

**Template for Submission of Scientific Information  
to Describe Areas Meeting Scientific Criteria for  
Ecologically or Biologically Significant Marine Areas**

**Title/Name of the area: Gulf of Cadiz**

**Abstract** (*in less than 150 words*)

The Gulf of Cadiz is located in the eastern sector of the North Atlantic Ocean, to the southwest of the Iberian Peninsula. Its eastern boundary is the Strait of Gibraltar, western border of the Mediterranean Sea. It is structurally a highly complex area, containing important geomorphological elements such as large submarine canyons and seamounts. The hydrology is also complex due to the interaction between waters formed in the Atlantic with water of Mediterranean origin.

The EBSA proposal includes a diversity of benthic habitat, both on soft and rocky bottoms, that are considered as hotspots of biodiversity, various habitats for endangered, threatened and declining species and it is also a seasonal migratory pathway for large migratory pelagic species and an important area for cetaceans.

**Introduction**

*(To include: feature type(s) presented, geographic description, depth range, oceanography, general information data reported, availability of models)*

The Gulf of Cadiz is located in the eastern sector of the North Atlantic Ocean, to the southwest of the Iberian Peninsula. Its eastern boundary is the Strait of Gibraltar, western border of the Mediterranean Sea. Its complex physiographic is characterized by irregular reliefs and a diversity of geomorphological features, including the continental shelf of the Spanish coast, channels, numerous mud volcanoes and the deep basin.

In the Gulf of Cádiz, oceanographic circulation follows an anti-cyclonic gyre (Pelegrí et al. 2005), and is controlled by the exchange of water masses through the Strait of Gibraltar: a surface flow of Atlantic origin enters the Mediterranean Sea, while another deep flow, of Mediterranean origin, circulates under the former towards the Atlantic Ocean.

The upper thermocline water mass is the North Atlantic Central Water (NACW) located at 300–600 m water depth (Machín et al. 2006). Two intermediate water masses are found between 600 and 1,500 m: the low-salinity Antarctic Intermediate Water (AAIW) and the Mediterranean water mass out into the Atlantic (Mediterranean Outflow Water, MOW). Below 1,500 m occurs the North Atlantic Deep Water (NADW). MOW circulation is poorly constrained and flows in three main branches: an intermediate branch towards the northwest, a principal branch towards the west, and a southern branch which plunges as far as the Canary Islands. The latter has been reported at 800 m along the Moroccan margin (Pelegrí et al. 2005), possibly transported through meddies (Ambar et al. 1999).

The MOW exerts a greater influence on the bottoms of the area as it circulates in contact with the friction surface of the seabed. This interaction with the seabed causes very particular small-scale hydrodynamics, producing subdivisions of the main flow as current energy is dissipated at greater depths.

**Location**

*(Indicate the geographic location of the area/feature. This should include a location map.)*

The proposed area is located in the Atlantic Ocean (Gulf of Cádiz) and includes waters under Spanish jurisdiction. The EBSA proposal is bounded by the parallels (37° 00'N and 35° 56'N) and meridians (6° 00'W and 7° 24'W). However, from an ecological point of view, it should be assessed the possibility of extending the geographic limits to include also waters under Portuguese jurisdiction. Moreover, waters under Moroccan jurisdiction could also be considered in accordance to ecological, biological and geomorphological criteria, although they are not included in the OSPAR Maritime Area. The entire area would be bounded by the latitudes (37° 00'N and 34° 00'N) and longitudes (6° 00'W and 9° 00'W).



The proposal covers the Gulf of Cádiz under Spanish jurisdiction, and includes the continental shelf along the Spanish coast as well as numerous mounds and mud volcanoes (white polygon). The blue polygon indicates waters under Portuguese jurisdiction, which contain the continental shelf along the Portuguese coast and pronounced canyons such as Lagos and Faro Canyons.

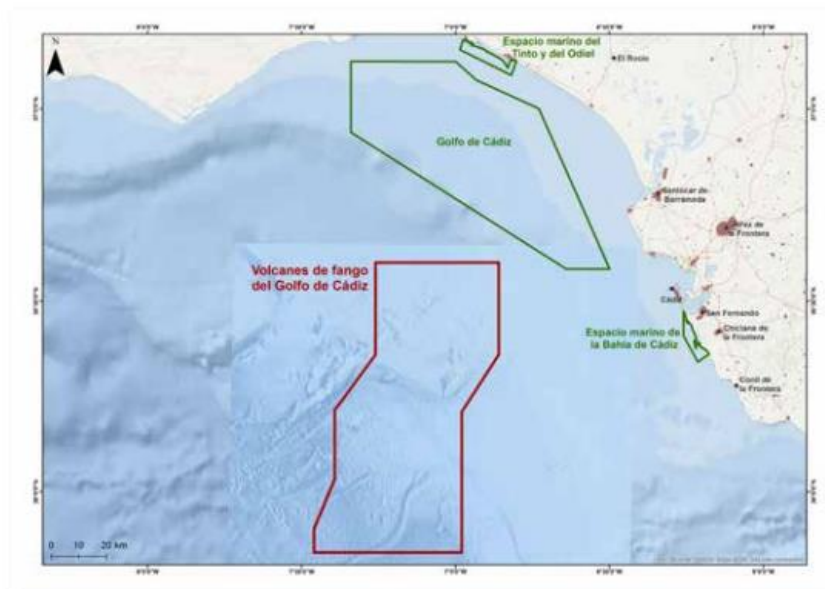


## Feature description of the proposed area

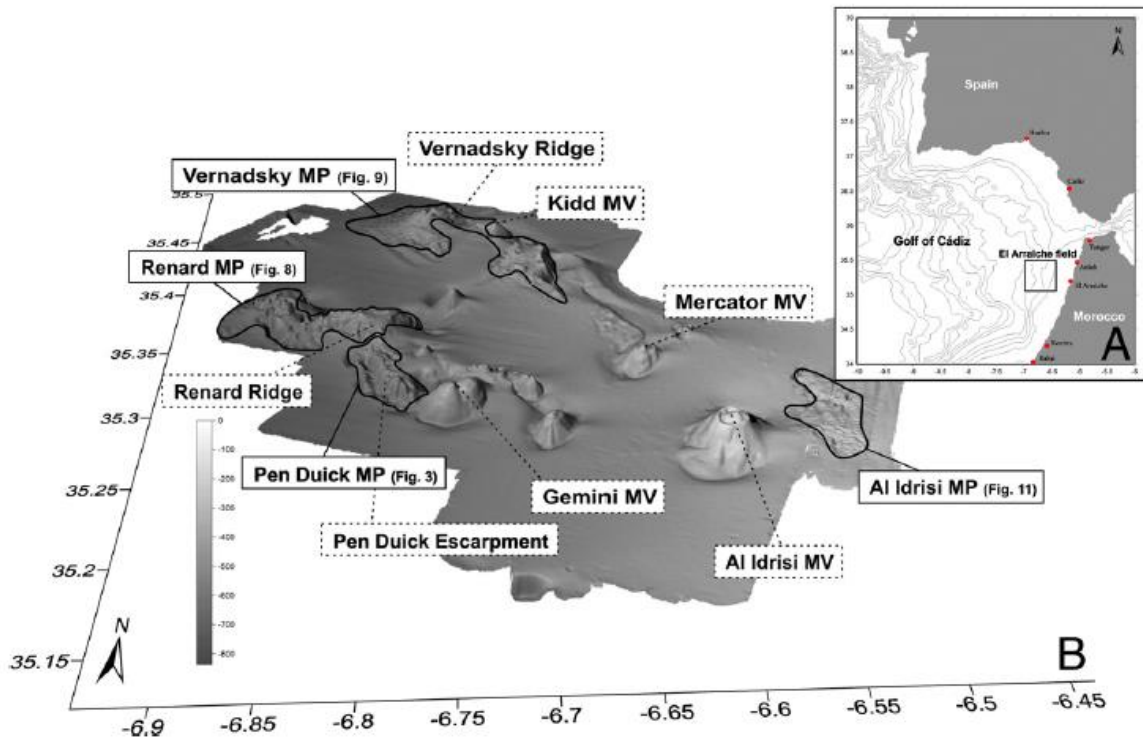
(This should include information about the characteristics of the feature to be proposed, e.g. in terms of physical description (water column feature, benthic feature, or both), biological communities, role in ecosystem function, and then refer to the data/information that is available to support the proposal and whether models are available in the absence of data. This needs to be supported where possible with maps, models, reference to analysis, or the level of research in the area)

- The EBSA proposal includes a diversity of benthic habitat that are considered as hotspots of biodiversity.

