2000 network viewer, http://natura2000.eea.europa.eu).


Figure 4. Major areas with submarine hydrothermal activity (black). Source: (Dando et al., 1999).

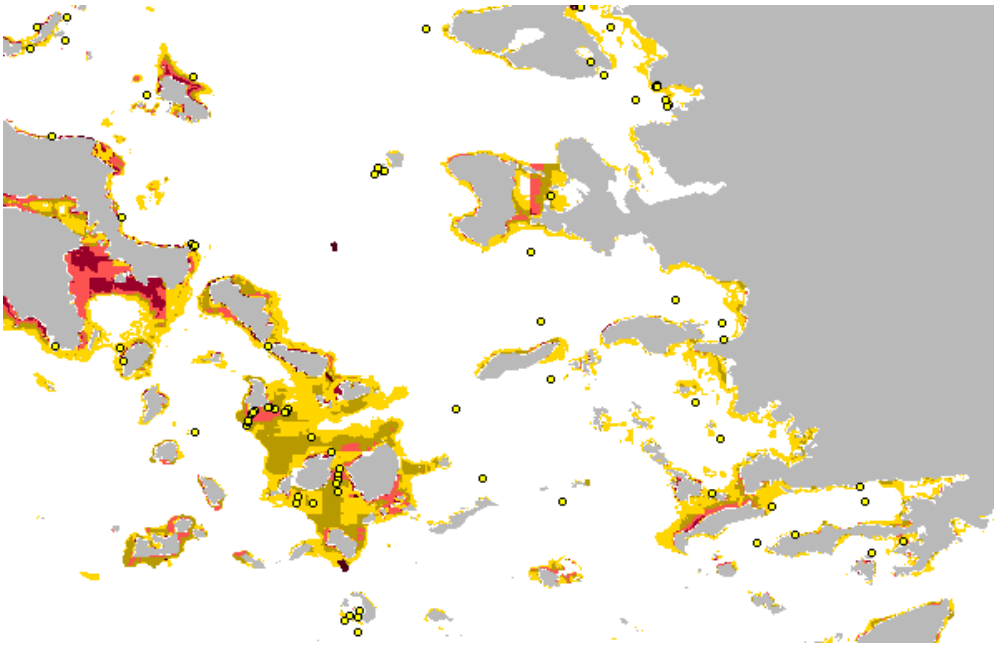

Figure 5. Predicted and known occurrence of Maerl and coralligenous (Dark red: >90% probability, yellow: 50% probability) (MEDISEH viewer, http://mareaproject.net/medviewer/)

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## Area No. 17: North Aegean

**Abstract**

The area is highly productive due to the input of trans-frontal river waters, upwellings and the input of nutrient-rich water from the Black Sea. The area includes some of the most important fishery grounds of the Aegean Sea. Rare species of cetaceans and corals are found in the area, as well as one of the largest marine parks of the Mediterranean, which supports an important Mediterranean monk seal population.

**Introduction**

The area (figure 1) comprises the large North Aegean continental shelf, ending at the North Aegean trench (more 1000 m depth). It is known as the most productive part of the Eastern Mediterranean (in terms of primary production and small pelagic fisheries, such as sardines and anchovy (Giannoulaki et al., 2005), due to the incoming waters from the Black Sea, as well as from the runoff on several trans-frontal rivers. Almost 40% of all the fish species known to occur in the waters surrounding Greece can be found in the Northern Aegean Sea/Thracian Sea between 100-400 meters depth, including 28 elasmobranches, some of which are protected species such as *Oxynotus centrina, Squatina aquatina, Squatina oculata, Squalus acanthias* or *Rostroraja alba* (Labropoulou and Papaconstantinou, 2000).

More than 30 Natura 2000 sites have been identified as biodiversity hotspots in the area, mainly due to the presence of Neptune seagrass (*Posidonia oceanica*) meadows, brown algae (*Cystoseira* spp.) forests and marine caves important for the life cycle of the Mediterranean monk seal (figure 2). For the latter species, a large marine area has been designated by Greece as National Marine Park (about 200,000 ha) in the North Sporades Archipelagos.

Additional ecological features of the North Aegean reported by research institutions and non-governmental organizations as unique for the Mediterranean are the presence of the cetacean species *Phocoena phocoena* (Notarbartolo di Sciara and Bearzi, 2010; Ryan et al., 2013) in the northern part of the area and cold water corals in the trench.

