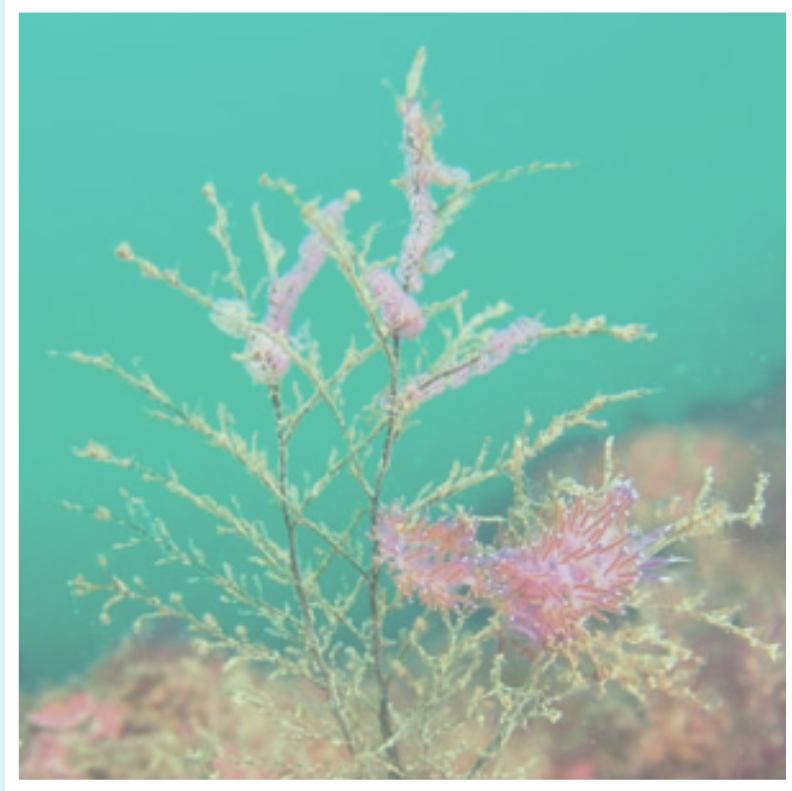




DOÑANA AND THE GULF OF CADIZ | 2010

Marine protected
area expansion proposal





DOÑANA AND THE GULF OF CADIZ | 2010

Marine protected area expansion proposal

CONTENTS

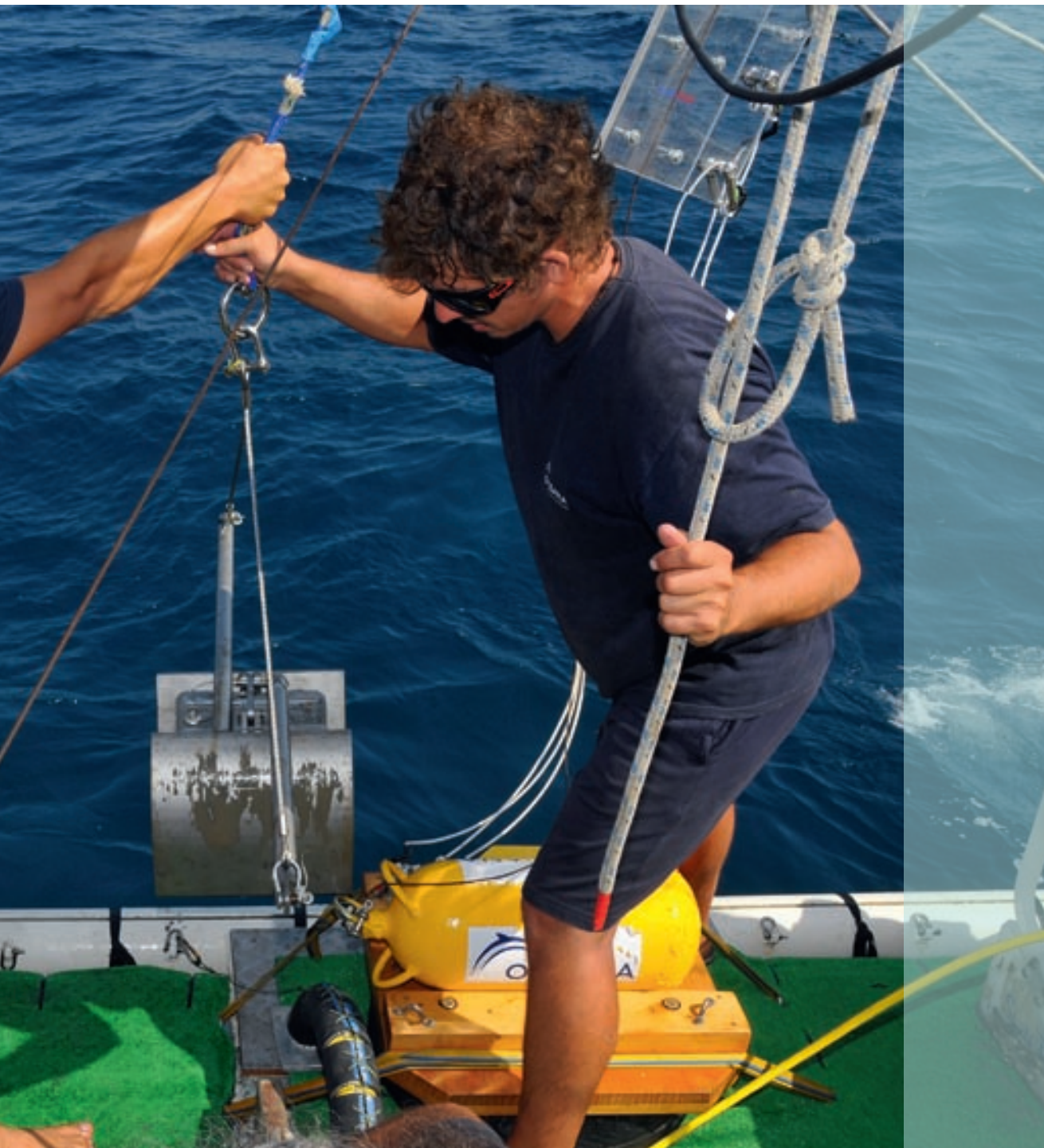


The Oceana Ranger catamaran during the campaign in the Gulf of Cádiz 2009. © OCEANA/ Carlos Minguell

EXECUTIVE SUMMARY	5
GEOGRAPHIC AND OCEANOGRAPHIC CONTEXT	9
OCEANA STUDIES AND PROPOSALS	15
→ Description	
→ Expansion of the Doñana marine protected area	
→ Need for sustainable management and control overfishing activity	
→ Human activities: Threats and damage to the ecosystem	
DESCRIPTION OF MARINE ECOSYSTEMS	33
→ Costal ecosystems	
→ Infralittoral and circalittoral marine ecosystems	
→ Protected sites in the Gulf of Cádiz	
STATE OF THE FISHING SECTOR	43
→ General description	
→ Fishing in the area proposed by Oceana	
ANNEX I SPECIES IN THE AREA PROPOSED FOR PROTECTION	55
ANNEX II FISHING GROUNDS IN THE GULF OF CÁDIZ	61
ANNEX III CARTOGRAPHY	65
→ Oceana proposal	
→ Sea bottom types	
→ Fishing grounds	
REFERENCES	73



Deckhands desending the Van Veen dredge in the protection area proposed by Oceana. South of Salmedina seamount, Cádiz. © OCEANA/ Carlos Minguell



EXECUTIVE SUMMARY

For thousands of years, the Gulf of Cádiz has been known for its ecological importance, as seen in ancient classical texts mentioning the abundance of its fisheries and the presence of numerous animal species. From the fantastic stories of Strabo, who defined tuna as the “pigs of the sea” because they would feed off the acorns that fell into the sea from the coastal oaks that extended past the Pillars of Hercules; to the documented production and commercialisation of “garum”, a fermented fish sauce made with salt, oil, vinegar, aromatic herbs and fish intestines.

The early establishment of Carthaginian factories put this area of the Atlantic on the map, thanks to the characteristics of the fisheries and the commercialisation of products, both of which gained international fame.

Though the growth of fisheries shed light on the diversity of species with commercial interest to humans, it offered only a glimpse into the total scope of marine species and, consequently, the ecosystems to which they belong.

Despite its importance, marine conservation is not a priority in this area.

One of the inconveniences of **habitats and species protection** has always been the lack of knowledge and attention paid to the marine environment, which is limited only to exploiting its commercial resources and maritime routes. As a consequence, this environment suffers from lack of protection in terms of surface area and its ecosystems are threatened and degraded. The studies developed in recent years have led to the discovery of the high rates of biodiversity in the Gulf of Cádiz; however, there is still an important lack of information, which becomes more severe as we move away from the coast. Coastal habitats are the subject of most studies, with particular emphasis on avifauna, the diversity of autochthonous dune species, rocky intertidal and sedimentary species, etc.

The published documents concerning the infralittoral and circalittoral areas are mainly focused on commercial species or describe the areas' physical and geological characteristics. However, few published studies reveal the wide variety of flora in these areas, including various species of seagrass, such as *Zostera* spp. or *Cymodocea nodosa*, rhodophycean or phaeophycean algae, most described between Mazagón and the mouth of the Guadalquivir River.

Concerning fauna, we find commercial species such as the wedge shell (*Donax trunculus*) or the striped venus (*Chamelea gallina*), although there are high levels of diversity among molluscs and other marine fauna, as well. Species of crustaceans are described, such as the fiddler crab (*Uca tangeri*), cephalopods including the octopus (*Octopus vulgaris*), fish species such as the boyer's sand smelt (*Atherina boyeri*) or the seahorse (*Hippocampus hippocampus*), as well as various annelid species. Apart from these species, cetaceans are also present in this area, including the bottlenose dolphin (*Tursiops truncatus*) or the harbour porpoise (*Phocoena phocoena*) and turtle species like the loggerhead turtle (*Caretta caretta*) or the green turtle (*Chelonia mydas*).

Samples taken by Oceana during the last three years have shown the presence of a wide variety of molluscs and fish, as well as ascidians, holothurians, star fish, urchins, anemones, banks of mysids, copepods and different larvae. Various species of corals have also been identified atop dispersed slabs of sandstone, including *Dendrophyllia ramea* and *Caryophyllia* spp., gorgonians including *Leptogorgia sarmentosa* and *Elisella paraplexauroides*, as well as hydrozoans, bryozoans, sponges, tunicates, etc.

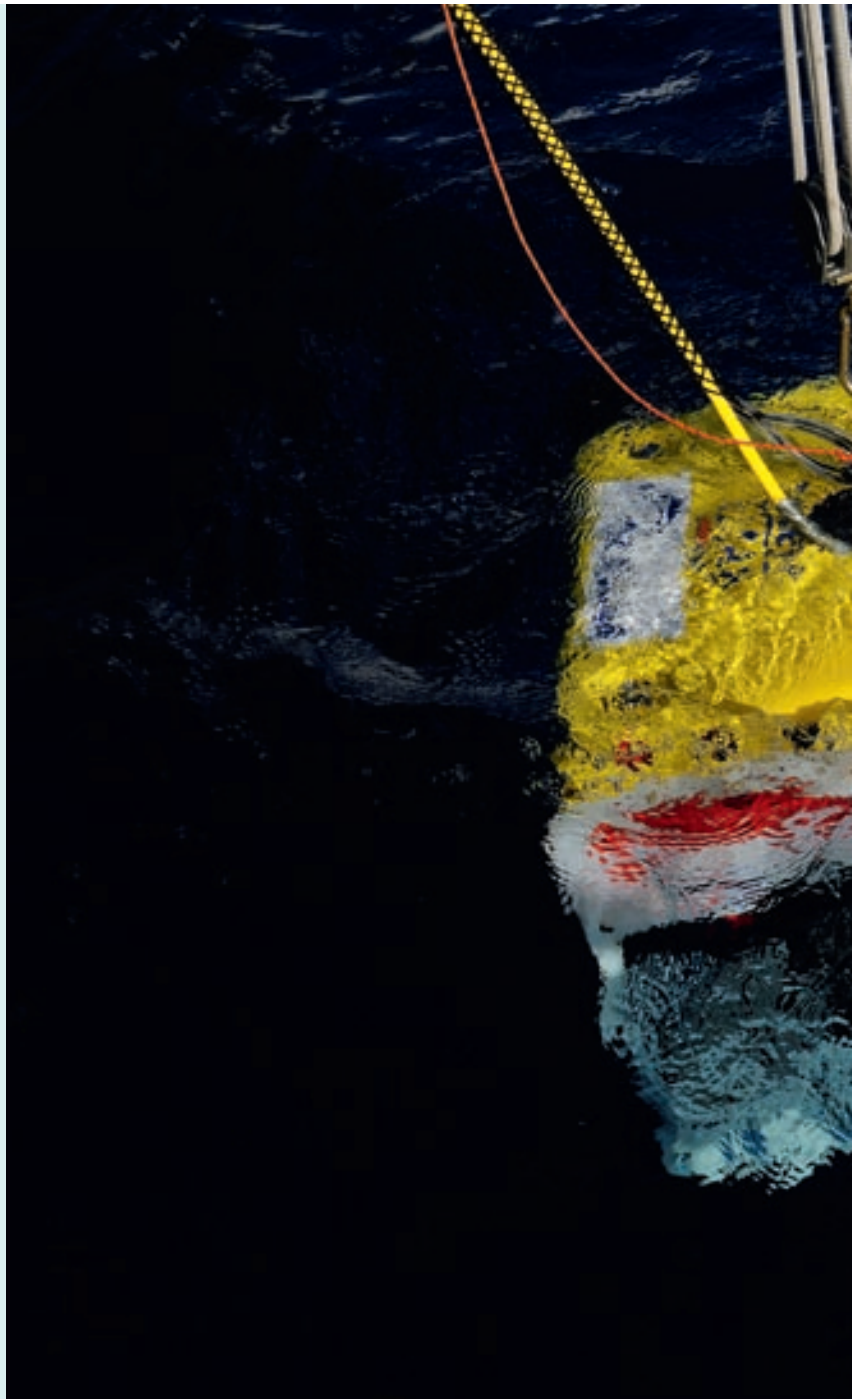
Overall, the **area's fishing sector** is in trouble. The overexploitation of the fishing grounds in the Gulf of Cádiz, due to an excessively large fleet and effort, has made the situation unsustainable for the sector that operates here. In addition, destructive fishing activities or non-compliance to regulations have worsened the state of populations and habitats.