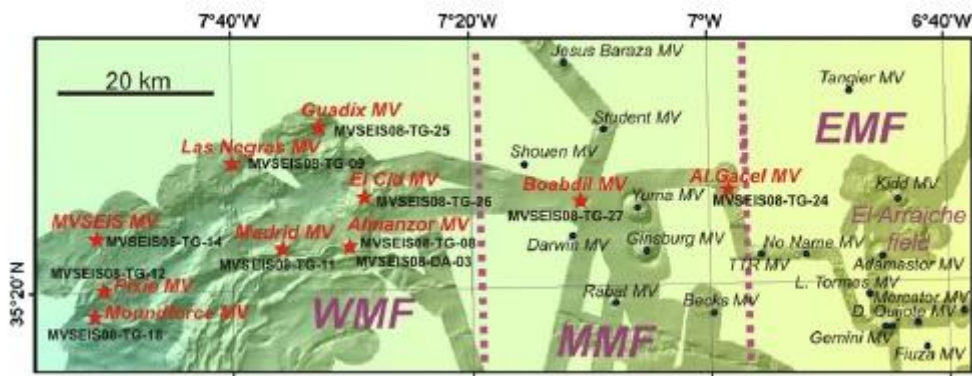
One of the most unique and significant geomorphological feature is present in this area, both on the Spanish and Moroccan Atlantic continental margins, and it is known as mud volcanoes (León et al., 2012; Díaz del Río et al., 2014; Mascle et al., 2014). Mud volcanoes (MVs) are defined as conic edifices constructed by surface extrusion of cold fluids containing mud, saline water and/or gases expelled from a pressurized deep source upwards through structurally controlled conduits (e.g. Brown 1990; Milkov 2000; Dimitrov 2002; Kopf 2002). This process causes substantial changes to the surface of deposits, significantly changing the existing reliefs and generating new carbonated structures. In this way, these bottoms become consolidated surfaces or surfaces of a mixed nature, composed of fragments of new carbonate rock created by the bacterial consumption of methane. The active process of the expulsion of fluid saturated gas through them cause high levels of biological diversity in the benthic ecosystems, which in turn determine the development of important deep-water habitats. The community associated with these bottoms is composed of symbiont species, such as polychaetes, bivalves and decapods that excavate galleries, but also of other species not strictly linked to the emissions, and which are characteristic of the bathyal sludge, such as molluscs, pennatulacea, polychaetes and echinoderms. The communities of pennatulacea and excavator mega fauna are widely distributed across different areas adjacent to the mud volcanoes, presenting high densities (as in the case of Tarshish and Pipoca volcanoes) and low densities (Anastasya) of pennatulacea (*Funiculina quadrangularis*, *Kophobelemnion stelliferum*, *Pennatula* cf. *aculeata*). Other species that are part of this community are the sponge *Thenia muricata*, molluscs, decapods, echinoderms and fish (Díaz del Río, 2014).



Location of mud volcanoes along the Spanish margin (Díaz del Río et al., 2014).

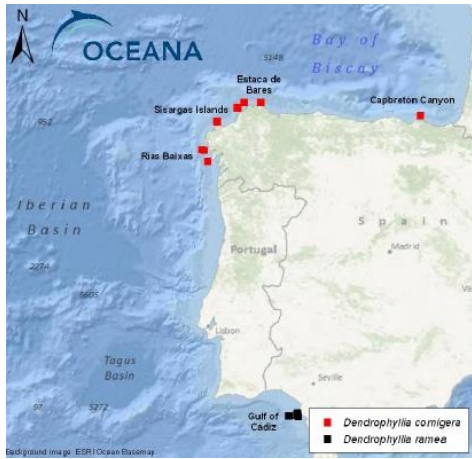


“El Arraiche mud volcano field” (rectangle) on the Moroccan margin. The dashed lines represent the mud volcanoes (MV) and the geomorphological structures. The solid lines indicate the presence of the mound provinces (MP) (Foubert et al., 2008).



Location of mud volcanoes along the Moroccan margin (Leon et al., 2012). These mud volcanoes are located on the offshore Moroccan continental margin (Gulf of Cádiz) at water depths between 750 and 1600 m.

Additionally, many other benthic habitats occur in this proposal, both on soft and rocky bottoms. Among them, there are mud with mixed communities such as bamboo corals *Isidella elongata*, gorgonian *Radicipes fragilis*, hexactinellid sponges *Pheronema carpenteri*, crinoids of the genus *Leptometra*, cnidarians *Flabellum chunii*; and rocky bottoms with aggregations of gorgonians (*Acanthogorgia*, *Swiftia*, *Gymnosarca bathybius*, *Placogorgia* spp., *Callogorgia verticillata*, *Viminella flagellum*, *Paramuricea clavata*), blacks corals (*Leiopathes*, *Stichopathes*, *Anthipathella*) and scleratinians (*Madrepora oculata* dominates, *Lophelia pertusa* and *Dendrophyllia cornigera*) (e.g. Aguilar et al., 2010; Cúrdia et al., 2012; Fonseca et al., 2013; Díaz del Río, 2014; Boavida et al., 2016) as well as assemblages of the red coral (*Corallium rubrum*) deep reefs (Boavida et al., 2016).



Locations of *Dendrophyllia* spp. forest recorded by OCEANA (2011)



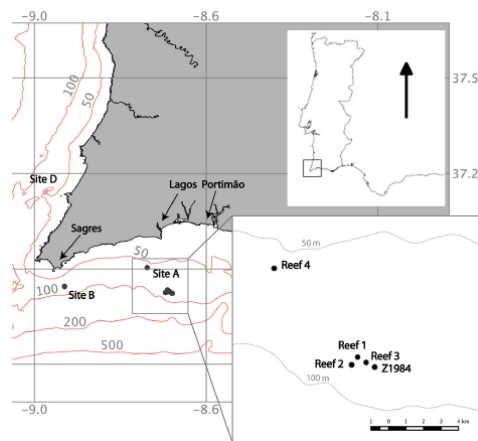
Locations of gorgonian gardens recorded by OCEANA (2011)



Locations of *Asconema setubalense* aggregations recorded by OCEANA (2011)



Locations of *Kophobelemnon stelliferum* aggregations recorded by OCEANA (2011)



Southwestern Portugal red coral (*Corallium rubrum*) gardens (Atlantic). Known locations of *Corallium rubrum*. Black symbols—red coral occurrences validated in this study (Boavida et al., 2016)

- *The EBSA proposal includes habitats for endangered, threatened and declining species.*

Many species recorded in the area have been considered as endangered, threatened and/or declining species, according to the IUCN, OSPAR, ICES, HABITAT DIRECTIVE, etc.