Regarding additional biodiversity elements, the following can be listed:

- Presence of 314 different zoobenthos species, including important “maerl” and coralligenous beds in the Chalkidiki peninsula (Antoniadou and Chintiroglou, 2005);
- Important stony corals, as *Caryophyllia inornata, Madracis pharensis, Cladocora caespitosa, Leptosammia pruvotti*, etc. (Vafidis et al., 1997);
- Protected and important sponges species, like *Spongia officinalis, Spongia agaricina, Spongia virgultosa, Hippospongia communis, Aplysina aerophoba* and many other important for the ecosystem (Voultsiadou-Koukoura and Koukouras, 1993);
- Important colonies of protected sponges in the National Marine Park of Alonissos and Northern Sporades (Voultsiadou et al., 2010);
- Stony coral *Dendrophyllia cornigera* found in different locations between Lesvos and mainland Greece (Salomidi et al., 2010);
- Important gorgonian communities on coralligenous beds between Lesvos and Mainland Greece: including *Eunicella cavolinii, Paramuricea clavata, Leptogorgia sarmentosa, Eunicella singularis* and *Corallium rubrum* (Salomidi et al., 2009);
- White gorgonian (*Eunicella singularis*) communities in Arethoussa and Phidonissi Islands at Kavala Bay (Skoufas et al., 2000);
- High diversity of molluscs, including protected species, like *Luria lurida* in the Chalkidiki peninsula (Antoniadou et al., 2005);

- More than 100 species of small invertebrates living within mussel beds (*Mytilus galloprovincialis*) in the Thermaikos Gulf (Chintiroglou et al., 2004).

The presence of all of these species in the area would benefit from confirmation by further studies.

**Location**

The North Aegean Sea (figure 3) is bounded to the south by a line running from Akra Kavirefs (38°09′31.76″N; 24°35′16.26″E) Evia Island to Cape Teke Burnu (38°06′12.48″N; 26°35′32.71″E) in Minor Asia (Turkey). To the North it is limited by the coastline of Macedonia and Thrace (Greece) and East Thrace (Turkey) (International Hydrographic Organization, 1953). The described area comprises waters within national jurisdiction of Greece and Turkey as well as waters outside national jurisdiction.

The physiography of the North Aegean Sea is dominated by the North Aegean Trough, an over 300 km long E-W oriented depression mostly over 800 m deep. Essentially the North Aegean Trough is divided (Papanikolaou et al., 2002) into two distinct physiographic areas:

1) The western part that contains approximately 20 sub-basin deeps separated by distinct intermediate ridges or channels, the deepest occurring at the south-west corner of the trough north of Alonnisos island, where the maximum water depth of 1610 m was found;

2) The eastern part that starts to the east of the area between the islands of Thasos and Limnos, where a submarine platform develops; the two sectors of the trough are separated by a ridge of 490 m maximum depth. The eastern part of trough is over 800 m deep and also contains several deeps reaching depth down to 1600 m at the western end of Saros Gulf.

Several other over 700 m deep basins develop in the southern half of the North Aegean. The bigger include the Lesvos basin, south of Lesvos Island, the Chios Basin west of Chios Island, the North and South Skiros basins offshore Skiros Island, the SE Evia basin, the Skopelos basin and other smaller basins.

The northern shelf of the Aegean Sea is wide with small seafloor gradients. The main physiographic provinces include several landlocked and more open gulfs that from west to east include the Thermaikos Gulf, a wide shelf zone gently sloping into the shelf break developed between 110-200 m (Lykousis and Chronis, 1980). The gulfs developed between the three legs of Chalkidiki Peninsula include the Singitikos and Toroneos Gulfs characterized by short shelf zones, especially Toroneos, reaching water depths of over 800 m. To the east of Chalkidiki peninsula (Perissoratis and Mitropoulos, 1989) distinguished on the shelf five main physiographic provinces. The Ierissos Gulf has an elliptical shape and a NW-SE orientation with the 50 m isobaths lying very close to the shore and the central part of the Gulf attaining depths of about 80 m. The Strymonikos Gulf has a rectangular shape and steep nearshore slopes, except near the mouth of the Strymon River delta. The central part of the gulf is slightly elevated, thus creating a small basin in the north which is connected to the open shelf by a channel. The Gulf of Kavala, which is circular and slopes smoothly to its center. The Strymonikos Plateau, which is occupying the deeper sector of the three aforementioned gulfs, extending to the shelf break that is around 130 m. The Samothraki Plateau extends eastward from Thasos to Samothraki Island. It slopes gently southward and is generally smooth except for a slight rise between the town of Alexandroupolis and Samothraki Island and a few NE-SW oriented channels in its eastern part. Beyond the shelf break, the seafloor falls steeply to more than 100 m into the North Aegean Trough. The easternmost province of the North Aegean shelf is occupied by the wedge shaped Saros Gulf (Kurt et al., 2000) extends parallel to the coast of the East Thrace shelf to the north and Gelibolu peninsula to the south. A wide shelf (about 10 km) exists at the northern gulf; on the contrary, steeply dipping sea bottom along the shores of Gelibolu Peninsula progress westwards where the gulf deepens and eventually merges to the North Aegean Trough. The other wide shelf area is the plateau developed around the islands of Limnos and Ayios Evstratios and the shelf area between the islands of Chios and Lesvos and Minor Asia.