The main fleet in the Gulf of Cádiz uses trawl gear to target deep-water rose shrimp (*Parapenaeus longirostris*), as well as purse seine and small-scale gear, including dredgers or longlines. In terms of capacity, the trawl fleet is the most important and also the most aggressive with the ecosystem. However, in terms of number of vessels, the small-scale gear fleet takes the forefront and, excluding dredgers, may be the most respectful towards the environment and most relevant in socio-economic and ecological terms.

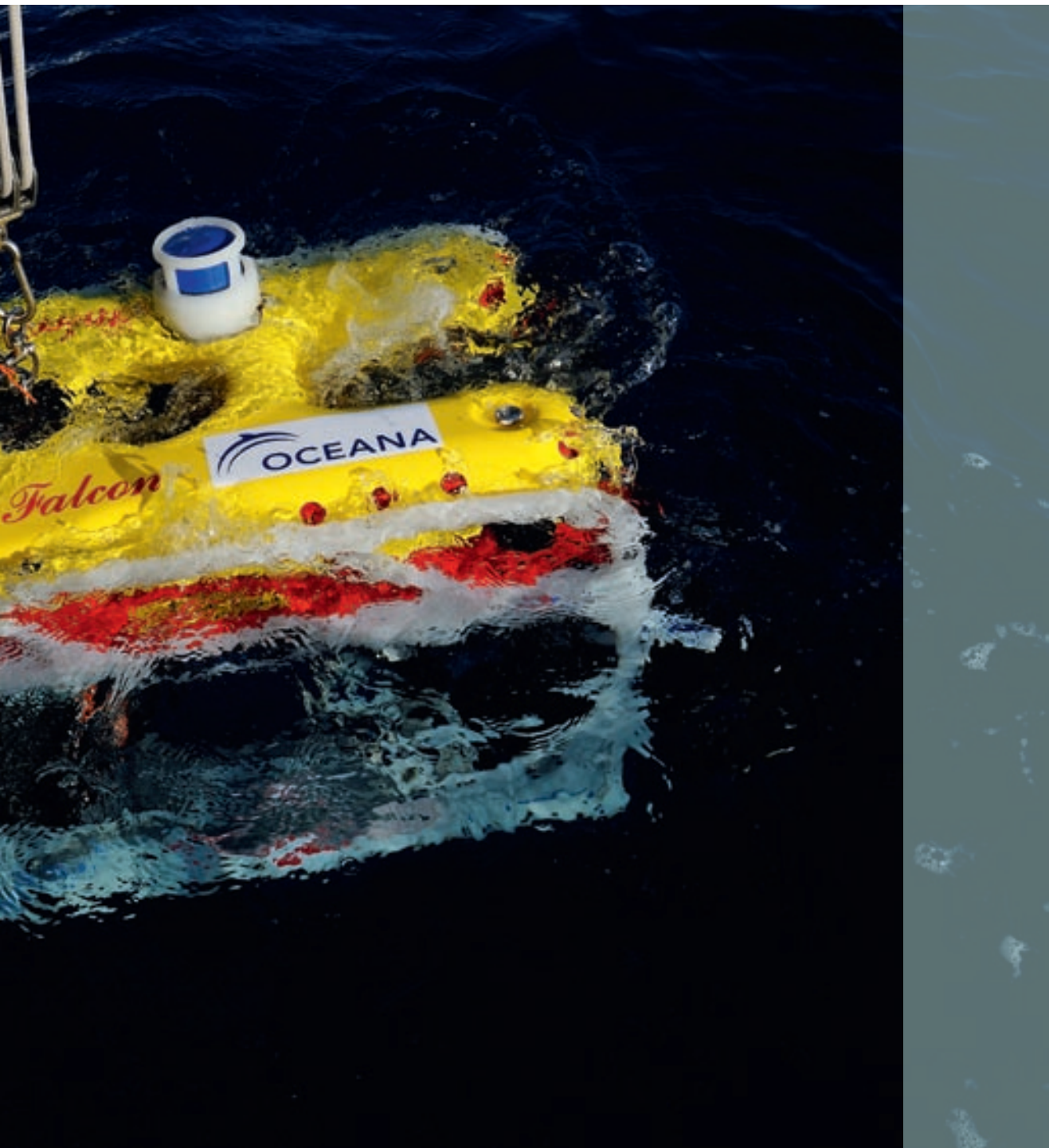
Oceana aims to stress the **ecological importance** of Doñana and the Gulf of Cádiz in general, proposing measures focused on their protection. Certain steps must be taken to achieve the conservation of marine ecosystems and the resources they provide including the creation of marine protected areas, like the proposal presented in this document, the development of in-depth scientific studies that shed light on the relevance of ecosystems, and effective management of fisheries.



Echinaster sepositus in Bajo del Mohío de Dentro, Cádiz.
© OCEANA/ Carlos Minguell



The ROV in front of Chipiona, Cádiz. © OCEANA/ Carlos Minguell



GEOGRAPHIC AND OCEANOGRAPHIC CONTEXT

Due to its geographic location, the Gulf of Cádiz is influenced by Atlantic and Mediterranean currents and a wind system that gives the area its characteristic features. The surroundings are mainly flat, with a large continental shelf, and the mouths of large rivers (Guadalquivir, Guadiana, Tinto, Odiel) predominate the marsh and estuarine areas. The accumulation of sediments forms long beaches and chains of sand dunes.

The Gulf of Cádiz has an extension of 1,565,220 ha, of which 1,009,440 are included in the Spanish EEZ.

The superficial current system (Figure 1) generates an area of upwelling around Cape Saint Vincent and a filament enters the Gulf of Cádiz; along with a sequence of warm-cold-warm waters in a NW-SE direction known as the Huelva Front¹. The water that comes in from the Mediterranean is warm and, perhaps because of this, small and medium-scale swirls with a warm nucleus form (eddies) in front of Tarifa.

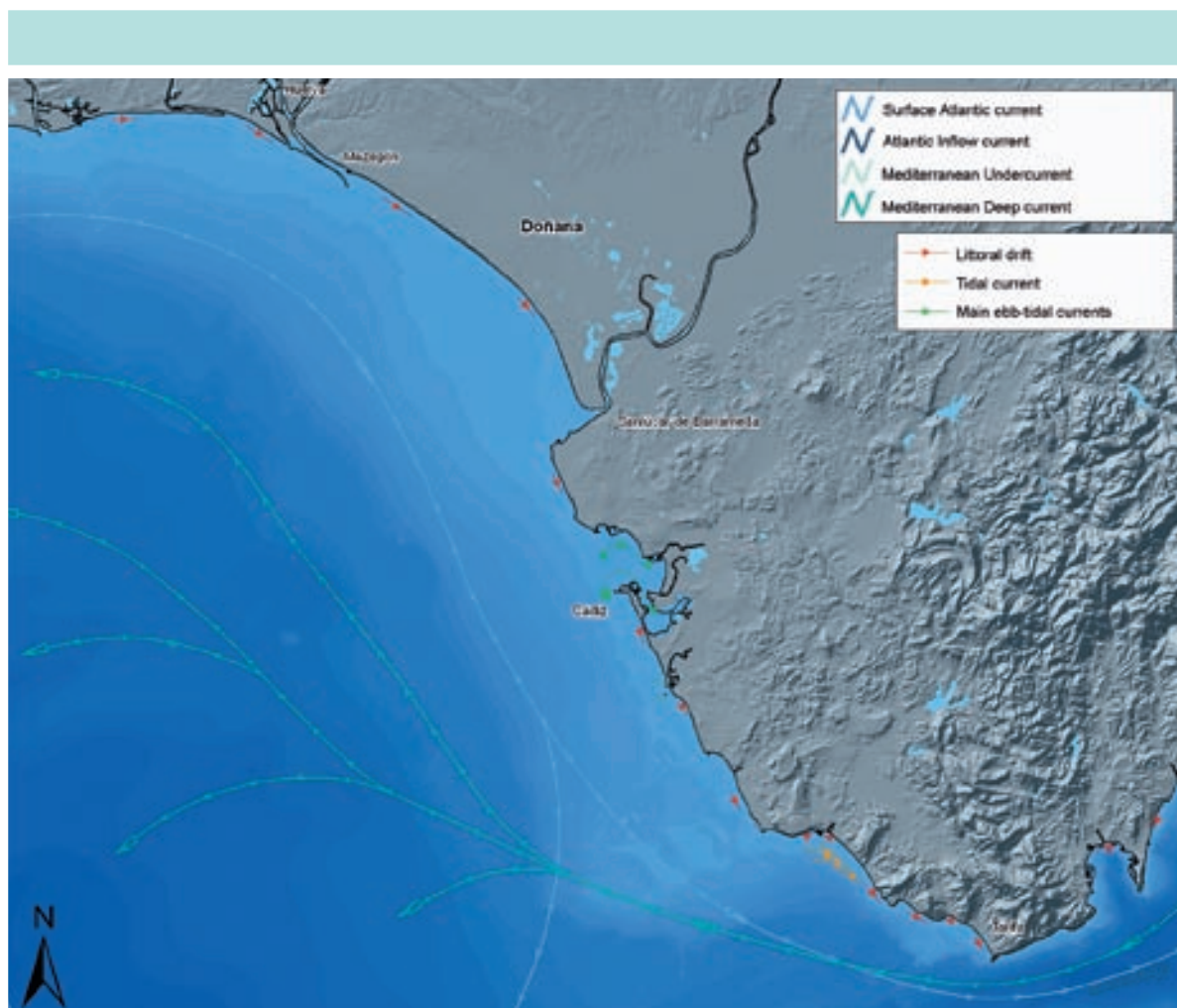


Figure 1. Currents system of the Gulf of Cádiz (Source: REDIAM)

A study carried out with satellite radiometers² on the shelf of the Gulf of Cádiz determined that the existing levels of chlorophyll and primary production in the area of the mouth of the Guadalquivir River exceeded the levels of other areas studied (Figure 2, concentration of zooplankton), also related to the wind system, where the westerly or Poniente wind increases the concentration of chlorophyll while decreasing temperature, and vice-versa for the easterly or Levante wind³. Maximum chlorophyll levels were registered in autumn and especially in spring. This generates ideal temperature and food availability conditions for the reproduction of species including the European anchovy (*Engraulis encrasicolus*), whose larval density is greater in this area than the rest of the gulf, and promotes larval development and recruiting of this and other species of commercial interest.

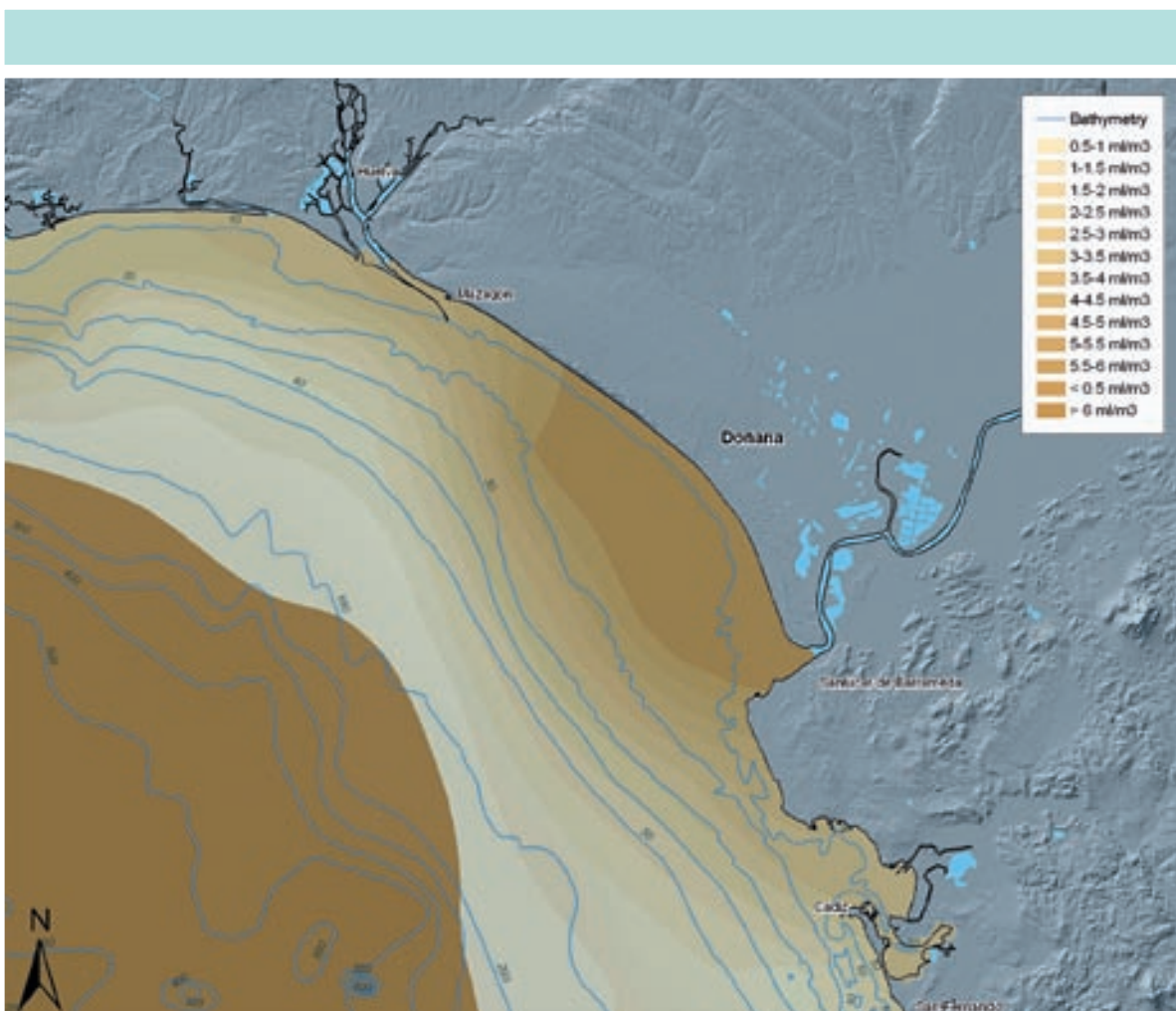


Figure 2. Zooplankton distribution in the Gulf of Cádiz (Source: REDIAM)

The figures below show the uniqueness of the coasts of Doñana and the North East coast of Cádiz, where increased temperatures promote the proliferation of primary production and, consequently, of zooplankton. Zooplankton is comprised of small marine microorganisms and small fish larvae in its initial stages. In addition, the upwelling and current systems complement the conditions necessary for this high concentration of zooplankton.