The table below shows a list of species that have been registered in the EBSA proposal and need protections as considered by different laws and conventions. Additionally, some species are not currently protected but OCENA proposed their inclusion (Oceana, 2010):

Especie	Figura de Protección	
<b>Plantas</b>		
<i>Zostera marina</i>	Berna (Anexo I)	Barcom (Anexo II)*
<b>Fofoceas</b>		
<i>Cystoseira usneoides</i>	Barcom (Anexo II)*	OCEANA
<b>Rodoficeas</b>		
<i>Lithophyllum cf. stictaeforme</i>	OCEANA	
<b>Poríferos</b>		
<i>Aplysina aerophoba</i>	Barcom (Anexo II)*	OCEANA
<b>Cnidarios</b>		
<i>Anemonia sulcata</i>	Hexacoralarios	OCEANA
<i>Caryophyllia cf. smithii</i>	CITES (Apéndice II)	
<i>Dendrophyllia cornigera</i>	CITES (Apéndice II)	VU-Andalucía
<i>Eunicella gazella</i>	VU-Andalucía	OCEANA
<i>Leptogorgia sarmentosa</i>	OCEANA	
<i>Caryophyllia sp.</i>	CITES (Apéndice II)	
<i>Dendrophyllia ramea</i>	CITES (Apéndice II)	VU-Andalucía
<i>Eunicella verrucosa</i>	VU-Lista Roja, VU-Andalucía	
<i>Parazoanthus axinellae</i>	Hexacoralario	
<i>ct. Polycyathus muelleriae</i>	CITES (Apéndice II)	
<b>Briozoos</b>		
<i>Pentapora fascialis</i>	VU-Andalucía	
<b>Crustáceos</b>		
<i>Maja squinado</i>	Berna (Apéndice III) Barcom (Anexo III)	VU-Andalucía
<b>Moluscos</b>		
<i>Ostrea edulis</i>	OSPAR (Reg II)	
<b>Equinodermos</b>		
<i>Paracentrotus lividus</i>	Berna (Apéndice III)	Barcom (Anexo III)
<b>Peces</b>		
<i>Accipenser sturio</i>	DH (Anexo II y IV)	
<i>Argyrosomus regius</i>	OCEANA	
<i>Engraulis encrasicolus</i>	OCEANA, EN-Baleares*	
<i>Gadus morhua</i>	OSPAR (Reg II, III)	VU- Lista Roja
<i>Hippocampus hippocampus</i>	CITES (Apéndice II) OSPAR (Reg. II, III, IV, V)	VU- Lista Roja

Especie	Figura de Protección	
<i>Pagrus pagrus</i>	EN- Lista Roja	
<i>Raja asterias</i>	LC- Lista Roja	
<i>Syngnathus abaster</i>	CR-Baleares*	
<i>Thunnus thynnus</i>	OSPAR (Reg. V) DD- Lista Roja	Barcom (Anexo III) Unclos (Anexo I)
<i>Torpedo torpedo</i>	DD-Lista Roja, CR-Baleares*	
<i>Alosa alosa</i>	DH (Anexo II y V) OSPAR (Reg. II, III, IV)	Berna (Apéndice III) Barcom (Anexo III)*
<i>Anguilla anguilla</i>	Barcom (Anexo III)*	
<i>Euthynnus alletteratus</i>	Unclos (Anexo I)	
<i>Galeorhinus galeus</i>	Barcom (Anexo III)* VU- Lista Roja	Unclos (Anexo I)
<i>Mugil cephalus</i>	EN-Baleares*	
<i>Mustelus mustelus</i>	Barcom (Anexo III)*	LR- Lista Roja, EN-Baleares*
<i>Pteromylaeus bovinus</i>	DD- Lista Roja	
<i>Raja clavata</i>	LRnt- Lista Roja,	OSPAR (Reg II)*
<i>Rhinobatos cemiculus</i>	Barcom (Anexo III)	EN- Lista Roja
<i>Sphyrna sp.</i>	Barcom (Anexo III)* EN- Lista Roja	Unclos (Anexo I)
<i>Torpedo marmorata</i>	DD- Lista Roja	OCEANA
<i>Xiphias gladius</i>	Barcom (Anexo III) DD- Lista Roja	Unclos (Anexo I)
<i>Alosa fallax</i>	DH (Anexo II y V) OSPAR (Reg. II, III, IV)	Berna (Apéndice III) Barcom (Anexo III)
<i>Aphia minuta</i>	EN-Baleares*	
<i>Atherina boyeri</i>	DD- Lista Roja	
<i>Echiichthys vipera</i>	EN-Baleares*	
<i>Gymnura altavela</i>	Barcom (Anexo II)*	VU- Lista Roja
<i>Hippocampus guttulatus</i>	CITES (Apéndice II) OSPAR (Reg. II, III, IV, V) DD- Lista Roja	Berna (Apéndice II-Med) Barcom (Anexo II)*
<i>Rhinobatos rhinobatos</i>	Barcom (Anexo III)*	EN-Red List
<i>Squatina squatina</i>	Ospar (Reg. II, III, IV) CR- Lista Roja	Berna (Anexo III) Barcom (Anexo II)*
<i>Torpedo nobiliana</i>	DD- Lista Roja	
<i>Umbrina cirrhosa</i>	Berna (Apéndice III)	Barcom (Anexo III)*
<b>Cetáceos</b>		
<i>Balaenoptera acutorostrata</i>	DH (Anexo IV) CMS (Apéndice I y II) Berna (Apéndice I y III)	Unclos (Anexo I) LC-Lista Roja
<i>Balaenoptera edeni</i>	DH (Anexo IV) CMS (Apéndice I y II) Berna (Apéndice II y III)	Unclos (Anexo I) DD- Lista Roja
<i>Balaenoptera physalus</i>	DH (Anexo IV) CMS (Apéndice I y II) Berna (Apéndice I y III)	Unclos (Anexo I) EN-Lista Roja.
<i>Globicephala melas</i>	DH (Anexo IV) CMS (Apéndice I y II) Berna (Apéndice I y III)	Unclos (Anexo I) DD-Lista Roja
<i>Grampus griseus</i>	DH (Anexo IV) CMS (Apéndice I y II) Berna (Apéndice II y III)	Unclos (Anexo I) LC-Lista Roja
<i>Delphinus delphis</i>	DH (Anexo IV) CMS (Apéndice I y II) Berna (Apéndice I y III)	Unclos (Anexo I) LC-Lista Roja