The SW end of the North Aegean Sea is marked by the elongate Evia island enclaving towards mainland Greece the Evoikos Gulf which is divided into the North Evoikos Gulf which is over 420 m deep and the South Evoikos Gulf that at its southernmost end that widens up and merges into the Cyclades plateau.

**Feature description of the area**

**Temperature:** The long term annual mean SST for the North Aegean is 18.19$^{o}$C. Seasonal variations closely follow the atmospheric temperatures lagged by approximately one month. Apart from the expected north-south gradient, the annual mean spatial distribution is modified by the inflowing Black Sea Water (hereafter BSW) through the Dardanelles Strait, and the Levantine Intermediate Water (LIW) inflowing from the south-eastern basin. This leads to annual mean lowest SSTs at the north-eastern part of ~17.5$^{o}$C and highest at the south-eastern part of ~18.9$^{o}$C.

The seasonal distribution of the SSTs in the North Aegean appears to be mostly affected by the seasonal variability of the characteristics and volume of the inflowing BSW. Winter (January-March) SSTs range from 11.5 to 14.5$^{o}$C with a mean of ~13.7$^{o}$C, with colder waters occupying the north-eastern and north-western parts of the basin, while warmer Levantine waters enter from the south-east. During spring (April-June) the horizontal SST distribution show cooler temperatures close to the Dardanelles mouth, gradually warming in the rest of the basin. Spring SST values range from 14 to 22$^{o}$C with a mean of ~18$^{o}$C, as warmer BSW enters the basin. Summer (July-September) SSTs are affected by a combination of the onset of the Etesian winds (see Upwelling Characteristics) and the even warmer inflowing BSW. Thus the resulting SST spatial distribution shows lower values close to the eastern-southeastern part gradually increasing to the west. Values during summer are ranging from 22.5 to 25.5$^{o}$C with a mean of ~24$^{o}$C. Fall (October-December) SSTs show a transitional distribution from summer to winter conditions, where lower values occupy again the north-eastern basin. Temperature values during fall are ranging from 14.5 to 21.5$^{o}$C with a mean of ~18.2$^{o}$C.

**Salinity:** The salinity in the North Aegean Sea is determined by the interaction of the following two major water masses: highly saline (S > 38.5) Levantine water (LW) originating in the Levantine and Cretan Seas and Black Sea water (BSW, S < 36) inflowing through the Dardanelles Strait. This fact, combined with the dominant mean cyclonic circulation of the Aegean Sea, determines the salinity distribution. The BSW due to their low density remain at the surface, forming a 20-40 m thick layer.

The mean sea-surface salinity (SSS) over the area of interest is estimated at 38.8 ± 0.3. The distribution is determined by the dominant cyclonic circulation. The highest sea-surface (S~39.2) values are located over the shelf of Lesvos island, due to the continued evaporation that the northward propagating LW undergoes. Between the islands of Lemnos and Lesvos there is a very intense thermohaline front. Thus, in the region east of Lemnos the minimum SSS values are often found. Minimal sea-surface salinity values are also observed around the island of Samothraki, due to the characteristic and very energetic anticyclone surrounding the islands of Samothraki and Imvros, which concentrates surface waters at each centre (Zervakis and Georgopoulos, 2002).

**Databases:** During the last 30 years many oceanographic cruises have been carried out by the Hellenic Center for Marine Research (HCMR) and a lot of oceanographic data are available in the Hellenic Oceanographic Data Centre (http://hnodc.hcmr.gr). A typical scheme of long-term variations of temperature and salinity in the Aegean is given in figure 4.

**Fisheries data**

The evaluation of the fishing effort in the Aegean, based on vessel monitoring system (VMS) recordings is given in figure 5. According to these data more than 2/3 of the recordings occur in the described area.