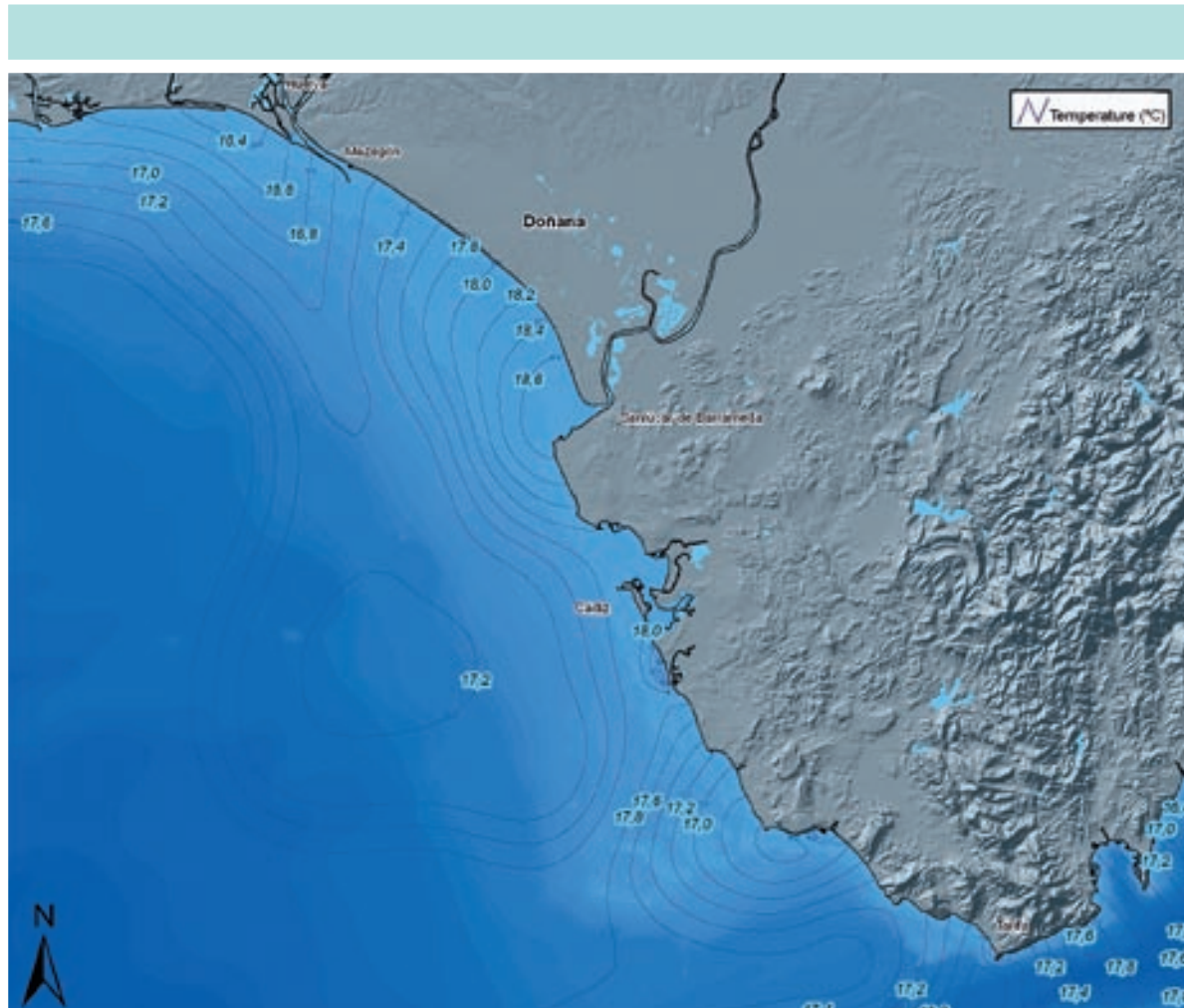
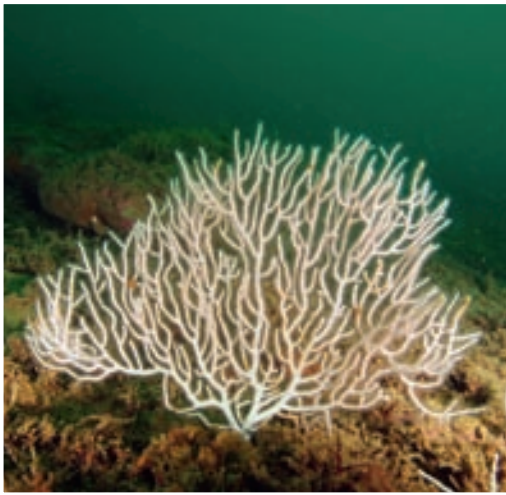


Figure 3. Distribution of surface water temperatures (Source: REDIAM)



Gorgonian (*Eunicella verrucosa*) in Bajo del Mohío de Dentro, Cádiz. © OCEANA/ Carlos Minguell



Dark colonial coral (*Phyllangia mouchezii*) in Bajo del Mohío de Dentro, Cádiz. © OCEANA/ Carlos Minguell



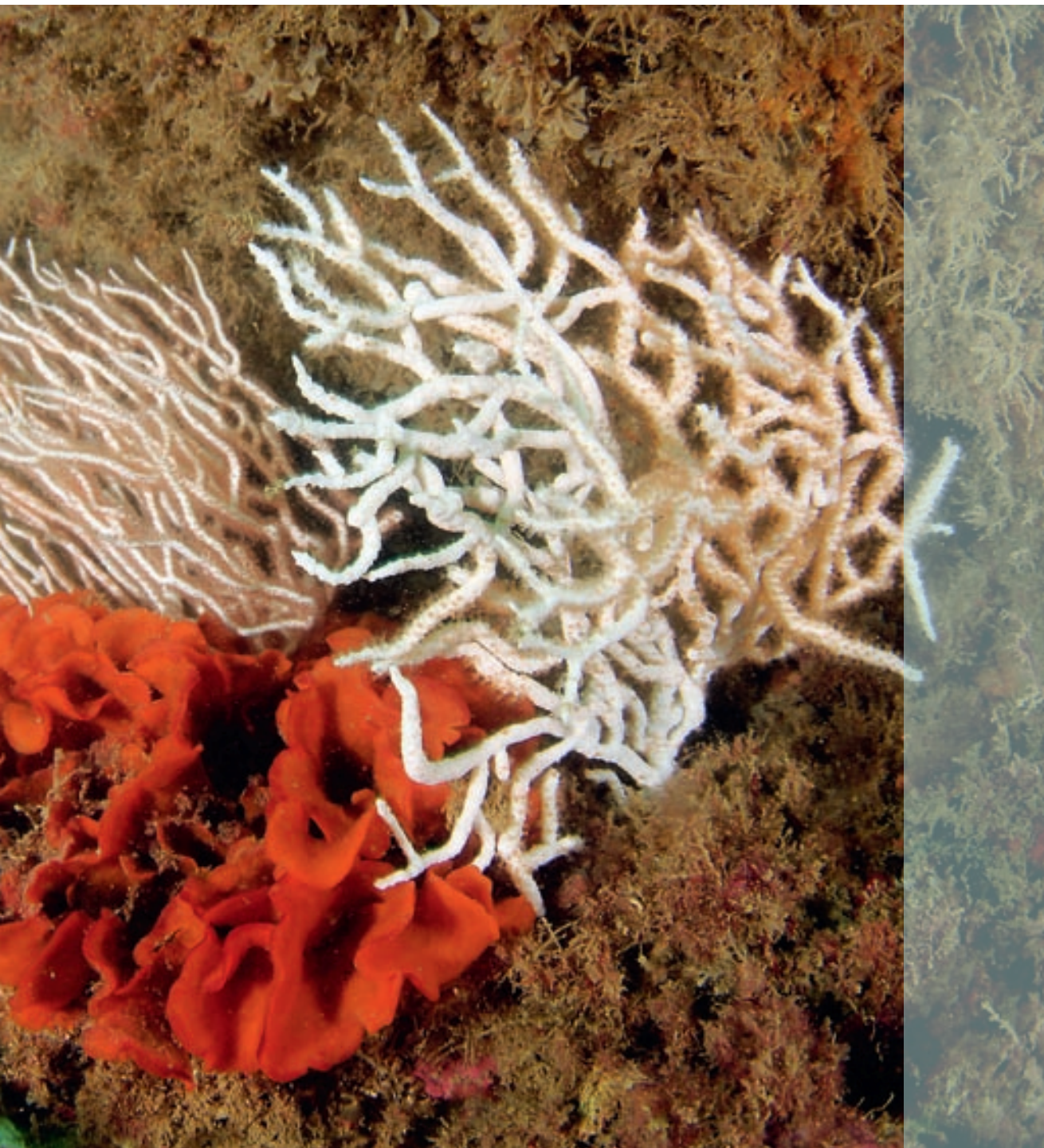
Protula tubularia in Bajo del Mohío de Dentro, Cádiz. © OCEANA/ Carlos Minguell



Coral (*Dendrophyllia cornigera*) in Chipiona, Cádiz. © OCEANA/ Carlos Minguell



Gorgonians (*Eunicella verrucosa*) and bryozoan (*Pentapora fascialis*).
Chipiona, Cádiz. © OCEANA/ Eduardo Sorensen



OCEANA STUDIES AND PROPOSALS

DESCRIPTION

During the last three years, Oceana's work in the Gulf of Cádiz, including sampling in waters of Doñana, has shed light on the benthic communities that inhabit this area⁴.

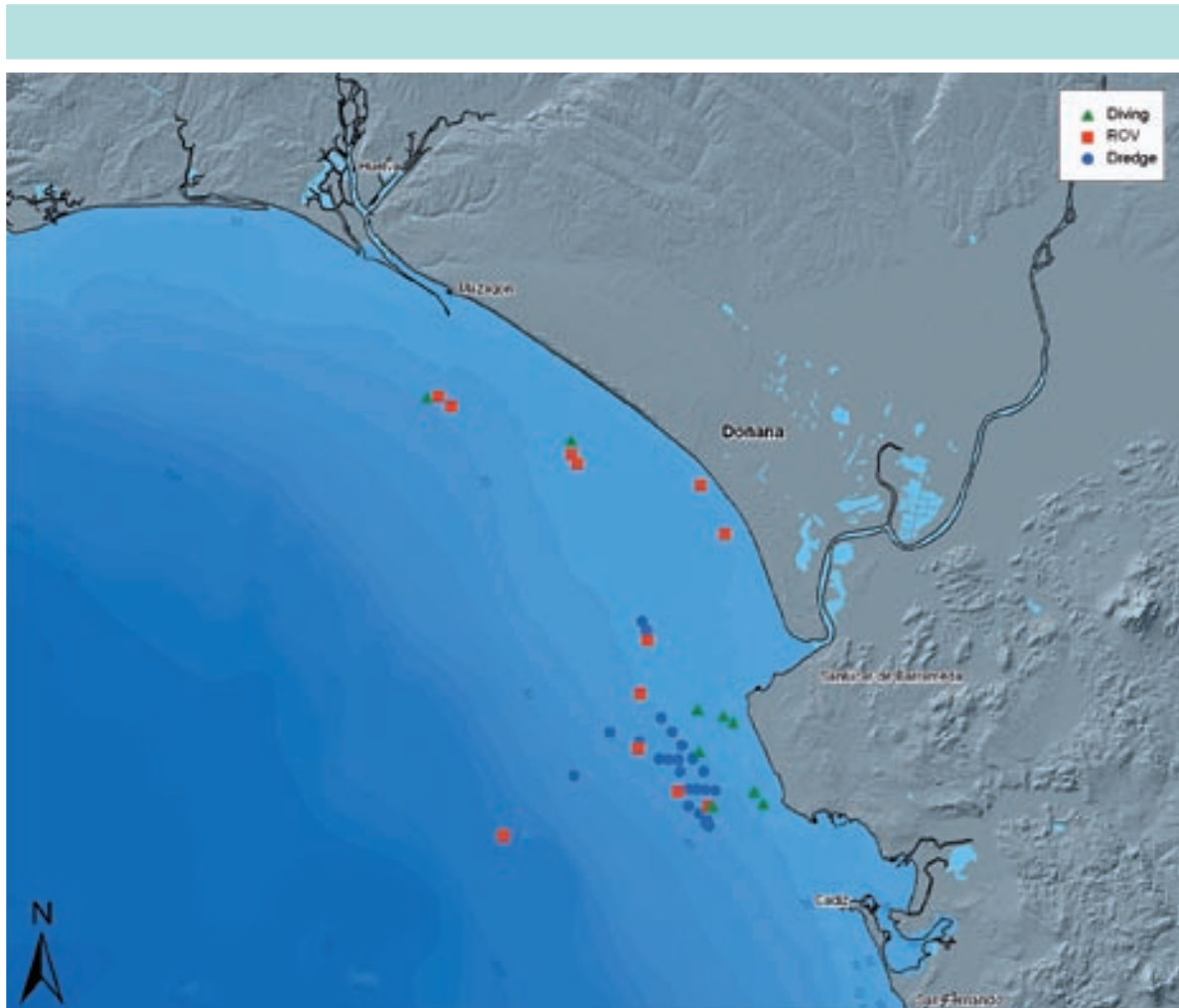


Figure 4. Areas sampled by Oceana in 2007 and 2009 with ROV and divers (Source: Oceana)

Most of the samplings were taken on soft seabeds with abundance of suspended sediment and important presence of bivalve and gastropod molluscs from the *Acanthocardia*, *Acirsa*, *Antalis*, *Cerastoderma*, *Cerithium*, *Chamalea*, *Chauvetia*, *Donax*, *Nassarius*, *Pecten* and *Turritella* genera, as well as the cephalopods *Sepia officinalis* and *Loligo* sp. Equally important presence of crustaceans was also noted, including genera *Pagurus*, *Paguristes* and *Diogenes*, and fish including white sea bream (*Diplodus sargus*), brown comber (*Serranus hepatus*), thicklip grey mullet (*Chelon labrosus*) and various gobies and flatfish. Ascidians were also abundant, although only *Styela plicata*, *Microcosmus* sp. and *Phallusia mamillata* were identified.