Especie	Figura de Protección	
<i>Stenella coeruleoalba</i>	DH (Anexo IV) CMS (Apéndice I y II) Berna (Apéndice II y III)	Unclos (Anexo I) LC-Lista Roja
<i>Phocoena phocoena</i>	DH (Anexo II y IV) CMS (Apéndice I y II) Berna (Apéndice II y III)	Unclos (Anexo I) LC-Lista Roja
<i>Physeter macrocephalus</i>	DH (Anexo IV) CMS (Apéndice I y II) Berna (Apéndice II y III)	Unclos (Anexo I) VU-Lista Roja
<i>Mesoplodon europaeus</i>	DH (Anexo IV) CMS (Apéndice I y II) Berna (Apéndice II y III)	Unclos (Anexo I) DD-Lista Roja
<i>Tursiops truncatus</i>	DH (Anexo II y IV) CMS (Apéndice I y II) Berna (Apéndice II y III)	Unclos (Anexo I) LC-Lista Roja
<i>Kogia breviceps</i>	DH (Anexo IV) CMS (Apéndice I y II) Berna (Apéndice II y III)	Unclos (Anexo I) DD-Lista Roja
<i>Megaptera novaeangliae</i>	DH (Anexo IV) CMS (Apéndice I y II) Berna (Apéndice II y III)	Unclos (Anexo I) LC-Lista Roja
<i>Orcinus orca</i>	DH (Anexo IV) CMS (Apéndice I y II) Berna (Apéndice II y III)	Unclos (Anexo I) DD-Lista Roja
<i>Kogia simus</i>	DH (Anexo IV) CMS (Apéndice I y II) Berna (Apéndice II y III)	Unclos (Anexo I) DD-Lista Roja
<i>Mesoplodon densirostris</i>	DH (Anexo IV) CMS (Apéndice I y II) Berna (Apéndice II y III)	Unclos (Anexo I) DD-Lista Roja
<b>Reptiles</b>		
<i>Caretta caretta</i>	DH (Anexo II y IV) CMS (Apéndice I)	Barcom (Anexo II)* EN-Red List y Andalucía
<i>Dermochelys coriacea</i>	DH (Anexo IV) CMS (Apéndice I)	Unclos (Anexo I) CR-Red List/Andalucía
<i>Chelonia mydas</i>	DH (Anexo II y IV) CMS (Apéndice I)	Barcom (Anexo II)* EN-Red List y Andalucía
<i>Eretmochelys imbricata</i>	DH (Anexo IV)	CR-Lista roja, EN-Andalucía
<p><b>Directiva Hábitats (DH).</b>  <b>Anexo II:</b> especies para cuya protección se requieren zonas especiales de conservación/ <b>Anexo IV:</b> especies que requieren una protección estricta.</p> <p><b>Convenio de Berna (Berna).</b>  <b>Apéndice I:</b> listado de especies de flora estrictamente protegidas/ <b>Apéndice II:</b> listado de especies de fauna estrictamente protegidas/ <b>Apéndice III:</b> listado de especies de fauna protegidas.</p> <p><b>Convenio de Barcelona (Barcom).</b>  <b>Anexo II:</b> listado de especies en peligro o amenazadas/ <b>Anexo III:</b> lista de especies cuya explotación debe estar regulada. (*Este convenio es para el Mediterráneo, pero la proximidad e influencias en el golfo de Cádiz requieren su mención).</p> <p><b>Convenio de Especies Migratorias (CMS).</b>  <b>Apéndice I:</b> especies migratorias en peligro/ <b>Apéndice II:</b> especies migratorias en estado desfavorable que deben ser objeto de acuerdos.</p> <p><b>CITES.</b>  <b>Apéndice I:</b> listado de especies cuyo comercio internacional está prohibido/ <b>Apéndice II:</b> listado de especies cuyo comercio internacional está regulado.</p> <p><b>Lista Roja de UICN.</b>  <b>CR-</b>Peligro Crítico/ <b>EN-</b>Peligro/ <b>VU-</b>Vulnerable/ <b>NT-</b>Casi amenazado/ <b>LC-</b>Preocupación menor/ <b>DD-</b>Datos insuficientes.</p> <p><b>OSPAR.</b>  Indica las Regiones OSPAR donde la especie está en riesgo. El golfo de Cádiz está incluido en Región IV (*no obstante se indican Regiones adyacentes que pueden estar relacionadas).</p> <p><b>OCEANA.</b>  Especies consideradas de importancia, pero no siempre incluidas en convenios o listados de protección.</p> <p><b>United Nations Convention on the Law Of the Sea (UNCLOS).</b>  Ley del Mar. <b>Anexo I:</b> Especies altamente migratorias.</p>		

Additionally, the following list of habitats are also endangered or threatened and are considered by different laws and conventions:

#### OSPAR Habitats

Coral gardens

Deep-se sponge aggregations

Seamounts

Sea-Pen & Burrowing Megafauna Communities

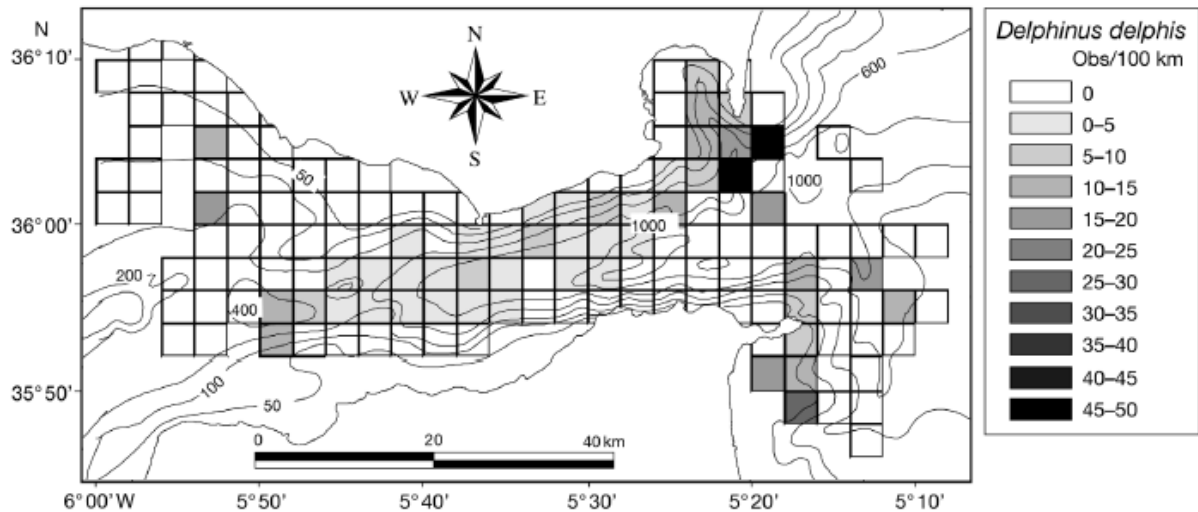
#### Habitat Directive Habitats

1170 Reefs

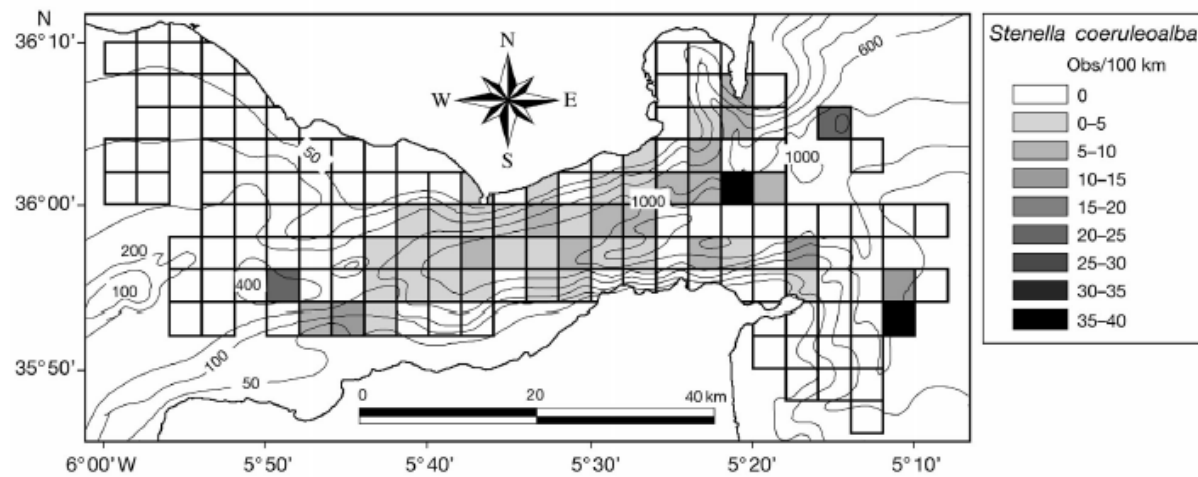
1180 Submarine structures made by leaking gases