**Assessment of the area against CBD EBSA criteria**

| **CBD EBSA criteria** (Annex I to | **Description** (Annex I to decision IX/20) | **Ranking of criterion relevance** (please mark one column with an X) | | | |
|---|---|---|---|---|---|
| | | **No** | **Low** | **Medi** | **High** |

| | | | | | |
|---|---|---|---|---|---|
| decision IX/20) | | **information** | | **um** | |
| **Uniqueness or rarity** | Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features. | | | | X |
| *Explanation for ranking*<br>The North Aegean contains unique oceanographic features, as it is the only area receiving waters from the Black Sea, which contribute to a high primary production.<br><br>It is the only area in the Mediterranean hosting a regular population of endangered Black Sea harbour porpoise (Ryan et al., 2013). | | | | | |
| **Special importance for life-history stages of species** | Areas that are required for a population to survive and thrive. | | | | X |
| *Explanation for ranking*<br>The area has a rich diversity of cetacean fauna, which depend on the area for feeding and breeding (Ryan et al., 2013).<br><br>The area is home to pelagic fish spawning grounds (Giannoulaki et al., 2008, 2011, 2013 and EU FP7 MEDISEH project). | | | | | |
| **Importance for threatened, endangered or declining species and/or habitats** | Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species. | | | X | |
| *Explanation for ranking*<br>The area is considered to be threatened by overfishing.<br><br>According to IUCN Red List, Black Sea harbour porpoises are EN, short-beaked common dolphins are EN, common bottlenose dolphins and striped dolphins are VU and Mediterranean monk seal is CE. All these species are permanently located in the area.<br><br>The Mediterranean monk seal reproduces regularly in Khalkidiki Peninsula and Sporades Archipelago (Cebrian, 1998).<br><br>The area contains important habitat for the survival of sperm whales between Khalkidiki and Sporades Islands (Cebrian, 1998). | | | | | |
| **Vulnerability, fragility, sensitivity, or slow recovery** | Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery. | | X | | |
| *Explanation for ranking*<br>Cetaceans are fragile and slow recovery due to their slow growth, long life, low reproductive potential. Mediterranean monk seal has a slow recovery capacity and reproduces regularly in the Khalkidiki | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Peninsula and Sporades Archipelago (Cebrian, 1998). | | | | | |
| **Biological productivity** | Area containing species, populations or communities with comparatively higher natural biological productivity. | | | | X |
| *Explanation for ranking*<br>Black Sea waters, which flow in the area through the Dardanelles strait, are rich in nutrients and contribute to the area's comparatively higher natural biological productivity. The upwelling in the Northern Aegean shores also plays a role in the high productivity. | | | | | |
| **Biological diversity** | Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity. | | | | X |
| *Explanation for ranking*<br>High productivity areas are present relatively lower biodiversity compared to the neighboring areas. Nevertheless, the area contains a large variety of habitats hosting a large number of species such as mollusks (Antoniadou and Chintiroglou, 2005), cetaceans (Cebrian, 2005), hydrozoans (Salomidi et al., 2009) and fish fauna (Maravelias et al., 2012), and it is likely to host the highest diversity of marine mammals in the eastern Mediterranean (Cebrian 1998, Ryan et al. 2013).<br><br>Although many data are available from the continental shelf the information on biodiversity in the North Aegean Trench is limited. | | | | | |
| **Naturalness** | Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation. | | X | | |
| *Explanation for ranking*<br>High level of human-induced disturbance and degradation of the seafloor by trawling. | | | | | |