Soft seabeds with remnants of bivalves.
© OCEANA/ Juan Carlos Calvin

Other species observed included the polychaete *Myxicola infundibulum*, ophiura *Ophiura texturata*, anemone *Calliactis parasitica* and large banks of mysids (*Rhopalophthalmus tartessicus* and cf. *Mesopodopsis slabberi*), as well as copepods and larva from other crustaceans and fish.

The data collected by Oceana shows that the area in front of Doñana and the coastal region south of the Guadalquivir harbour a wide variety of species and vulnerable communities.

Although the seabeds in front of Doñana are mainly composed of sediments of varying thickness, seabeds made of hard substrates were also identified, mostly rocky slabs or low and dispersed rocky areas harbouring various communities. Here, it is common to find gorgonians (*Leptogorgia sarmentosa*), tree coral (*Dendrophyllia ramea*), cup coral (*Caryophyllia* sp.), dead man's fingers (*Alcyonium palmatum*), false red coral (*Parerythropodium coralloides*), various bryozoans (*Pentapora* cf. *ottomulleriana*, *Turbicellepora magnicostata*), the green echiuroid *Bonellia viridis* and polychaetes including *Serpula vermicularis* and *Sabella pavonina*.



Hard substrates *Aplysina aerophoba* (left) and *Dendrophyllia ramea* (right) in the area of Doñana.
© OCEANA/ Carlos Minguell and © OCEANA/ Juan Cuetos

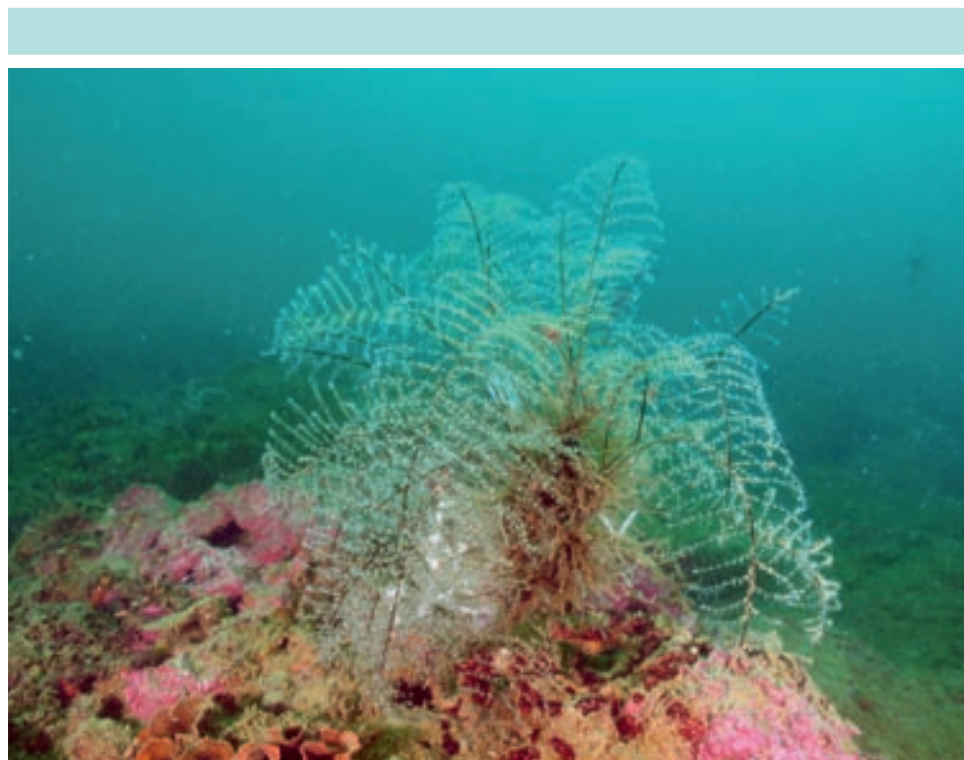
The soft seabeds are full of burrows and holes inhabited by species such as the angular crab (*Goneplax rhomboides*) and the red band fish (*Cepola rubescens*). Hermit crabs (especially from the *Pagurus* genus), the swimming crab (*Polybius* cf. *henslowii*), and small ophurians are less common although frequently found.

Hardly any species live on top of the sediment, while infauna is abundant and diverse, including mainly annelids, sipunculans and molluscs.

As far as demersal ichthyic fauna is concerned, only a few specimens of an unidentified pleuronectiform were observed. However, some fish species were observed in the water column, including dolphinfish (*Coryphaena hippurus*), garfish (*Belone belone*), little tunny (*Euthynnus alleteratus*), etc.

Among the molluscs, the predominant bivalves and gastropods include *Turritella communis*, *Aporrhais pespelecani*, *Thracia* cf. *villosiuscula*, *Acanthocardium* sp., etc.

All of the rocky areas extending between Chipiona and Rota are rich in corals and gorgonians. The gorgonians inhabit extensive areas atop rocks in shallow coastal waters while the corals are usually found in deeper waters off the coast. The most common anthozoans include *Leptogorgia sarmentosa*, *Eunicella verrucosa*, cf. *E. gazella*, *Elisella paraplexauroides*, *Dendrophyllia ramea*, *D. cornigera*, *Caryophyllia* cf. *smithii* cf. *Polycyathus muelleriae*, *Alcyonium palmatum*, *Paralcyonium spinulosum*, cf. *Corynactis viridis*, *Parazoanthus axinellae*, *Epizoanthus* cf. *arenaceus*, *Aiptasia mutabilis* and *Alicia mirabilis*.



Gorgonians atop a hard seabed in the area around Doñana. © OCEANA/ Carlos Minguell

This ecosystem with abundant overhangs, slabs, rocks, caves, etc. harbours rich fauna including large schools of fish such as the rubberlip grunt (*Plectorhinchus mediterraneus*), African striped grunt (*Parapristipoma octolineatum*), saddled seabream (*Oblada melanura*), white seabream (*Diplodus sargus*), annular seabream (*D. annularis*), common sea bream (*D. vulgaris*) and Senegal seabream (*D. bellottii*), along with redbanded seabream (*Sparus auriga*), goldsinny wrasse (*Ctenolabrus rupestris*), grey triggerfish (*Balistes capriscus*), painted comber (*Serranus scriba*), black scorpionfish (*Scorpaena porcus*), large-scaled scorpionfish (*Scorpaena scrofa*), toadfish (*Halobatrachus didactylus*), peacock wrasse (*Symphodus tinca*), etc.

Other species include the sponges *Aplysina aerophoba*, *Crambe crambe*, *Cliona viridis*, cf. *Phorbas fictitius*, *Axinella damicornis*, *Acanthella acuta*, *Hemimycale columella*, etc.; ascidians *Synoicum* sp., *Polysincraton lacazei*, *Diplosoma* sp., *Didemnum* sp., *Pycnoclavella taureanensis*, *Styela plicata*, cf. *Molgula* sp., cf. *Stolonica socialis*, *Polycitor* cf. *adriaticus*., etc.; hydrozoans *Nemertesia antennina*, *Halocordyle disticha* and cf. *Synthecium evansi*; molluscs *Calliostoma zizyphinum*, *Hexaplex trunculus*, *Flabellina* spp., *Hypselodoris tricolor* and *Sepia officinalis*; echinoderms *Echinaster sepositus*, *Coscinasterias tenuispina*, *Paracentotus lividus* and *Holothuria tubulosa*; annelids *Protula tubularia*, *Hydroides* cf. *norvegicus* and *Polydora* sp.; bryozoans *Turbicellipora magnicostata*, *Pentapora fascialis*, *Chartella* sp., cf. *Caberea ellisii* and *Myriapora truncata*; the echiuroid *Bonellia viridis*; and algae including *Halopteris flicina*, *Mesophyllum* sp., *Lithophyllum* cf. *stictaeforme*, *Plocamiun cartilagineum*, *Halymenia floresia*, *Peyssonnelia squamaria*, etc.



Sponge (*Hemimycale columella*) i Bajo del Mohío de Dentro, Cádiz.
© OCEANA/ Carlos Minguell

The City Hall of Rota, in its local Agenda 21⁵, also described many other species frequently observed in the area, many of them of commercial interest. Apart from the ones already mentioned in this document, the following were also observed: the golden grey mullet (*Liza aurata*), zebra seabream (*Diplodus cervinus*), chub mackerel (*Scomber japonicus*), bluefin tuna (*Thunnus thynnus*), swordfish (*Xiphias gladius*), common stingray (*Dasyatis pastinaca*), marbled torpedo ray (*Torpedo marmorata*), blackchin guitarfish (*Rhinobatos cemiculus*), turbot (*Psetta maxima*), black seabream (*Spondylosoma cantharus*), salema (*Sarpa salpa*), round sardinella (*Sardinella aurita*), moray eel (*Muraena helena*), conger eel (*Conger conger*), African halfbeak garfish (*Hyporhamphus picarte*), greater amberjack (*Seriola dumerili*), twaite shad (*Alosa fallax*), tarpon (*Megalops atlanticus*), ocean sunfish (*Mola*

mola), slender sunfish (*Ranzania laevis*), flying gurnard (*Dactylopterus volitans*), Atlantic lizardfish (*Synodus saurus*), cobia (*Rachycentron canadum*), corb (*Sciaena cirrhosa*) and rays (*Raja* spp.). The following invertebrates are also mentioned: the shiffarm jellyfish (*Rhizostoma pulmo*), snakelocks anemone (*Anemonia sulcata*), hermit crab (*Clibanarius arthropus*), murex (*Murex branderis*), the sea snails (*Monodonta turbinata* and *Gibbula divaricata*), the grooved carpet shell (*Ruditapes decussatus*), or the common sea urchin (*Paracentrotus lividus*).

Legally protected species

Among the species located in the area proposed for protection by Oceana, the following are those listed in a protection convention or other legal agreement. The species that should be protected due to their special ecological importance or role in the food chain are also included, although these are not listed in the limited marine species protection lists.

Species	Protection Treaty	
Plants		
<i>Zostera marina</i>	Bern (Annex I)	Barcon (Annex II)*
Phaeophyceean species		
<i>Cystoseira usneoides</i>	Barcon (Annex II)*	OCEANA
Rhodophyceean species		
<i>Lithophyllum</i> cf. <i>stictaeforme</i>	OCEANA	
Poriferans		
<i>Aplysina aerophoba</i>	Barcon (Annex II)*	OCEANA
Cnidarians		
<i>Anemonia sulcata</i>	Hexacorals	OCEANA
<i>Caryophyllia</i> cf. <i>smithii</i>	CITES (Appendix II)	
<i>Dendrophyllia cornigera</i>	CITES (Appendix II)	VU-Andalucía
<i>Eunicella gazella</i>	VU-Andalucía	OCEANA
<i>Leptogorgia sarmentosa</i>	OCEANA	
<i>Caryophyllia</i> sp.	CITES (Appendix II)	
<i>Dendrophyllia ramea</i>	CITES (Appendix II)	VU-Andalucía
<i>Eunicella verrucosa</i>	VU-Red List, VU-Andalucía	
<i>Parazoanthus axinellae</i>	Hexacorals	
cf. <i>Polycyathus muelleriae</i>	CITES (Appendix II)	
Bryozoans		
<i>Pentapora fascialis</i>	VU-Andalucía	
Crustaceans		
<i>Maja squinado</i>	Bern (Appendix III) Barcon (Annex III)	VU-Andalucía
Molluscs		
<i>Ostrea edulis</i>	OSPAR (Reg II)	
Echinoderms		
<i>Paracentrotus lividus</i>	Bern (Appendix III)	Barcon (Annex III)
Fish		
<i>Accipenser sturio</i>	HD (Annex II, Annex IV)	
<i>Argyrosomus regius</i>	OCEANA	
<i>Engraulis encrasicolus</i>	OCEANA, EN-Baleares*	
<i>Gadus morhua</i>	OSPAR (Reg II, III)	VU- Red List
<i>Hippocampus hippocampus</i>	CITES (Appendix II) OSPAR (Reg. II, III, IV, V)	VU- Red List

Species	Protection Treaty	
<i>Pagrus pagrus</i>	EN- Red List	
<i>Raja asterias</i>	LC- Red List	
<i>Syngnathus abaster</i>	CR-Balearic Islands*	
<i>Thunnus thynnus</i>	OSPAR (Reg. V) DD- Red List	Barcon (Annex III) Unclos (Annex I)
<i>Torpedo torpedo</i>	DD-Red List, CR-Balearic Islands*	
<i>Alosa alosa</i>	HD (Annex II, Annex V) OS- PAR (Reg. II, III, IV)	Bern (Appendix III) Barcon (Annex III)*
<i>Anguilla anguilla</i>	Barcon (Annex III)*	
<i>Euthynnus alleteratus</i>	Unclos (Annex I)	
<i>Galeorhinus galeus</i>	Barcon (Annex III)* VU- Red List	Unclos (Annex I)
<i>Mugil cephalus</i>	EN-Balearic Islands*	
<i>Mustelus mustelus</i>	Barcon (Annex III)*	LR- Red List, EN-Balearic Islands*
<i>Pteromylaeus bovinus</i>	DD- Red List	
<i>Raja clavata</i>	NT- Red List	OSPAR (Reg II)*
<i>Rhinobatos cemiculus</i>	Barcon (Annex III)	EN- Red List
<i>Sphyrna sp.</i>	Barcon (Annex III)* VU, EN- Red List	Unclos (Annex I)
<i>Torpedo marmorata</i>	DD- Red List	OCEANA
<i>Xiphias gladius</i>	Barcon (Annex III) DD- Red List	Unclos (Annex I)
<i>Alosa fallax</i>	HD (Annexes II and V) OSPAR (Reg. II, III, IV)	Bern (Appendix III) Barcon (Annex III)
<i>Aphia minuta</i>	EN-Balearic Islands*	
<i>Atherina boyeri</i>	DD- Red List	
<i>Echiichthys vipera</i>	EN-Balearic Islands*	
<i>Gymnura altavela</i>	Barcon (Annex II)*	VU- Red List
<i>Hippocampus guttulatus</i>	CITES (Appendix II) OSPAR (Reg. II, III, IV, V) DD- Red List	Bern (Appendix II-Med) Barcon (Annex II)*
<i>Rhinobatos rhinobatos</i>	Barcon (Annex III)*	EN-Red List
<i>Squatina squatina</i>	OSPAR (Reg. II, III, IV) CR- Red List	Bern (Appendix III) Barcon (Annex II)*
<i>Torpedo nobiliana</i>	DD- Red List	
<i>Umbrina cirrhosa</i>	Bern (Appendix III)	Barcon (Annex III)*
Cetaceans		
<i>Balaenoptera acutorostrata</i>	HD (Annex IV) CMS (Appendices I and II) Bern (Appendices II and III)	Unclos (Annex I) LC- Red List
<i>Balaenoptera edeni</i>	HD (Annex IV) CMS (Appendices I and II) Bern (Appendices II and III)	Unclos (Annex I) DD- Red List
<i>Balaenoptera physalus</i>	HD (Annex IV) CMS (Appendices I and II) Bern (Appendices II and III)	Unclos (Annex I) EN- Red List
<i>Globicephala melas</i>	HD (Annex IV) CMS (Appendices I and II) Bern (Appendices II and III)	Unclos (Annex I) DD- Red List
<i>Grampus griseus</i>	HD (Annex IV) CMS (Appendices I and II) Bern (Appendices II and III)	Unclos (Annex I) LC- Red List
<i>Delphinus delphis</i>	HD (Annex IV) CMS (Appendices I and II) Bern (Appendices II and III)	Unclos (Annex I) LC- Red List