➤ *The EBSA proposal is an important area for cetaceans.*

This Atlantic–Mediterranean water interface is considered to be a biogeographic boundary (Sanjuán et al. 1994). Nevertheless, there is substantial transport of organisms across this ecotone and different cetaceans species are present in waters of the Gulf of Cadiz and Strait of Gibraltar: short-beaked common dolphins (*Delphinus delphis*), striped dolphins (*Stenella coeruleoalba*), bottlenose dolphins (*Tursiops truncatus*), long-finned pilot whales (*Globicephala melas*), sperm whales (*Physeter macrocephalus*) and killer whales (*Orcinus orca*) (De Stephanis et al., 2008).

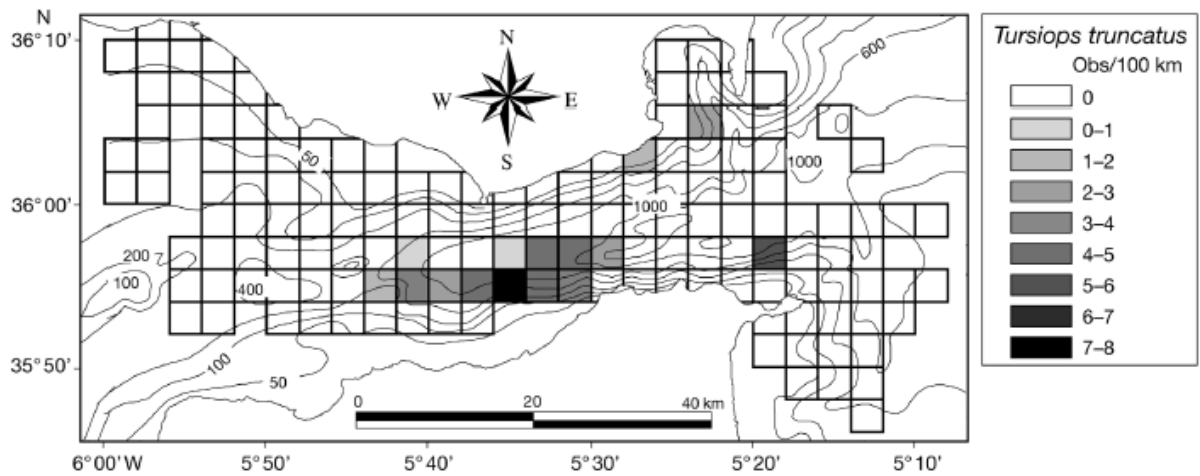


*Delphinus delphis*. Distribution of encounter rates of common dolphins over the study area during this study (De Stephanis et al., 2008)

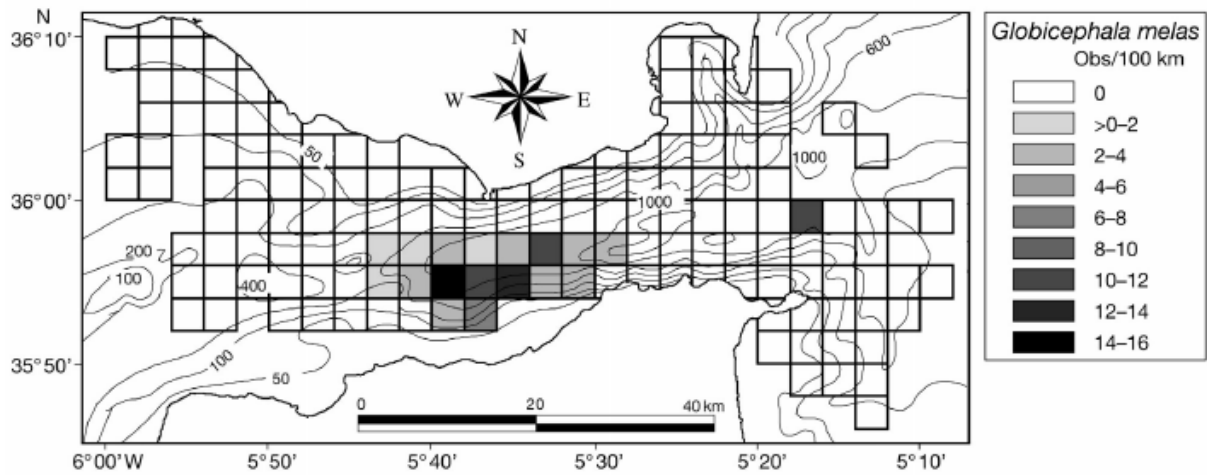


*Stenella coeruleoalba*. Distribution of encounter rates of striped dolphins over the study area during this study (De Stephanis et al., 2008)