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**Maps and Figures**

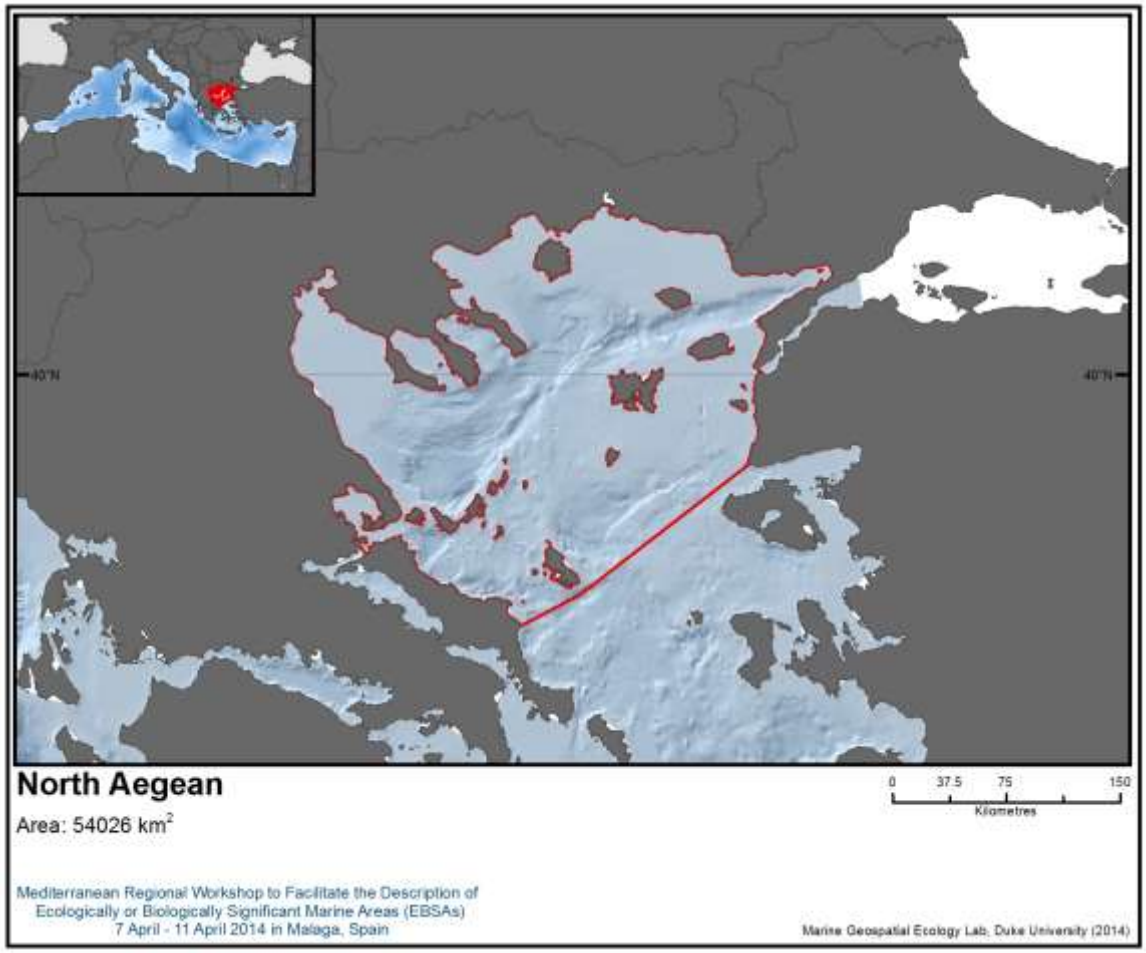


Figure 1. Area meeting the EBSA criteria.

Figure 2. Marine Natura 2000 areas in the North Aegean.