Species	Protection Treaty	
<i>Stenella coeruleoalba</i>	HD (Annex IV) CMS (Appendices I and II) Bern (Appendices II and III)	Unclos (Annex I) LC- Red List
<i>Phocoena phocoena</i>	HD (Annexes II and IV) CMS (Appendices I and II) Bern (Appendices II and III)	Unclos (Annex I) LC- Red List
<i>Physeter macrocephalus</i>	HD (Annex IV) CMS (Appendices I and II) Bern (Appendices II and III)	Unclos (Annex I) VU- Red List
<i>Mesoplodon europaeus</i>	HD (Annex IV) CMS (Appendices I and II) Bern (Appendices II and III)	Unclos (Annex I) DD- Red List
<i>Tursiops truncatus</i>	HD (Annexes II and IV) CMS (Appendices I and II) Bern (Appendices II and III)	Unclos (Annex I) LC- Red List
<i>Kogia breviceps</i>	HD (Annex IV) CMS (Appendices I and II) Bern (Appendices II and III)	Unclos (Annex I) DD- Red List
<i>Megaptera novaeangliae</i>	HD (Annex IV) CMS (Appendices I and II) Bern (Appendices II and III)	Unclos (Annex I) LC- Red List
<i>Orcinus orca</i>	HD (Annex IV) CMS (Appendices I and II) Bern (Appendices II and III)	Unclos (Annex I) DD- Red List
<i>Kogia simus</i>	HD (Annex IV) CMS (Appendices I and II) Bern (Appendices II and III)	Unclos (Annex I) DD- Red List
<i>Mesoplodon densirostris</i>	HD (Annex IV) CMS (Appendices I and II) Bern (Appendices II and III)	Unclos (Annex I) DD- Red List
Reptiles		
<i>Caretta caretta</i>	HD (Annexes II and IV) CMS (Appendix I)	Barcon (Annex II)* EN-Red List and Andalucía
<i>Dermochelys coriacea</i>	HD (Annex IV) CMS (Appendix I)	Unclos (Annex I) CR-Red List/Andalucía
<i>Chelonia mydas</i>	HD (Annexes II and IV) CMS (Appendix I)	Barcon (Annex II)* EN-Red List and Andalucía
<i>Eretmochelys imbricata</i>	HD (Annex IV)	CR-Red list, EN-Andalucía
<p>Habitats Directive (HD). Annex II: species requiring designation of special areas of conservation/ Annex IV: species requiring strict protection.</p> <p>Bern Convention (Bern). Appendix I: list of strictly protected species of flora./ Appendix II: list of strictly protected species of flora/ Appendix III: list of protected species of fauna.</p> <p>Barcelona Convention (Barcon). Annex II: list of endangered or threatened species/ Annex III: list of species whose exploitation is regulated. (*This convention is for the Mediterranean, but the proximity to and influences from the Gulf of Cádiz are worth mentioning).</p> <p>Convention on Migratory Species (CMS). Appendix I: endangered migratory species/ Appendix II: migratory species that have an unfavourable conservation status that should be conserved through agreements.</p> <p>CITES. Appendix I: list of species whose international trade is prohibited/ Appendix II: list of species whose international trade is regulated.</p> <p>IUCN Red List. CR-Critically endangered/ EN-Endangered/ VU-Vulnerable/ NT-Near threatened/ LC- Least concern/ DD-Data deficient.</p> <p>OSPAR. Indicates the OSPAR Regions where the species is at risk. The Gulf of Cádiz is included in Region IV (*nevertheless, adjacent regions that may be related are indicated).</p> <p>OCEANA. Species considered important, but not included in conventions or protection lists.</p> <p>United Nations Convention on the Law Of the Sea (UNCLOS). Law of the Sea. Annex I: Highly Migratory Species.</p>		

Classification of habitats and protection treaties

The following tables include the habitats observed in the area proposed by Oceana and classified under the OSPAR Convention, Habitats Directive or Network of Natural Parks. Each one of the conventions lays down conservation measures or recommendations.

Figure 5 shows a division of currently protected habitats. Their degree of representation is shown in the following tables.

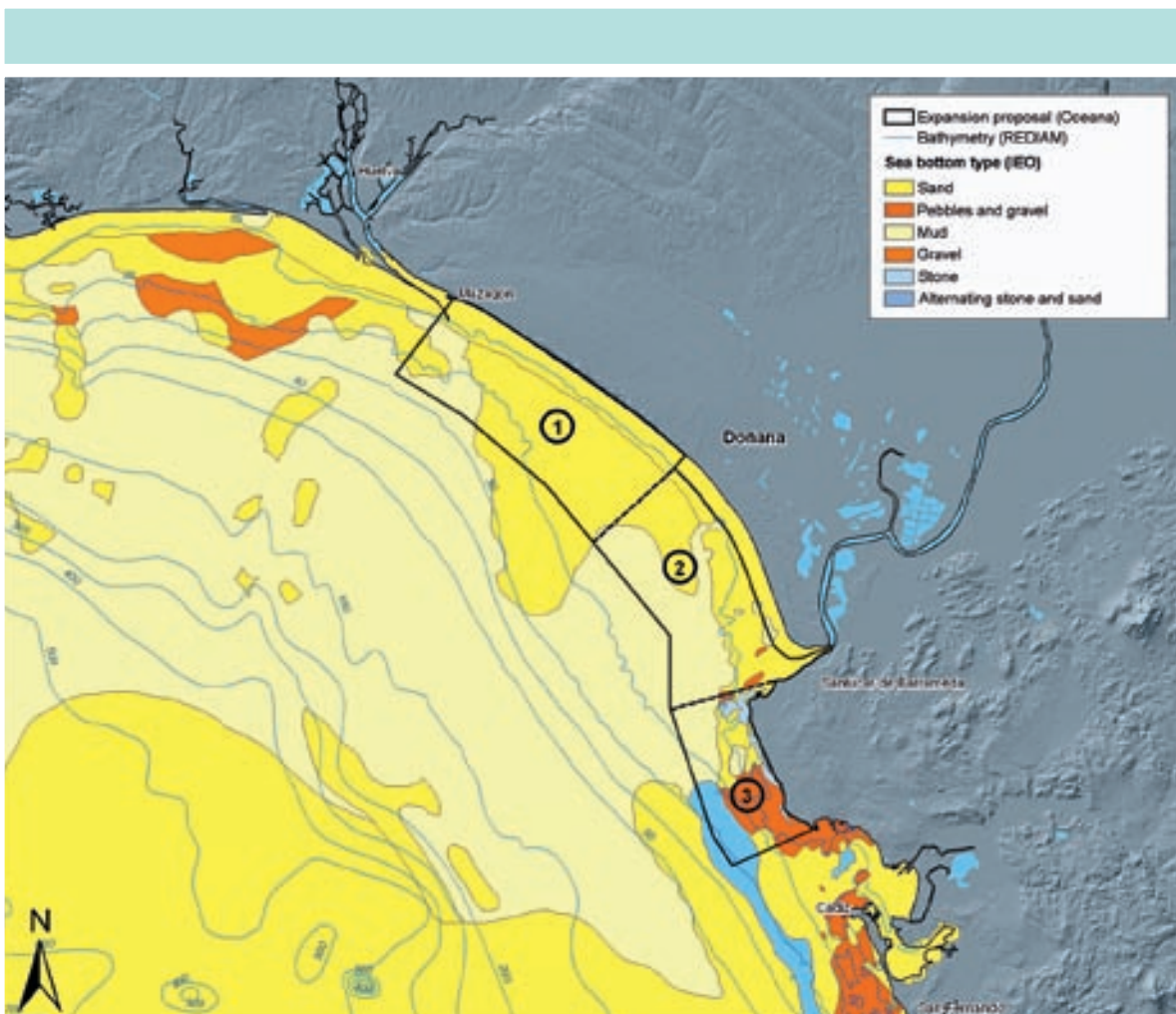


Figure 5. Proposal over sea bottom type. Proposal divided in random zones (1, 2, 3) for habitat characterization (Source: IEO, REDIAM and Oceana)

· OSPAR Convention

Under Annex V⁶, on the Protection and Conservation of Ecosystems and Biological Diversity of Maritime Areas, this convention establishes a list of endangered habitats located within the OSPAR regions that are in need of measures for their protection and conservation. The Gulf of Cádiz is included in Region IV and following is a list of habitats classified in this convention that occur in the area proposed for protection by Oceana.

OSPAR		
Habitats	Presence in Proposed Area	Presence in the Gulf of Cádiz
Coral Beds	Zone 1 on dispersed sandstone slabs and Zone 3 widely distributed.	High. Presence of deep sea white corals in dome areas.
<i>Cymodocea</i> spp. beds	Not confirmed.	Confirmed in Rio Piedra Marshes and Flecha del Rompido, Straits N.P. ⁷
Intertidal marshes	Zone 2 at the mouth of the Guadalquivir	Various locations: Gulf of Cádiz, mouth of the Guadiana, etc.
<i>Lophelia pertusa</i> reefs	Not present	Deeper areas
<i>Ostrea edulis</i> beds	Zone 3	Gulf of Cádiz and coasts of Tarifa
Sea pens and communities of burrowing megafauna	Zones 1, 2 and 3	Widely distributed
<i>Zostera</i> spp. beds	Zone 1 and 2 close to the coast	Confirmed in the Gulf of Cádiz and Straits N.P.



Nudibranch (*Flabellina affinis*).
Bajo del Mohío de Dentro, Cádiz.
© OCEANA/ Carlos Minguell

- Habitats Directive

The Habitats Directive⁸ is an EC directive requiring the creation of marine protected areas for habitats listed in its Annex I, in order to guarantee their conservation.

Furthermore, Law 42/2007 on Natural Heritage and Biodiversity⁹, following the guidelines established by the EU Habitats and Birds Directives and applying them within the Spanish scope, includes the habitats and species mentioned in these directives in national legislation and creates the Catálogo Español de Hábitats en Peligro de Desaparición (*Spanish Catalogue of Endangered Habitats*), which lists habitats that require special strategies and plans for their protection and recovery due to their size, loss or state of decline.

Habitat Directive (92/43/EEC)			
Code	Marine habitat	Doñana Zones	Degree of representation
1110	Sandbanks which are slightly covered by sea water all the time	Zone 1 Zone 2 Zone 3	High High Present
1130	Estuaries	Zone 2 at the mouth of the Guadalquivir	High
1140	Mudflats and sandflats not covered by seawater at low tide	Zone 1 north Zone 3	Present Significant
1150	Coastal lagoons	Inside the Park	High
1160	Large shallow inlets and bays	Entire area	High
1170	Reefs	Zone 1 north Zone 3	Present High

- Network of National Parks

In addition, the Law on the Network of National Parks¹⁰ also lists various habitats that, due to their importance, must be taken into account when designating protected sites in order to increase the network's degree of ecological representation. This list is especially important in this case, because Doñana is a National Park and its marine expansion could significantly contribute to an increase in the variety of habitats and species present in these protected sites.

Spanish natural marine systems to be represented in the network of National Parks		
Habitat type	Doñana Zone	Degree of representation
Detritic and sedimentary bottoms	Zone 1 Zone 2 Zone 3	High High Present
Seagrass beds	Zone 1 Zone 2	Present Present
Pelagic passing areas, reproduction areas or areas with regular presence of cetaceans or large migratory fish	Zone 1 Zone 2 Zone 3	Present Present Present
Large filtering communities: Sponges, ascidians and bryozoans	Zone 1 Zone 2 Zone 3	Present Present High
Communities on hard substrates with populations of photophilic or shade-tolerant algae	Zone 1 north Zone 3	Present High
Rocky seamounts	Zone 3	High

- EUNIS Classification of European Habitats

EUNIS¹¹ is a European system of classification that harmonises the description of habitats and facilitates the international use of this data. Oceana has catalogued all the habitats observed in the area of Doñana according to these criteria.