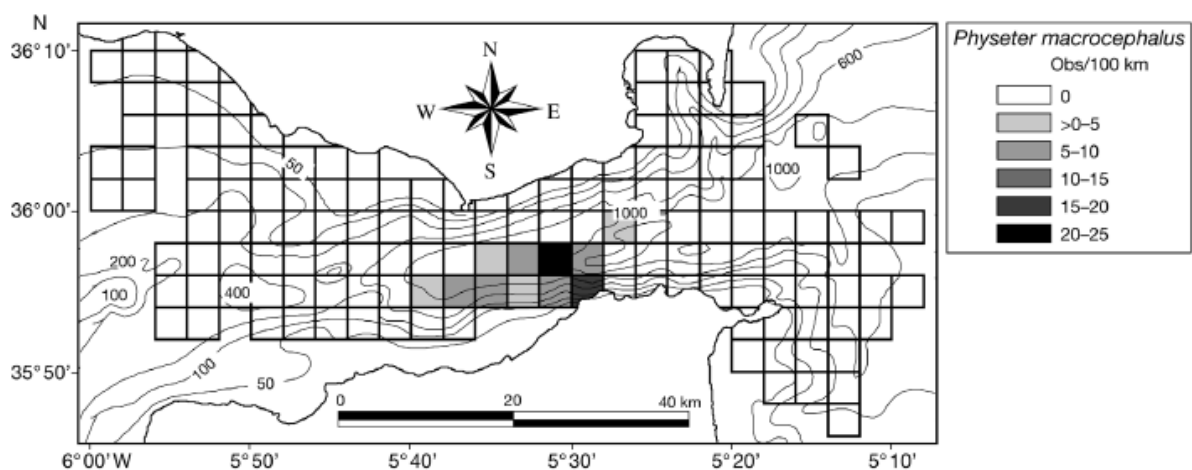




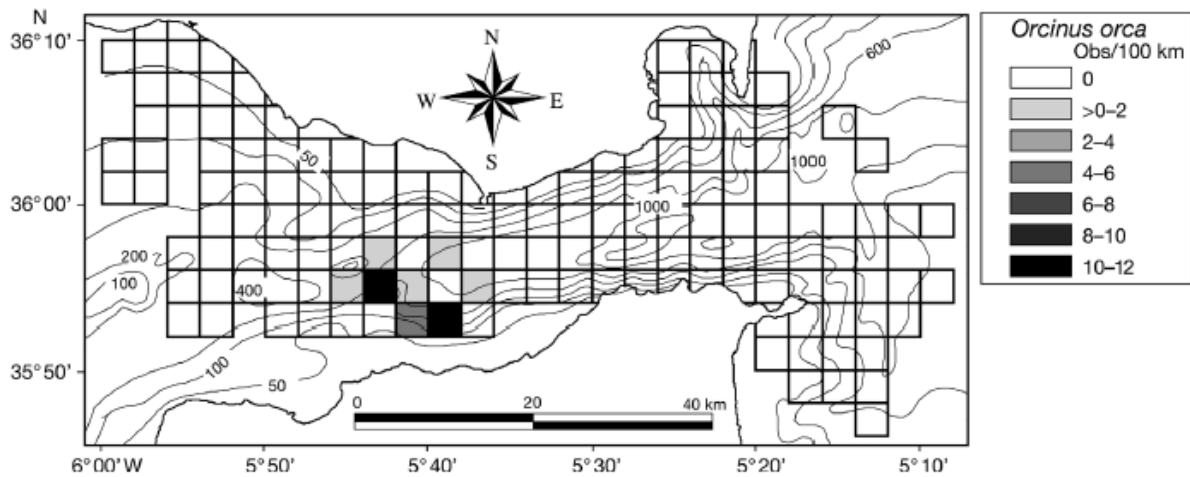
*Tursiops truncatus*. Distribution of encounter rates of bottlenose dolphins over the study area during this study (De Stephanis et al., 2008)



*Globicephala melas*. Distribution of encounter rates of long-finned pilot whales over the study area during this study (De Stephanis et al., 2008)



*Physeter macrocephalus*. Distribution of encounter rates of sperm whales over the study area during this study (De Stephanis et al., 2008)



*Orcinus orca*. Distribution of encounter rates of killer whales over the study area during this study (De Stephanis et al., 2008)

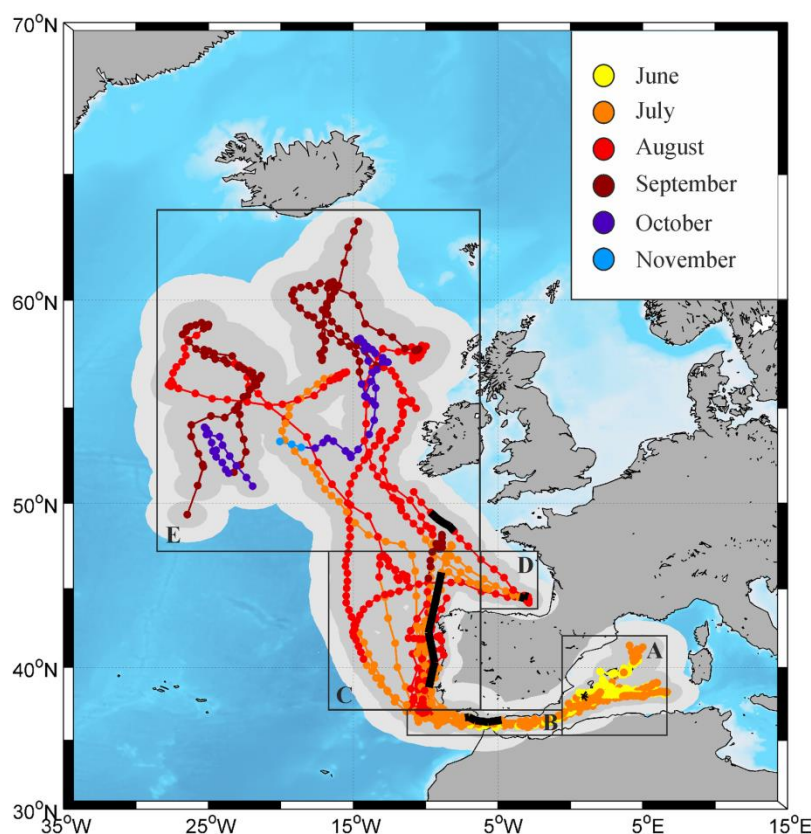
Specifically during spring and summer this area provides essential feeding and nursing habitat for this latter species. The small seasonal resident population of 39 killer whales, which is genetically and ecologically distinct from killer whales in the Atlantic Ocean, use the area and the same individuals have been re-sighted annually from 1999 to 2016. They belong to 5 social pods, stable over the study period (Esteban et al., 2014; 2016). Esteban et al., 2014 showed, using model predictions, that killer whales are highly associated with a probable distribution of bluefin tuna during their migration throughout the study area, constraining their distribution to the Gulf of Cadiz in spring and the Strait of Gibraltar in spring and summer.

The Strait of Gibraltar subpopulation of killer whales is considered Vulnerable in the Spanish National Catalogue of Endangered Species but may be considered Endangered based upon other monitoring studies.

- *The EBSA proposal is also a seasonal migratory pathway for a large migratory pelagic species: Atlantic bluefin tuna (Thunnus thynnus).*

The Atlantic bluefin tuna is the largest of all tunas (ICCAT 2006–2014) and one of the most highly priced fish species in the world (Ottolenghi et al., 2004). In spring, Atlantic bluefin tuna, *Thunnus thynnus* (Linnaeus, 1758), perform long seasonal reproductive migrations between feeding areas in the Atlantic Ocean and spawning grounds, either in the Gulf of Mexico (western stock) or the Mediterranean Sea (eastern stock). Like all bluefin tuna stocks, both stocks of the Atlantic bluefin tuna are threatened by overfishing.

The bluefin tuna reproductive season in the Mediterranean Sea extends from May to July. In correlation with a progressive east-to-west increase of the sea surface temperature, the spawning process begins in the Levantine Sea, and then shifts to the southern Tyrrhenian-Malta region and eventually to the Balearic Sea (Heinisch et al., 2008). As in the eastern spawning area, the reproductive season is known to spread over around 3 months (April-June) in the Gulf of Mexico (Baglin et al., 1982).



Estimated paths (with 50% and 95% confidence intervals) of 13 Atlantic bluefin tuna tagged in early June, 2009-2011 ( $\geq 45$  d at liberty). Five successive regions throughout the migratory pathways between the western Mediterranean and the North Atlantic Ocean are distinguished (A-E, black boxes): Balearic area (A), Strait of Gibraltar (B), western Iberian coast (C), Bay of Biscay (D), and North Atlantic area (E). Bold black lines represent five-day coverage of tag #39 track in each of these regions (Aranda et al., 2013).

### Feature condition and future outlook of the proposed area

*(Description of the current condition of the area – is this static, declining, improving, what are the particular vulnerabilities? Any planned research/programmes/investigations?)*

The Gulf of Cádiz waters suffer the impact produced by fishing, shipping and pollution.

- Fishing activities: probably the fishing activity that has the greatest impact is bottom trawling which is responsible for the destruction of some ecosystems. This type of non-selective fishing causes changes in the composition of ecosystems, affecting the long-term productivity of the fishery. The physical consequences of bottom trawling are the alteration and/or direct destruction of habitat and the re-suspension of sediment, increasing turbidity and changing the geochemical composition of the deposits.

-Shipping: due to its proximity to the Strait of Gibraltar and the Cape of San Vicente there are important navigation routes that pass over this EBSA proposal with a high intensity of large-tonnage "industrialized" vessels that mainly transport oil and containers.