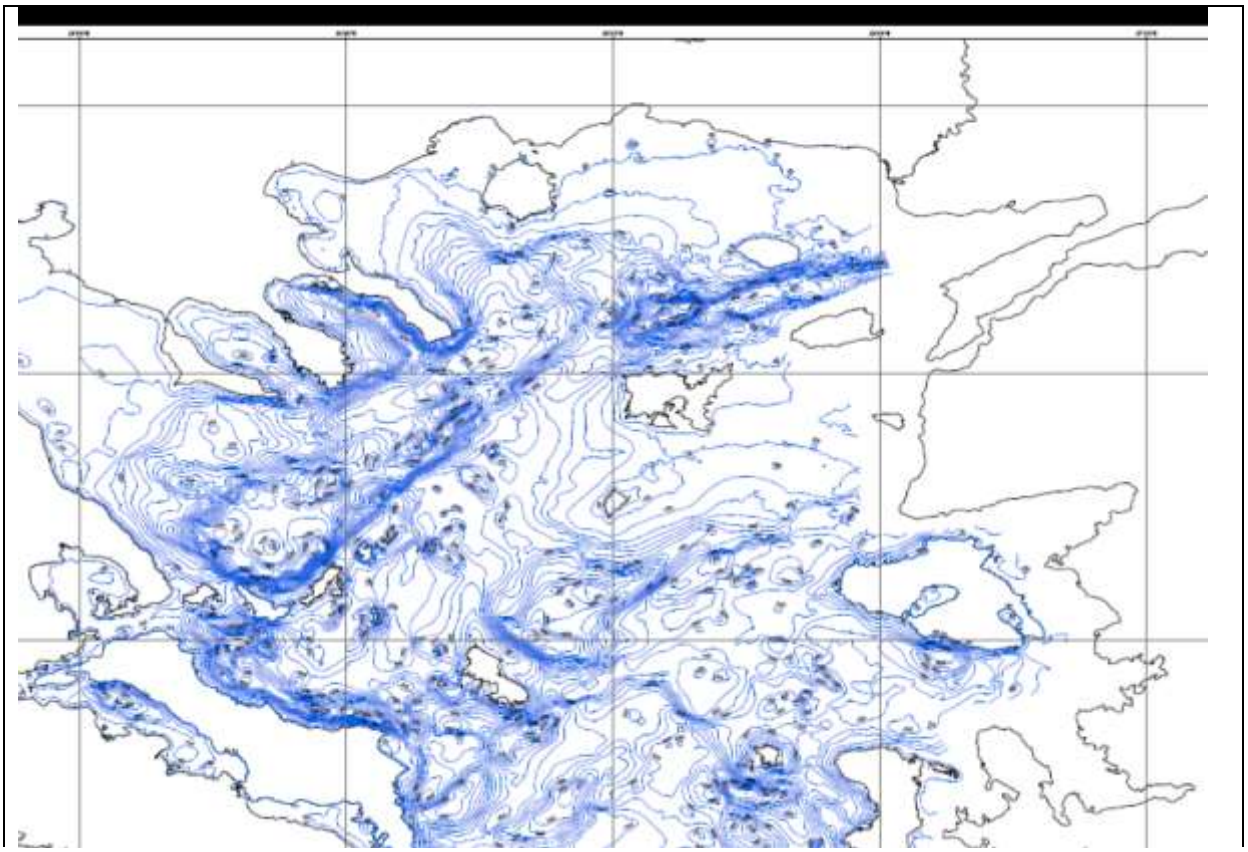

Figure 3. The North Aegean (source: Initial Assessment for the implementation of the Marine strategy Framework Directive in Greece, Hellenic Central Water Authority, Ministry of Environment, 2012).

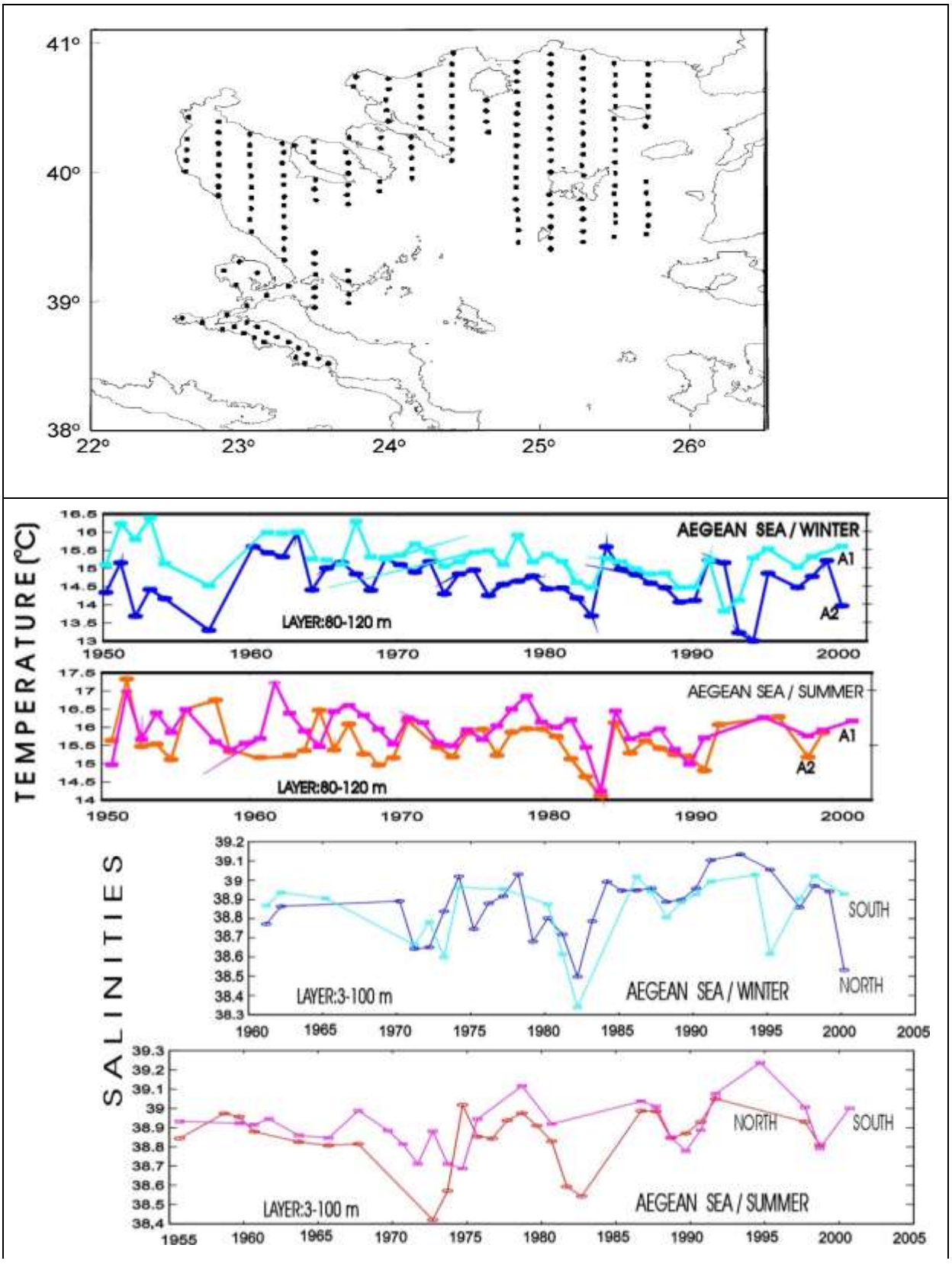


Figure 4. Long-term variability of temperature and salinity in the Aegean (Kontogianis et al., 2013).