Code	Marine Habitat
A1	Littoral rock and other hard substrata
A1.112	<i>Chthamalus</i> spp. on exposed upper eulittoral rock
A1.41	Communities of littoral rockpools
A1.471	Hydrolittoral solid rock (bedrock): level bottoms with little or no macrophyte vegetation
A1.473	Hydrolittoral solid rock (bedrock): reefs
A2	Littoral sediments
A2.2221	Oligochaetes in full salinity littoral mobile sand
A2.2222	Oligochaetes in variable salinity littoral mobile sand
A2.231	Polychaetes in littoral fine sand
A2.24	Polychaete/bivalve-dominated muddy sand shores
A2.242	<i>Cerastoderma edule</i> and polychaetes in littoral muddy sand
A2.31	Polychaete/bivalve-dominated mid estuarine mud shores
A2.32	Polychaete/bivalve-dominated upper estuarine mud shores
A2.33	Marine mud shores
A2.421	Cirratulids and <i>Cerastoderma edule</i> in littoral mixed sediment
A2.5	Coastal saltmarshes and saline reedbeds
A2.83	Hydrolittoral stony substrata
A2.84	Hydrolittoral gravel substrata
A2.86	Hydrolittoral muddy substrata
A2.87	Hydrolittoral mixed sediment substrata
A3	Infralittoral rock and other hard substrata
A3.1	Atlantic and Mediterranean high energy infralittoral rock
A3.2	Atlantic and Mediterranean moderate energy infralittoral rock
A3.3	Atlantic and Mediterranean low energy infralittoral rock
A4	Circalittoral rock and other hard substrata
A4.1	Atlantic and Mediterranean high energy circalittoral rock
A4.2	Atlantic and Mediterranean moderate energy circalittoral rock
A4.3	Atlantic and Mediterranean low energy circalittoral rock
A5	Sublittoral sediment
A5.22	Sublittoral sand in variable salinity (estuaries)
A5.231	Infralittoral mobile clean sand with sparse fauna
A5.234	Semi-permanent tube-building amphipods and polychaetes in sublittoral sand
A5.24	Infralittoral muddy sand
A5.241	<i>Echinocardium cordatum</i> and <i>Ensis</i> spp. in lower shore and shallow sublittoral slightly muddy fine sand

Code	Marine Habitat
A5.245	<i>Turritella</i> in muddy sands
A5.25	Circalittoral fine sand
A5.26	Circalittoral muddy sand
A5.32	Sublittoral mud in variable salinity (estuaries)
A5.326	Oligochaetes in variable or reduced salinity infralittoral muddy sediment
A5.33	Infralittoral sandy mud
A5.34	Infralittoral fine mud
A5.35	Circalittoral sandy mud
A5.36	Circalittoral fine mud
A5.42	Sublittoral mixed sediment in variable salinity (estuaries)
A5.43	Infralittoral mixed sediments
A5.44	Circalittoral mixed sediments
A5.6	Sublittoral biogenic reefs
A7	Pelagic water column
A7.11	Temporary neuston layer
A7.3	Completely mixed water column with full salinity
A7.4	Partially mixed water column with reduced salinity and medium or long residence time
A7.6	Vertically stratified water column with reduced salinity
A7.9	Vertically stratified water column with full salinity
A7.A2	Seasonal fronts in full salinity water column

Apart from the habitats mentioned above, there are other important habitats that have yet to be included in national and international classifications. These habitats are characteristic of this area and provide important biological richness to the areas proposed for protection. The main ones are:

- The muddy and sandy infralittoral and circalittoral seabeds with abundance of molluscs and polychaetes
- The sandy-muddy seabeds with burrowing fauna
- The *Crassostrea angulata* beds on bottoms with mixed sediments or sandy-muddy seabeds
- The biogenic reefs with presence of corals and other anthozoa on infralittoral and circalittoral rocks -as well as other faunal communities on infralittoral and circalittoral rocks (i.e. bryozoans and tunicates)
- Communities of sponges on infralittoral and circalittoral rocks
- Infralittoral communities of fucoid algae from the *Cystoseira* y *Sargassum* genera
- Toralline algae on infralittoral rocks, etc.

EXPANSION OF THE DOÑANA MARINE PROTECTED AREA

Currently, the marine protected area of Doñana National Park is less than 4,000 hectares, compared to more than 100,000 hectares of protected land area between the natural and national park.



Gorgonian (*Leptogorgia sarmentosa*) and brown comber (*Serranus hepatus*).
© OCEANA/ Eduardo Sorensen

Because the continental shelf in this area is extensive and depths over 50 meters are reached far from the coast, at least 10 miles, Doñana's marine ecosystem extends much further than the one currently included in the protected area.

Furthermore, the expansion of the protected area must include both sides of the mouth of the Guadalquivir and various miles in front of Doñana given the high rates of phytoplankton production and because this is a spawning area for the European anchovy¹². Other studies¹³ have also proven the high biomass levels of some fish families, such as Sparidae, Solidae and Haemulidae, as well as some specific species including *Diplodus bellottii*, *Merluccius merluccius* and *Arnoglossus laterna*, and the stomatopod crustacean *Squilla mantis*.

The area proposed by Oceana to be included within the protected area of Doñana covers roughly 80,000 hectares (compared to the less than 4,000 hectares currently protected), between Mazagón in Huelva (on the west) and Rota in Cádiz (on the east), extending roughly 8 kilometres into open waters.

The presence of species in danger of extinction, such as the guitarfish (*Rhinobatos rhinobatos* and *R. cemiculus*), is particularly important. Many of these species were commonly found in the fishing catch not long ago and some were subsequently used in scientific studies¹⁴- although fishermen point out that these and other endangered elasmobranch species (i.e. the angelshark -*Squatina squatina*-) are very rare or non-existent today.

THE NEED FOR SUSTAINABLE MANAGEMENT AND EFFECTIVE CONTROL OF FISHING ACTIVITIES

Fishing in the area under consideration constitutes one of the main driving forces of the economy, but is also the area's main threat. The lack of control and management measures for fishing activities is not only causing serious damage to marine ecosystems of high ecological value, but is also threatening the economic viability of the sector in the medium term.

A clear example of this is the current situation in the Gulf of Cádiz, where Spain was recently condemned by the European Courts of Justice for lack of control and compliance concerning minimum size regulations¹⁵.

Expanding the marine protected areas or identifying new areas of ecological importance is useless if active protection and management measures are not implemented, and if the necessary measures to articulate effective control mechanisms are not available.



Trawling net with gorgonians. © OCEANA/ Jesús Renedo

The diversity and cultural richness harboured by the fishing sector in the Gulf of Cádiz should be conserved, but years of overexploitation and lack of control have made this impossible without strict and appropriate management and control of the fishing fleet, valuation of the local fishing products and synergy with a network of marine protected areas in the region.

The following are among the main infringements detected by Oceana which should be urgently eliminated in the area described in this document:

A) Common infringements of professional fishing regulations

- Use of banned gear or devices
- Fishing in restricted areas in the Fishing Reserve of the mouth of the Guadalquivir River
- Violation of the technical measures described for small-scale gear
- Bottom trawling less than 6 miles from the coast
- Violation of closed seasons
- Fishing by unregistered vessels and/or landings in unauthorised places an/or undeclared catches and/or commercialisation of fishing products
- Lack of respect for regulations concerning minimum sizes

B) Common infringements of recreational fishing regulations

- Catching unauthorised species (i.e. octopus, mackerel)
- Use of unauthorised gear (cephalopod traps, longlines)
- Exceeding the maximum catch per license/day
- Fishing without a license
- Commercialisation of catch



Trawler from Sanlúcar fishing inside the marine area of Doñana National Park, at only 5 meters depth. © OCEANA/ Juan Cuetos

In short, the expansion of the protected area of Doñana should include a management plan that eliminates human threats to the area's biodiversity (including fishing infractions, pollution, deterioration of the coast and seabeds), while allowing activities that are compatible with the area's ecological value.

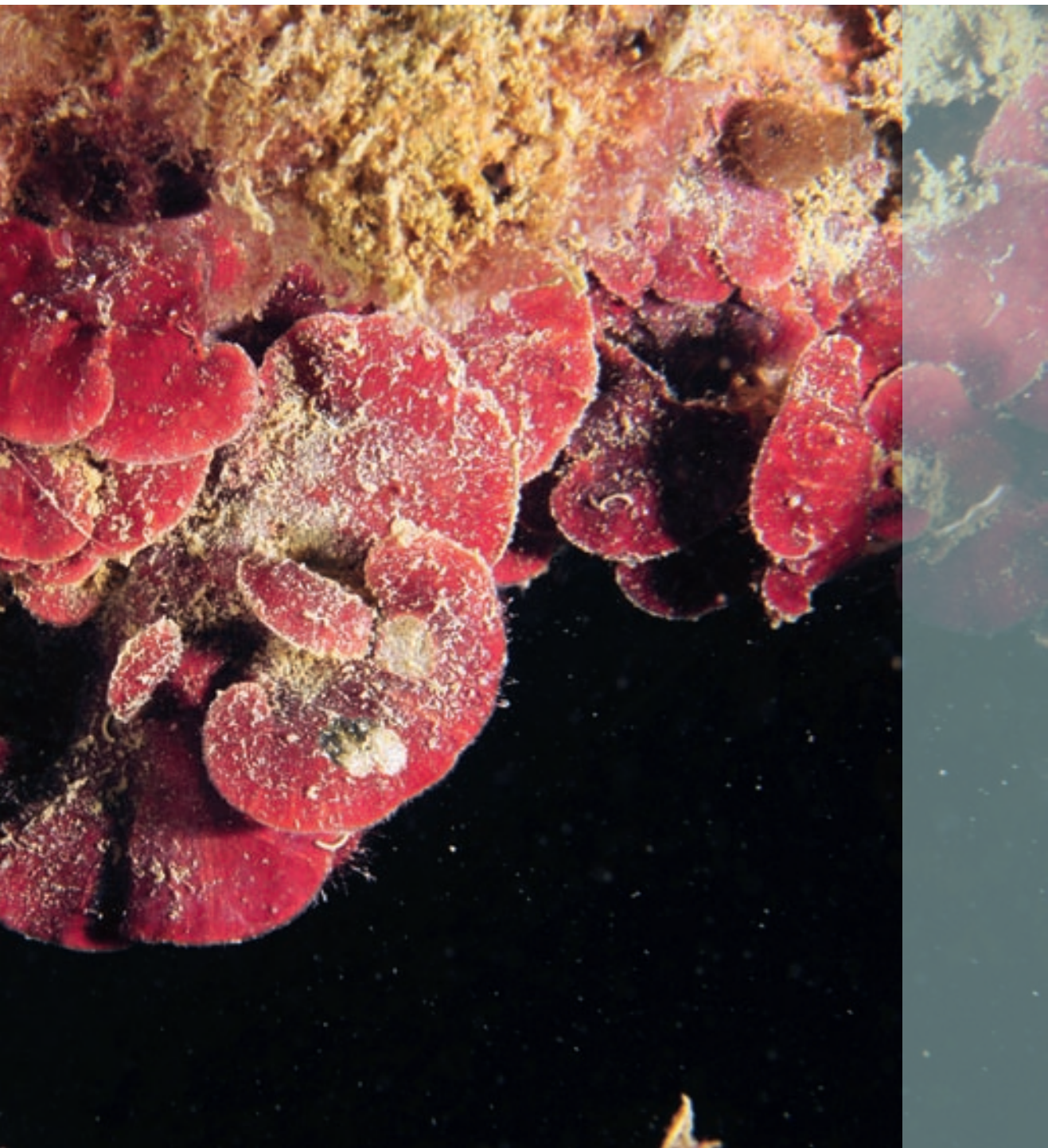
HUMAN ACTIVITIES: THREATS AND DAMAGE TO THE ECOSYSTEM

All human activities have an impact on marine ecosystems. The area of the Gulf of Cádiz is affected by many of these activities, including dredging at the mouth of the Guadalquivir River, the installation of single buoy moorings for unloading and transporting hydrocarbons in Huelva, dense maritime traffic to/from the ports in the Mediterranean, the extraction and production of fishing resources through fishing, handpicking and aquaculture, chemical pollution from industrial factories or cities –on the coast or in the rivers-, energy production at sea, construction on the coast including ports or breakwaters, the regeneration of beaches, or the impacts caused by the climate change, among others.

All the potential impacts of these activities must be taken into consideration and reduced or eliminated, whenever possible. While some of these threats can and should be eliminated (illegal fishing, destruction of the marine benthos, overexploitation of resources, chemical contamination, etc.), others (organised extraction of marine resources, generation of energy, maritime transportation, etc.), given their importance and relevance in society, should be carefully regulated to make them more compatible with the existence of protected areas and all necessary steps should be taken to ensure compliance with legislation concerning the conservation of the environment.



Red algae (*Peyssonellia* sp.), Bajo del Mohío de Dentro, Cádiz.
© OCEANA/ Carlos Minguell



DESCRIPTION OF MARINE ECOSYSTEMS

COSTAL ECOSYSTEM

The coast of the Gulf of Cádiz is a low, sandy coast where high levels of sedimentation and the creation of large dune systems are common. However, there are clear differences between the western and eastern regions. While the coast of Huelva is mostly covered by soft sediments, the coast of Cádiz is also characterised by the presence of rocky areas and rockpools.



Yellow-legged gull (*Larus cachinnans*).
© OCEANA/ Eduardo Sorensen

Two types of environments can also be distinguished in these areas, depending on the erosion and sedimentation processes, as well as the type of dune system. As such, the area with the highest levels of marine erosion on the coast of Huelva is located in Doñana National Park, between east Mazagón and Matalascañas, while high to very high sedimentation occurs in the rest of the area¹⁶.

There are various studies concerning the flora of these dune systems that includes the presence of *Ammophila arenaria*, *Malcomia littorea*, *Cakile maritima*, *Pancreatium maritimum*, *Eryngium maritimum*, *Salsola kali*, *Euphorbia paralias*, etc., and also concerning its important avifauna¹⁷. Given the abundance of information available on the terrestrial ecosystems of the coastal area above sea level, including dunes, coastal lagoons, marshes, etc., we will not go into detail about the biocenosis of this coastal region.

INFRALITTORAL AND CIRCALITTORAL MARINE ECOSYSTEMS

Very few studies have been published concerning the park's submerged ecosystems. The presence of some species of seagrass has been documented, including *Ruppia maritima*, *Zostera* spp. and *Cymodocea nodosa*¹⁸. In general, there are few publications on the benthic communities in the Gulf of Cádiz and, in the case of Doñana, these are practically non-existent.

From personal communication and so-called grey literature, we are aware of the presence of some marine species of gastropod and bivalve molluscs, including some reef-forming species or species that form large communities, such as the Portuguese oyster (*Crassostrea angulata*) or Poli's stellate barnacle (*Chthamalus stellatus*), as well as communities of algae with presence of fucoid brown algae and red algae.

The few existing studies concerning marine flora in the area are mainly focused on areas outside the park. This includes a publication in the 90s about the benthic flora of the coast of Huelva¹⁹. Although the samples were taken outside the protected area, and the easternmost area was Matalascañas, the diversity gives us an idea of the existing species that, at that time, allowed for the identification of 91 taxa. Among these, almost half are rhodophycean species, including *Gelidium pusillum*, *G. latifolium*, *Halymenia floresia*, *Chondracanthus acicularis*, *Gracilaria verrucosa*, *Polysiphonia lanosa*, *Stylonema cornu-cervi*, *Anthithamnion tenuissimum*, *Bangia atropurpurea*, *Aglaothamnion tenuissimum*, etc. Of special importance among the phaeophycean (brown) algae are some species that form important communities, including *Cystoseira usneoides*, *Fucus vesiculosus*, *Sargassum vulgare* and *Dictyopteria polypodioides*.