Maritime traffic is an important source of pollution both because of the potential risk of accidental spillage and because of the intense noise that generate

- Water pollution: the main sources of pollution are ships and cities located in the coast (mostly in summer when the intensity of tourism in some coastal increase)

Conversely, some actions to protect the area and to ensure the conservation of its biodiversity are being carried out, and one specific area within this EBSA proposal have been protected in accordance with international and Spanish regulations and conventions: "The Gulf of Cadiz mud volcanoes" is located in the bathymetric range between 300 and 1,200 m, placing it on the upper middle part of the continental slope and the southern Iberian continental margin.

Three basic types of habitats have been identified, catalogued, and described within the generic level 1180: (1) the "Mud volcanoes" subtype, which is widespread in the area; (2) the subtype "Collapsed depressions", located next to the volcanoes Anastasya, Pipoca, Hesperides, Almazan, Aveiro and San Petersburg, and (3) the "Pockmarks" subtype, which is widespread throughout the area, especially in the south, being a very diffuse phenomenon in the more distal areas of the slope (112 locations have been mapped). Other habitats at different levels, within the generic 1180, include the "Structures produced by leaking gases with carbonate substrates of chemosynthetic origin", which is extensive in the area of gas emission, as well as designation "Structures produced by leaking gases with chemosynthetic species", which has been identified in the volcanoes Albolote, Gazul, Anastasya, Pipoca, Tarsis, Hesperides, Almazan, Aveiro and St. Petersburg.

In addition, and of equal importance, 9 subtypes of habitats linked to habitat 1170 "Reefs" have been identified. These are: (1) Bathyal rock with *Acanthogorgia hirsuta*, on Pipoca; (2) reef of deep coral *Lophelia pertusa* and/or *Madrepora oculata*, on bottoms of carbonate rocks and accumulations of compressed dead coral on the slopes of the Gazul mud volcano, which presents significantly more active hydrodynamics than in other areas of the SCI, as well as a low level of dragnet fishing activity; (3) deep rocky bottoms with antipataria, of the genus *Leiopathes*, *Antipathes* and *Stichopathes*, have been found in the environment of the volcanoes Gazul, Hesperides and Almazan; (4) bathyal rock with large hexactinellid sponges (*Asconema setubalense*), in the surroundings of Chica and Enmedio; (5) bathyal sedimentary rock with *Bebryce mollis*, found only on Gazul; (6) bathyal rock with *Callogorgia verticillata* in specific areas of the Chica complex; (7) bathyal rock with *Callogorgia* and *Demospongiae*, in the area around Enmedio; (8) deep rocky bottoms with aggregations of *Demospongiae*, identified in Gazul, Magallanes, Enano, Enmedio and Chica, and (9) deposits of dead coral with remains of escleractinias (e.g.: *Lophelia pertusa*, *Madrepora oculata*, *Dendrophyllia alternata*), colonized by small octocorals (e.g.: *Swiftia*, *Bebryce*, *Placogorgia*) scattered around the volcanoes Albolote, Gazul, Hesperides, Almazan and Aveiro. Between them, these reef habitats occupy a surface area of approximately 2,063 hectares.

The management plan of the area is being development in the framework of the INTEMARES project.

Apart from conservation projects, every year the Instituto Español de Oceanografía (IEO) carry out a bottom trawling survey on the Gulf of Cadiz named ARSA. This survey aims to provide data for the assessment of demersal commercial fish species and benthic ecosystems on the area. This survey is part of an international effort to monitor marine ecosystems and is coordinated by the International Bottom Trawling Surveys (IBTS) working group of the International Council for the Exploration of the Sea (ICES).

### Assessment of the area against CBD EBSA Criteria

(Discuss the area in relation to each of the CBD criteria and relate the best available science. Note that a proposed area for EBSA description may qualify on the basis of one or more of the criteria, and that the polygons of the EBSA need not be defined with exact precision. And modeling may be used to estimate the presence of EBSA attributes. Please note where there are significant information gaps)

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
<b>Uniqueness or rarity</b>	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			X
<p><i>Explanation for ranking (must be accompanied by relevant sources of scientific articles, reports or documents)</i></p> <p>The Gulf of Cádiz is a border area between different biogeographic regions where water masses of different origin (Atlantic and Mediterranean) confluence. Additionally, canyons and submarine seamounts are present along the area. These features (border areas, canyons and features) are increasingly recognized as being high in endemic species.</p> <p>Existence of unusual geomorphological structures (the pockmarks and mud volcanoes), and the presence of rare species (such as molluscs and polychaetes associated with the fluid emissions) characterized the area.</p> <p>Despite these, the current information on this criteria is still low. More scientific research is need to cover the different systems and habitats present in the area (e.g. communities associated with submarine structures made by leaking gases, deep-sea habitats, reefs, etc.) and improve the knowledge of species.</p>					
<b>Special importance for life-history stages of species</b>	Areas that are required for a population to survive and thrive.				X
<p><i>Explanation for ranking (must be accompanied by relevant sources of scientific articles, reports or documents)</i></p> <p>The EBSA proposal is an important area for cetaceans and a seasonal migratory pathway for large migratory pelagic species (e.g tuna species). Additionally, habitat-forming species that characterized benthic habitats and offer substrate and refuge to other species spend their entire life cycle within the area. See the section "Feature description of the proposed area" for further explanation.</p>					
<b>Importance for threatened, endangered or declining species and/or habitats</b>	Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species.				X
<p><i>Explanation for ranking (must be accompanied by relevant sources of scientific articles, reports or documents)</i></p> <p>Habitats and species considered as 'threatened, endangered or declining' based on different regulations and conventions are present in the EBSA proposed. See the section "Feature description of the proposed area" for further explanation.</p> <p>The fauna associated with mud volcanoes and the adjacent seabed includes twenty species included in conservation listings nationally and internationally, as well as in the Spanish Catalogue of Endangered Species or the OSPAR Convention.</p>					

<b>Vulnerability, fragility, sensitivity, or slow recovery</b>	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
<i>Explanation for ranking (must be accompanied by relevant sources of scientific articles, reports or documents)</i>					
<p>The fishing activity that has the greatest impact on communities and is responsible for the destruction of some ecosystems is the bottom trawling. Therefore, the relative biomass of sensitive species has declined as a consequence of trawling impacts in most of the soft bottoms of the southern Spanish Shelf.</p> <p>On rocky substrates, the number of sensitive species is probably much higher, since many of the habitat-forming species are sessile and have big sizes and long life cycles (coral reefs, gorgonian forest, sponge grounds, etc.). In the same way, other species with a reproduction characterized by limited offspring such as sharks or cetaceans, makes their populations very vulnerable to anthropogenic impacts.</p>					
<b>Biological productivity</b>	Area containing species, populations or communities with comparatively higher natural biological productivity.				X
<i>Explanation for ranking (must be accompanied by relevant sources of scientific articles, reports or documents)</i>					
<p>The complex hydrology due to the interaction between waters formed in the Atlantic with water of Mediterranean origin and the role of geomorphological canyons and seamounts as a mechanism to transport organic matter and sediment from the continental shelf to the deep areas, turn this zone into a highly productive biological system.</p>					
<b>Biological diversity</b>	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.				X
<i>Explanation for ranking (must be accompanied by relevant sources of scientific articles, reports or documents)</i>					
<p>The structurally highly complex area includes a great diversity of geomorphological features (submarine canyons, seamounts, banks and mounds, mud volcanoes, slope affected by smaller rock outcrops, etc) and hence, a great diversity of benthic niches available.</p> <p>See the section "Feature description of the proposed area" for further explanation.</p>					
<b>Naturalness</b>	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		
<i>Explanation for ranking (must be accompanied by relevant sources of scientific articles, reports or documents)</i>					
<p>Fisheries, shipping and water pollution have had a strong impact on the bottom communities and have induced changes in their structure. Among these impacts are:</p> <ul style="list-style-type: none"> <li>- Fishing mortality on target species and bycatch</li> <li>- Habitat's modifications through erosion of the sediment and damage to the benthos by different elements of the gears.</li> <li>- Changes in migratory routes</li> </ul> <p>See the section " Feature condition and future outlook of the proposed area " for further explanation.</p>					

### Sharing experiences and information applying other criteria (Optional)

Other Criteria	Description	Ranking of criterion relevance (please mark one column with an X)			
		Don't Know	Low	Medium	High
Add relevant					

<i>criteria</i>					
<i>Explanation for ranking (must be accompanied by relevant sources of scientific articles, reports or documents)</i>					

## References

(e.g. relevant documents and publications, including URL where available; relevant data sets, including where these are located; information pertaining to other relevant material, models, etc.)