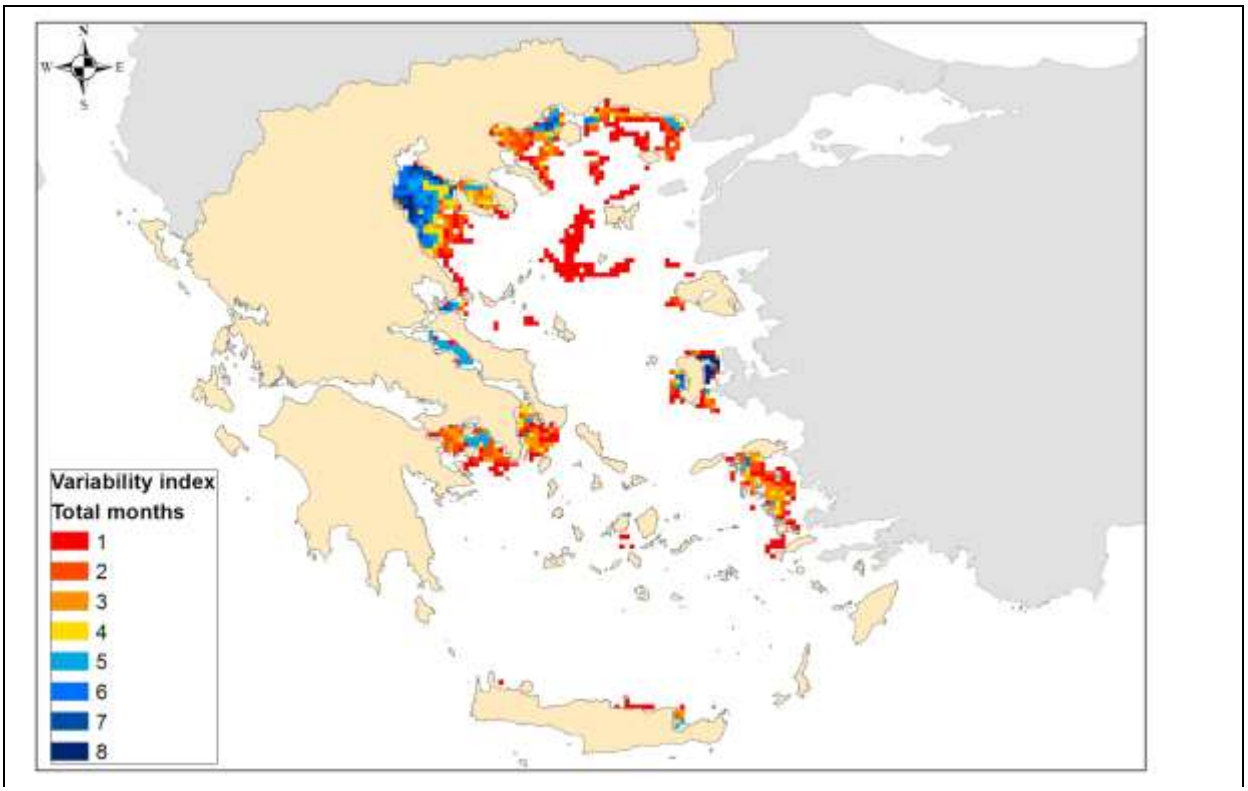


Figure 5. Vessel monitoring system data to identify and map fishing effort (source Maina et al., 2014).