Although almost one hundred species were catalogued in the area of Huelva, only ten were found between Mazagón and the mouth of the Guadalquivir, coinciding with the front of the protected areas of Doñana: *Gelidium latifolium*, *Polyides rotundus*, *Polysiphonia scopulorum*, *Ceramium rubrum*, *Erythrotrichia carnea*, *Cystoseira usneoides*, *Sargassum vulgare*, *Dictyota dichotoma*, *Blidingia marginata* and *B. minima*.

Knowledge is also scarce concerning fauna. Some species are well known because they are exploited²⁰, particularly the clam or wedge shell (*Donax trunculus*), but also other bivalve molluscs such as the striped venus (*Chamelea gallina*), the banded carpet shell (*Venerupis rhomboides*), the peppery furrow shell (*Scrobicularia plana*), the common cockle (*Cerastoderma edule*), the razor clam (*Solen marginatus*) or the European razor clam (*Ensis* spp.).



Samples of molluscs collected during Oceana campaigns.
© OCEANA/ Eduardo Sorensen

The same occurs with some fish species. Thanks to studies about distribution in the Gulf of Cádiz and their commercial interest, more information is known about their presence on the coasts of Doñana. This is the case of the wedge sole (*Dicologlossa cuneata*)²¹ among others, proof that these waters are an important spawning and nursery area for this species. While there are other studies about the area's ichthyologic populations²², these are usually focused on sweet and briny water species, not marine species. The Spanish Oceanographic Institute should also be mentioned, although this institution focuses on the Gulf of Cádiz in general, not specifically Doñana, as we will see further ahead.

In addition, the tailings dam failure at Aznalcollar in 1998 led to a series of studies²³ on the levels of contamination in marine species at the mouth of the Guadalquivir and adjacent areas that shed light on some species in the Doñana area. These species include crustaceans such as the fiddler crab (*Uca tangeri*), caramote prawn (*Melicertus kerathurus*), delta prawn (*Palaemon longirostris*), mantis shrimp (*Squilla mantis*), shamefaced crab (*Calappa granulata*) and Norway lobster (*Nephrops norvegicus*); molluscs including the Portuguese oyster (*Crassostrea angulata*), peppery furrow shell (*Scrobicularia plana*), squid (*Loligo vulgaris* and *Alloteuthis* sp.), common cuttlefish (*Sepia officinalis*), common octopus (*Octopus vulgaris*) and the musky octopus (*Eledone moschata*); and fish including the grey mullet (*Liza ramada*), sharpnose mullet (*L. saliens*), striped mullet (*Mugil cephalus*), thicklip grey mullet (*Chelon labrosus*), eel (*Anguilla anguilla*), European anchovy (*Engraulis encrassicolus*), sardine (*Sardina pilchardus*), meagre (*Argyrosomus regius*), hake (*Merluccius merluccius*), Senegal seabream (*Diplodus belloti*), white seabream (*Diplodus sargus*), common two-banded seabream (*Diplodus vulgaris*), Atlantic horse mackerel (*Trachurus trachurus*), black-bellied angler (*Lophius budegassa*), toadfish (*Halobatrachus didactylus*), transparent goby (*Aphia minuta*), black goby (*Gobius niger*), rock goby (*G. paganellus*), common gobies (*Pomatoschistus microps* and *P. minutus*), blenny (*Lipophrys trigloides*), boyer's sand smelt (*Atherina boyeri*), red mullet (*Mullus surmuletus*), garfish (*Belone belone*), clingfish (*Opeatogenys gracilis*), bastard grunt (*Pomadasis incisus*), spotted seabass (*Dicentrarchus punctatus*), bluefish (*Pomatomus saltatrix*), brown comber (*Serratus hepatus*), gilthead seabream (*Sparus aurata*), common mummichog (*Fundulus heteroclitus*), blue butterflyfish (*Stromateus fiatola*), five-spotted wrasse (*Symphodus roissali*), straightnose pipefish (*Nerophis ophidion*), greater pipefish (*Syngnatus acus*), seahorse (*Hippocampus hippocampus*), pompano (*Trachynotus ovatus*), shi drum (*Umbrina cirrhosa*), Senegalese sole (*Solea senegalensis*), common sole (*S. vulgaris*), Portuguese sole (*Synaptura lusitanica*), and the already mentioned wedge sole.

To complement the increased knowledge about the area, studies have been carried out concerning the abundance of crustaceans and annelids²⁴, especially at the mouth of the Guadalquivir River. These species include *Nereis diversicolor* and *Streblospio shrubsolii*, the amphipod *Corophium orientale*, and the mysids *Rhopalophthalmus tartessicus*, *Neomysis integer* and *Mesopodopsis slabberi*.

The importance of the mouth and estuary of the Guadalquivir River as a spawning and nursery ground for different species²⁵ led to the creation of a fishing reserve in 2004²⁶.

Many of the copepods of the coastal lagoons have also been the subject of study²⁷, including the identification of some species capable of living in both sweet and salt water, commonly found in briny lakes or estuaries. For example, *Arctodiaptomus salinus*, *A. wierzejskii*, *Oithona nana*, etc.

The appearance of turtles and cetaceans stranded on the coasts of Doñana²⁸ also indicates the presence of these animals in the area. These include the bottlenose dolphin (*Tursiops truncatus*), striped dolphin (*Stenella coeruleoalba*), common dolphin (*Delphinus delphis*), harbour porpoise (*Phocoena phocoena*), plot whale (*Globicephala melas*), Risso's dolphin (*Grampus griseus*), fin whale (*Balaenoptera physalus*), minke whale (*B. acutorostrata*) and the humpback whale (*Megaptera novaeangliae*), as well as the loggerhead turtle (*Caretta caretta*), green turtle (*Chelonia mydas*) and the leatherback turtle (*Dermochelys coriacea*).

We shouldn't overlook the information included in other studies that mention different marine species in the area. The Doñana Biological Station mentions a list of species in its field notes and Web page²⁹. Not all of these species were identified in the protected area possibly because some inhabit deeper waters than the ones in the park area. However, the list does include species that are characteristic of the Gulf and found both inside and outside the protected area.

Among these, more than 30 crustaceans, dozens of molluscs, over one hundred species of fish and other echinoderms, cnidarians, chordates, etc.



Hydraulic dredge in Doñana, in the B Area of the Guadalquivir river mouth fishing reserve, where this fishing gear is forbidden. © OCEANA/ Juan Cuetos

Decapod crustaceans: *Alpheus glaber*, *Atelecyclus undecimdentatus*, *Crangon crangon*, *Pontocaris lacazei*, *Dorippe lanata*, *Dromia personata*, *Goneplax rhomboides*, *Homola barbata*, *Ilia nucleus*, *Maja squinado*, *Pagurus alatus*, *P. prideauxi*, *Palaemon adspersus*, *P. elegans*, *P. longirostris*, *P. macrodactylus*, *P. serratus*, *Palaemonetes varians*, *Rhithropanopeus harrisi*, *Parthenope angulifrons*, *Carcinus maenas*, *Liocarcinus depurator*, *L. holsatus*, *L. vernalis*, *Polybius henslowii*, *Processa* sp., *Upogebia deltaura*, *Eriocheir sinensis* and *Pilumnus villosissimus*.

Stomatopod crustaceans: *Rissoides desmaresti* and *Sicyonia carinata*.

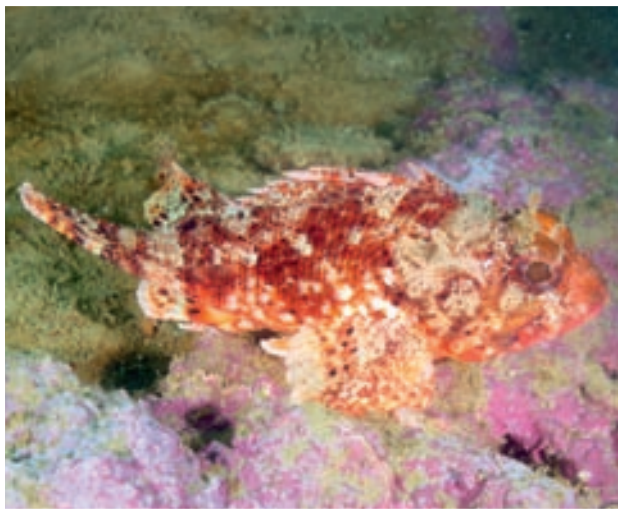
Osteichthyes fish: *Accipenser sturio*, *Anguilla anguilla*, *Conger conger*, *Echelus myrus*, *Ophisurus serpens*, *Atherina boyeri*, *Halobatrachus didactylus*, *Belone belone*, *Hemiramphus picarti*, *Alosa alosa*, *Alosa fallax*, *Sardina pilchardus*, *Sardinella aurita*, *Engraulis encrasicolus*, *Fundulus heteroclitus*, *Trisopterus luscus*, *Gadus morhua*, *Merluccius merluccius*, *Phycis phycis*, *Ammodytes tobianus*, *Lipophrys pavo*, *L. trigloides*, *Parablennius gattorugine*, *Brama brama*, *Callyonimus*

maculatus, *C. pusillus*, *C. reticulatus*, *Caranx ronchus*, *Lichia amia*, *Trachinotus ovatus*, *Trachurus trachurus*, *Spicara flexuosa*, *S. maena*, *Cepola rubescens*, *Aphia minuta*, *G. niger*, *Lesueurigobius sanzoi*, *Pomatoschistus microps*, *P. minutus*, *Parapristipoma octolineatum*, *Plectorhinchus mediterraneus*, *Pomadasys incisus*, *Coris julis*, *Symphodus bailloni*, *S. cinereus*, *Dicentrarchus labrax*, *D. punctatus*, *Chelon labrosus*, *Liza aurata*, *L. saliens*, *L. ramada*, *Mugil cephalus*, *Mullus barbatus*, *M. surmuletus*, *Pomatomus saltatrix*, *Argyrosomus regius*, *Umbrina canariensis*, *U. cirrhosa*, *Scomber japonicus*, *S. scombrus*, *Serranus cabrilla*, *S. hepatus*, *S. scriba*, *Boops boops*, *Dentex canariensis*, *D. gibbosus*, *Diplorus annularis*, *D. bellotti*, *D. puntazzo*, *D. sargus*, *D. vulgaris*, *Lithognathus mormyrus*, *Pagellus acarne*, *P. bellotti*, *P. erythrinus*, *Pagrus auriga*, *P. pagrus*, *Sarpa salpa*, *Sparus aurata*, *Spondylosoma cantharus*, *Sphyræna sphyraena*, *Stromateus fiatola*, *Echiichthys vipera*, *Trachinus draco*, *Uranoscopus scaber*, *Arnoglossus imperialis*, *A. linterna*, *A. thori*, *Bothus podas*, *Citharus linguatula*, *Scophtalmus rhombus*, *Buglossidium luteum*, *Dicologlossa cuneata*, *D. hexophthalma*, *Microchirus boscanion*, *Solea lascaris*, *S. senegalensis*, *S. vulgaris*, *Synaptura lusitanica*, *Scorpaena notata*, *Aspitrigla obscura*, *Lepidotrigla cavillone*, *Trigla lucerna*, *Hippocampus hippocampus*, *H. guttulatus*, *Syngnathus abaster*, *S. acus*, *Balistes capriscus* and *Sphoeroides spengleri*.

Chondrichthian fish: *Galeorhinus galeus*, *Mustelus mustelus*, *Dasyatis pastinaca*, *Gymnura altavela*, *Pteromylaeus bovinus*, *Raja asterias*, *R. clavata*, *R. miraletus*, *Torpedo marmorata*, *T. nobiliana* and *T. torpedo*.

Cefalaspidomorphi: *Petromyzon marinus*.

Cetaceans: *Balaenoptera acutorostrata*, *B. edeni*, *B. physalus*, *Delphinus delphis*, *Globicephala melas*, *Grampus griseus*, *Stenella coeruleoalba*, *Tursiops truncatus*, *Orcinus orca*, *Phocoena phocoena*, *Kogia breviceps*, *K. simas*, *Physeter macrocephalus*, *Mesoplodon densirostris* and *M. europaeus*.



Osteichthyes fish documented during Oceana campaigns. © OCEANA/ Carlos Minguell

Reptiles: *Caretta caretta*, *Chelonia mydas*, *Eretmochelys imbricata* and *Dermochelys coriacea*.

Cnidarians: *Aurelia aurita*.

Echinoderms: *Astropecten aranciacus*, *A. irregularis*, *Scichaster canaliferus*, *Echinocardium cordatum*, *Spatangus purpureus*, *Paracentrotus lividus* and *Holothuria* sp.



Starfish (*Coscinasterias tenuispina*) atop soft substrate with bioturbation.
© OCEANA/ Eduardo Sorensen

Bivalve molluscs: *Anadara diluvii*, *A. corbuloides*, *Atrina pectinata*, *Crassostrea angulata*, *Ostrea edulis*, *Anomia ephippium*, *Chlamys flexuosus*, *Pecten maximus*, *Acanthocardia aculeata*, *A. echinata*, *A. paucicostata*, *tuberculata*, *Cerastoderma edule*, *Donax trunculus*, *D. venustus*, *Maetra corallina*, *Pisidium* sp., *Scrobicularia plana*, *Pharus legumen*, *Solen marginatus*, *Chamelea gallina*, *Circomphalus casinus*, *Dosinia lupinus*, *Ruditapes decussatus*, *R. philippinarum* and *Venerupis rhomboides*.

Cephalopod molluscs: *Eledone moschata*, *Octopus vulgaris*, *Sepia officinalis*, *Sepietta neglecta*, *Sepiola atlantica*, *Alloteuthis media*, *A. subulata* and *Loligo vulgaris*.

Gastropod molluscs: *Aplysia depilans*, *Peringia ulvae*, *Murex brandaris*, *Hexaplex trunculus*, *Nassarius corniculus*, *N. reticulatus*, *Cymbium olla*, *Aporrhais pespelicani*, *Calyptrea chinensis*, *Turritella communis* and *Umbraculum mediterraneum*.

Polyplacaphora molluscs: *Chiton olivaceus*.