Abascal, F.J., medina, A., De la Serna, J.M., Godoy, D., Aranda, G., 2016. Fisheries Oceanography, 25:1, 54-66.

Ambar I, Armi L, Bower A, Ferreira T (1999) Some aspects of time variability of the Mediterranean Water off south Portugal. Deep- Sea Res I 46:1109–1136

Aranda, G., Abascal, F.J., Varela, J.L., Medina, A., 2013. Spawning Behaviour and Post-Spawning Migration Patterns of Atlantic Bluefin Tuna (*Thunnus thynnus*) Ascertained from Satellite Archival Tags. PLoS ONE 8(10): e76445. doi:10.1371/journal.pone.0076445

Baglin RE Jr (1982) Reproductive biology of western Atlantic bluefin tuna. Fish Bull 80: 121-134

Boavida, J., Paulo, D., Aurelle, D., Arnaud-Haond, S., Marschal, C., Reed, J., Gonçalves, J.M.S., Serrao, E.A., 2016. A Well-Kept Treasure at Depth: Precious Red Coral Rediscovered in Atlantic Deep Coral Gardens (SW Portugal) after 300 Years. PLoS ONE 11(1): e0147228. doi:10.1371/journal.pone.0147228

Boavida, J., Assis, J., Silva, I., Serrao, E.A., 2016. Overlooked habitat of a vulnerable gorgonian revealed in the Mediterranean and Eastern Atlantic by ecological niche modelling. Scientific Reports, 6:36460. DOI: 10.1038/srep36460

Brown KM (1990) The nature and hydrogeologic significance of mud diapirs and diatremes for accretionary systems. J Mar Geophys Res 95(6):8969–8982

Cúrdia, J., Monteiro, P., Alfonso, C.M.L., Santos, M.N., Cunha, M.R., Gonçalves, J.M.S., 2012. Spatial and depth-associated distribution patterns of shallow gorgonians in the Algarve coast (Portugal, NE Atlantic). Helgol Mar Res DOI 10.1007/s10152-012-0340-1

De la Torriente, A., Aguilar, R., 2011. OSPAR Workshop on the improvement of the definitions of habitats on the OSPAR list. Background document for discussion: "Coral gardens", "Deep sea sponge aggregations" and "Seapen and burrowing megafauna communities". Bergen, Norway, 20-21 October.

De Stephanis, R., Cornulier, T., Verborgh, P., Salazar Sierra, J., Pérez Gimeno, N., Guinet, C., 2008. Summer spatial distribution of cetaceans in the Strait of Gibraltar in relation to the oceanographic context. Marine Ecology Progress Series, 353: 275-288.

Dimitrov LI (2002) Mud volcanoes-the most important pathway for degassing deeply buried sediments. Earth Sci Rev 59:49–76.

Esteban, R., Verborgh, P., Gauffier, P. 2016. Dynamics of killer whale, bluefin tuna and human fisheries in the Strait of Gibraltar. Biological Conservation 194:31-38.

Esteban, R., Verborgh, P., Gauffier, P. 2016. Using a multi-disciplinary approach to identify a critically endangered killer whale management unit. *Ecological Indicators* 66, 291-300

Esteban, R., Verborgh, P., Gauffier, P. 2016. Conservation Status of Killer Whales, *Orcinus Orca*, in the Strait of Gibraltar. In: G. Notarbartolo di Sciara, M. Podestà, B.E. Curry (Editors), *Mediterranean marine mammal ecology and conservation. Advances in Marine Biology* 75:141-172. <http://dx.doi.org/10.1016/bs.amb.2016.07.001>

Esteban, R., Verborgh, P., Gauffier, P. 2013. Identifying key habitat and seasonal patterns of a critically endangered population of killer whales. *Journal of the Marine Biological Association of the United Kingdom*. doi:10.1017/S002531541300091X

Fonseca, P., Abrantes, F., Aguilar, R., Campos, A., Cunha, M., Ferreira, D., Fonseca, T.P., García, S., Henriques, V., Machado, M., Mechó, A., Relvas, P., Rodriguez, A.F., Salgueiro, E., Vieira, R., Weetman, A., Castro, M., 2013. A deep-water crinoid *Leptometra celtica* bed off the Portuguese south coast. *Mar Biodiv* DOI 10.1007/s12526-013-0191-2

Heinisch G, Corriero A, Medina A, Abascal FJ, de la Serna JM et al. (2008) Spatial-temporal pattern of bluefin tuna (*Thunnus thynnus* L. 1758) gonad maturation across the Mediterranean Sea. *Mar Biol* 154: 623-630. doi:10.1007/s00227-008-0955-6.

Kopf A (2002) Significance of mud volcanism. *Rev Geophys* 40:1–52

León, R., Somoza, L., Medialdea, T., Vázquez, J.T., González, F.J., López-González, N., Casas, D., Mata, M.P., Fernández-Puga, M.C., Giménez-Moreno, C.J., Díaz del Río, V., 2012. New discoveries of mud volcanoes on the Moroccan Atlantic continental margin (Gulf of Cádiz): morpho-structural characterization. *Geo-Mar Letters* DOI 10.1007/s00367-012-0275-1

Machín F, Pelegrí JL, Marrero-Díaz A, Laiz I, Ratsimandresy AW (2006) Nearsurface circulation in the southern Gulf of Cádiz. *Deep-Sea Res II* 53(11/13):1161–1181

Masclé, J., Mary, F., Praeg, D., Brosolo, L., Camera, L., Ceramicola, S., Durpé, S., 2014. Distribution and geological control of mud volcanoes and other fluid/free gas seepage features in the Mediterranean Sea and nearby Gulf of Cadiz. *Geo-Marine Letters*, 34, Issue 2-3: 89-110.

Milkov AV (2000) Worldwide distribution of submarine mud volcanoes and associated gas hydrates. *Mar Geol* 167:29–42

Ottolenghi, F., Silvestri, C., Giordano, P., Lovatelli, A. and New, M.B. (2004) *Capture-Based Aquaculture. The Fattening of Eels, Groupers, Tunas and Yellowtails*. Rome: Food and Agriculture Organization of the United Nations, 308 pp.

Pelegrí JL, Marrero-Díaz A, Ratsimandresy A, Antoranz A, Cisneros- Aguirre J, Gordo C, Grísolia D, Hernández-Guerra A, Láiz I, Martínez A, Parrilla G, Pérez-Rodríguez P, Rodríguez-Santana A, Sangrà P (2005) Hydrographic cruises off northwest Africa: the Canary Current and the Cape Ghir region. *J Mar Syst* 54: 39–63

## Maps and Figures



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