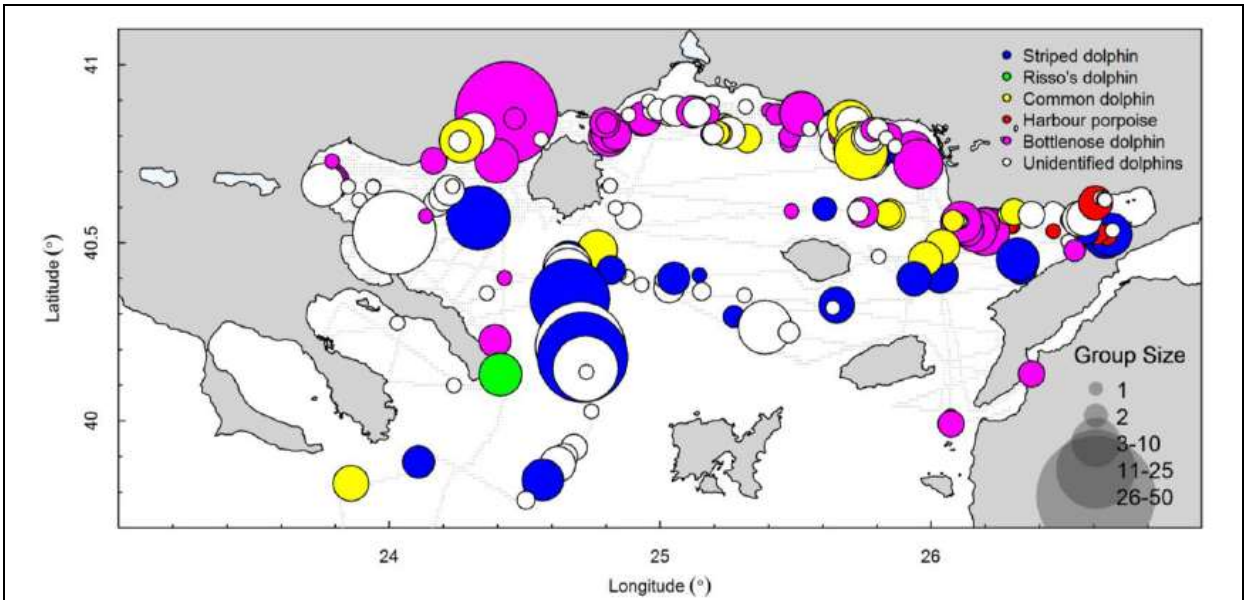


Figure 6. Distribution of cetaceans in the Northern Aegean (source: Ryan et al., 2013) Sightings of cetaceans during both inshore and offshore surveys in the Thracian Sea (northern Aegean Sea). The radius of each symbol, and hence the symbol size, is proportionate to mean estimated group size. NB: Some areas were more intensively surveyed than others, and the sightings presented here are not corrected for effort. The track of the research vessel is shown as a grey line.

*To share or publish these data contact MEDISEH and PERSEUS EU projects.*

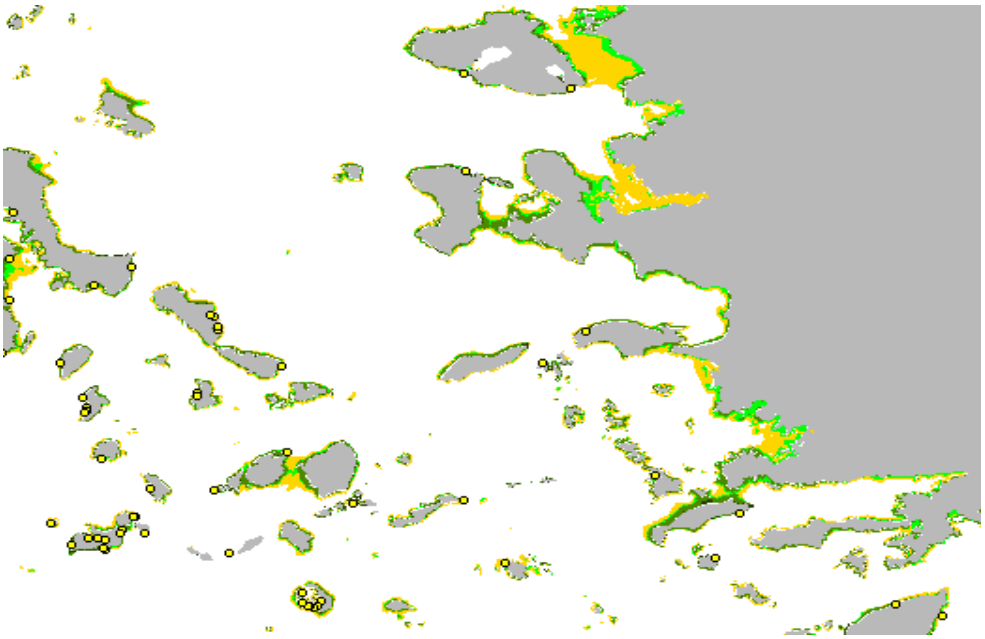

Figure 7. Predicted and known occurrence of Posidonia oceanica. (Dark green: present, light green: probability 28-99%, yellow: possibly absent) (MEDISEH viewer, http://mareaproject.net/medviewer/).

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