Scaphopod molluscs: *Dentalium* sp.

PROTECTED SITES IN THE GULF OF CÁDIZ

There are currently three marine protected areas in the Gulf of Cádiz (apart from the Straits natural park) and all of them are extensions of the protected coastal region.

Doñana National Park is both the largest and oldest protected area. Today, including the expansion of the natural park, the protected area has gone from 50,720 hectares to 104,970 hectares, although less than 5,000 hectares are marine areas.

The other marine protected areas in the Gulf of Cádiz are:

- Bahía de Cádiz Natural Park with 10,522 hectares of land and 4,955 hectares of proposed marine area.
- La Breña Natural Park and Marshes of Barbate, with 3,925 land hectares and 1,152 marine hectares.

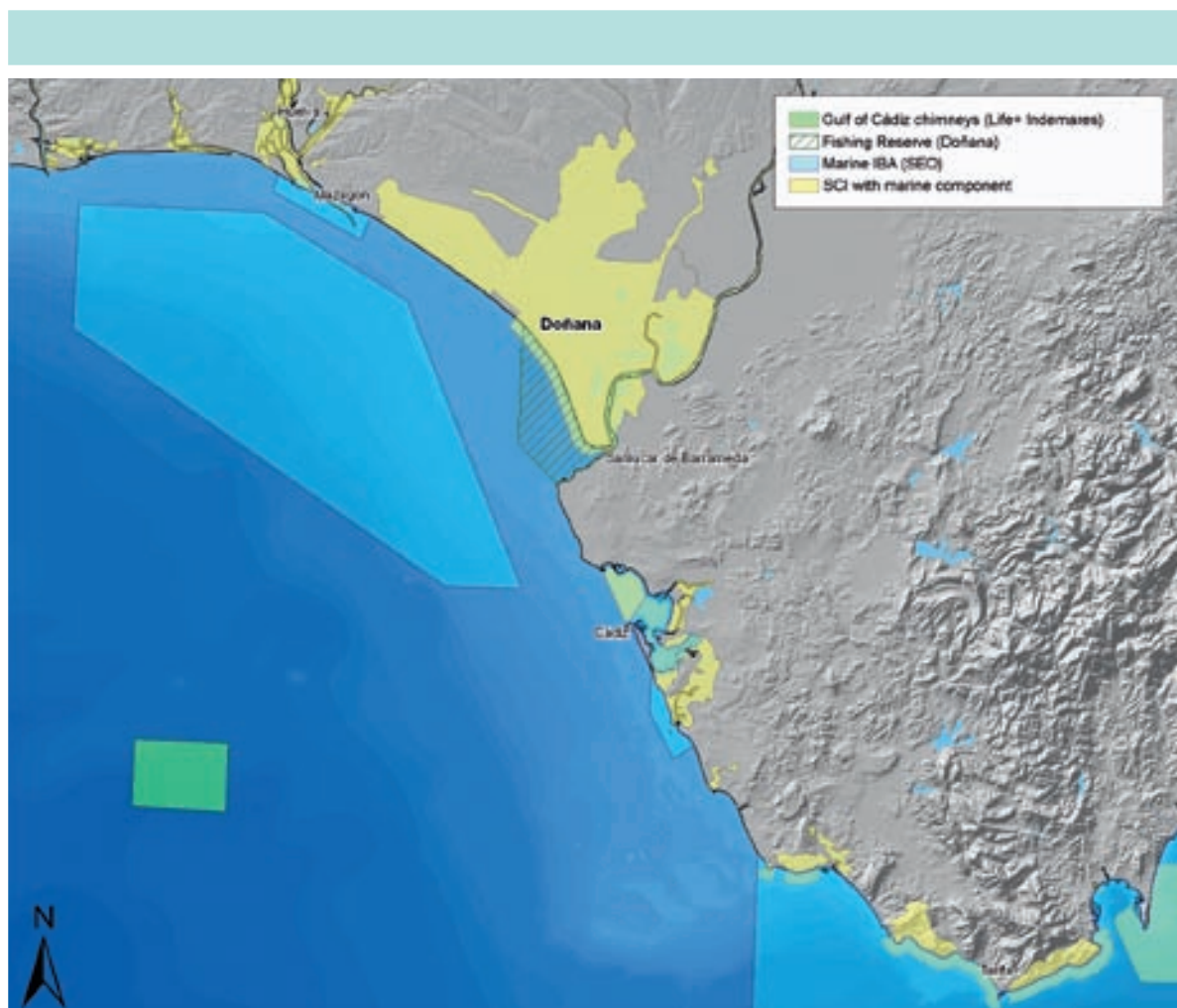


Figure 6. Protected areas in the Gulf of Cádiz (Source: SEO, REDIAM and INDEMARES)

Furthermore, the Fishing Reserve of the mouth of the Guadalquivir River³⁰, includes waters already included in the National Park and other adjacent areas, both in the river itself and in the eastern part of its mouth, covering roughly 19,000 hectares.

This gives a total of roughly 25,000 hectares of marine protected areas, or 2% of the Spanish EEZ in this gulf.

Currently, apart from the sites mentioned above, there are other coastal areas that are protected or pending protection and have been included in the Natura 2000 Network³¹. These include: the Fishing Corrals Natural Monuments in Rota, Tómbolo de Trafalgar, Punta del Boquerón, the Dunes of Bolonia and Cliff of Asperillo; the Natural Parks of Sancti Petri, the island of Trocadero, the Estuary of the Piedras River, the Marshes of Isla Cristina, the Marshes of the Piedras River and Flecha del Rompido; The Natural Park of the Marshes of Odiel; as well as Areas of Community Interest like Trafalgar Point, the Estuary of the Tinto River or the island of San Bruno.

There are also other initiatives underway to designate new protected sites in the area. These include the proposal to create two marine IBAs (Important Bird Area) recently presented by the SEO³² (Spanish Ornithology Society). One of these areas would include 236,600 hectares in the Gulf of Cádiz, starting roughly 6-15 kilometres from the coasts between Isla Cristina and Rota, and extending roughly 20 kilometres into open waters. The second area would include 6,060 hectares in front of the marshes of the Tinto and Odiel Rivers. The third area would overlap with the Gulf of Cádiz Natural Park.

Lastly, given that the protected marine areas are coastal and shallow areas, the need to create pelagic or deep-water protected marine areas is evident. As part of the development of the LIFE+ INDEMARES project³³, the mud volcanoes and domes in the Gulf of Cádiz have been chosen for future protection. These are located at 500-600 meters depth and roughly 60 miles from the coast, covering between 200,000 and 300,000 hectares.

This area, which has been the subject of numerous geological studies³⁴, harbours a variety of interesting biocenoses including communities of deep-water white corals (*Lophelia pertusa* and *Madrepora oculata*)³⁵, sinoglibid polychaete annelids³⁶ and other organisms³⁷, including molluscs, crustaceans and echinoderms, linked to these gas and cold gas-seeping seabeds and mud volcanoes.

Both the area being researched through LIFE+ INDEMARES and the one included in this proposal would contribute significantly to the conservation of the ecosystems and species in the Gulf of Cádiz, increasing the degree of representation of fauna and flora.



Fishermen at starboard in the purse seiner Manolo III rolling up the nets. Guadalquivir river mouth fishing reserve, area forbidden for purse seines. Doñana National Park, Huelva. © OCEANA/ Jesús Renedo



STATE OF THE FISHING SECTOR

GENERAL DESCRIPTION

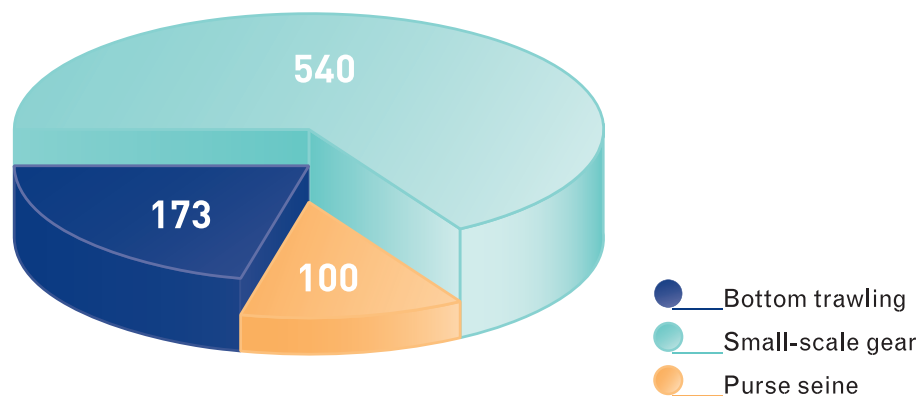
The Spanish Ministry of Agriculture, Fisheries and Food (MAPA, now MARM)³⁸ describes the fishing fleet in the Gulf of Cádiz as a mixed, multispecies fishery. The trawling, artisanal and seining fleets are worth mentioning, although according to the Operational Fleet Census³⁹ small-scale gear is the most relevant in terms of number of registered vessels, doubling the total of trawlers and seiners, and this fact makes this fleet particularly important in socio-economic terms, apart from its general eco-friendly nature. However, in terms of average tonnage, the trawling fleet is the most important and its environmental and economic costs exceed the others.

		Tonnage GT		Total length	Declared power	
Type of gear	No. vessels	Average	Total	Average	Average	Total
Bottom trawl	173	43.388	7,506.02	18.6	215.52	37,284.01
Small-scale gear	540	5.41	2,922.33	9	139.2	61,660.26
Purse seine	100	21.18	2,744.94	16.4	187.28	18,916
Total	813	23.326	13,173.29	14.66	180.66	117,860.27

Fleet in the Gulf of Cádiz Operational Fleet Census

Other fleets must also be taken into account, such as the dredger fleet that targets molluscs⁴⁰ with 122 vessels and is included in the census as small-scale gear; or the surface longlining fleet that targets large pelagic species like swordfish or sharks; or other single-species artisanal fleets like the almadraba that targets bluefin tuna (*Thunnus thynnus*), or the "voraceros" that target the blackspot seabream (*Pagellus bogaraveo*)⁴¹.

FLEET OF THE GULF OF CADIZ (No. of Vessels)



Part of the trawl and purse seine fleet operates in third-country fishing grounds, mainly north and east of Africa because of the poor state of resources in the Gulf of Cádiz, hence the importance of the artisanal fleet in this area. Furthermore, efforts to recover this fishing ground should be increased and focused on a national fishery based on sustainable exploitation of resources.

Available figures and data concerning the importance of the species caught in the Gulf of Cádiz come mainly from the fish market. As such, errors can be expected because some direct sales occur outside the market and, although this percentage is significant, the lack of data makes it difficult to estimate.

According to market data, the deep-water rose shrimp (*Parapenaeus longirostris*) and the striped venus (*Chamelea gallina*) are two of the most highly valued species and are caught mainly by bottom trawlers and dredgers. In addition, landed species include the octopus (*Octopus vulgaris*), the sardine (*Sardina pilchardus*) or the European anchovy (*Engraulis encrasicolus*).

Official market data			Main species landed	
Location	Total kg	Total Euros	In kg	In Euros
Algeciras	1,099,931	4,607,944.73	Horse mackerel (HOM), Bluefin tuna (BFT), Blackspot seabream (SBR), Blue jack mackerel (JAA)	Blackspot seabream (SBR), Bluefin tuna (BFT), Horse mackerel (HOM), Swordfish (SWO)
Ayamonte	1,352,566	7,064,692.97	Deep-water rose shrimp (DPS), European hake (HKE), octopus (OCC), blue whiting (WHB)	Deep-water rose shrimp (DPS), Norway lobster (NPS), European hake (HKE), octopus (OCC)
Barbate	3,155,257	6,719,106.07	European anchovy (ANE), sardine (PIL), chub mackerel (MAS), silver scabbardfish (SFS)	European anchovy (ANE), silver scabbardfish (SFS), sardine (PIL), octopus (OCC)
Bonanza	2,681,208	10,801,469.14	European anchovy (ANE), striped venus clam (SVE), sardine (PIL), deep-water rose shrimp (DPS)	Deep-water rose shrimp (DPS), caramote prawn (TGS), European anchovy (ANE), striped venus clam (SVE)
Cádiz	10,121,717	15,107,230.35	Senegalese hake (HKM), sardine (PIL), European anchovy (ANE), Silver John Dory (JOS)	Senegalese hake (HKM), European anchovy (ANE), angler (NMZ)
Chipiona	304,816.7	2,225,401.12	Wedge sole (CET), meagre (MGR), caramote prawn (TGS), cuttlefish (CTC)	Caramote prawn (TGS), wedge sole (CET), meagre (MGR), cuttlefish (CTC)
Conil	678,534.8	3,750,909.49	silver scabbardfish (SFS), octopus (OCC), rubberlip grunt (GBR), rock mullet (MUR)	Red porgy (RPG), rock mullet (MUR), silver scabbardfish (SFS), octopus (OCC)
Huelva	782,107.5	3,383,078.21	Deep-water rose shrimp (DPS), octopus (OCC), European hake (HKE), cuttlefish (CTC)	Deep-water rose shrimp (DPS), cuttlefish (CTC), octopus (OCC), caramote prawn (TGS)
Isla Cristina	6,214,830	22,177,959.24	Deep-water rose shrimp (DPS), striped venus clam (SVE), sardine (PIL), bullet tuna (BLT)	Deep-water rose shrimp (DPS), striped venus clam (SVE), Norway lobster (NPS), European hake (HKE)
Puerto Sta María	3,002,899	7,389,545.03	Chub mackerel (MAS), octopus (OCC), Deep-water rose shrimp (DPS), European hake (HKE)	Deep-water rose shrimp (DPS), chub mackerel (MAS), cuttlefish (CTC), octopus (OCC)
Punta Umbría	6,004,051	14,691,579.82	Sardine (PIL), striped venus clam (SVE), European anchovy (ANE), octopus (OCC)	Striped venus clam (SVE), sardine (PIL), European anchovy (ANE), octopus (OCC)
Rota	182,909.4	913,605.35	Meagre (MGR), octopus (OCC), rubberlip grunt (GBR), common pandora (PAC)	Meager (MGR), Senegalese sole (OAL), octopus (OCC), gilthead seabream (SBG)
Tarifa	827,120.9	6,686,135.81	Blackspot seabream (SBR), silver scabbardfish (SFS), bluefin tuna (BFT), blue jack mackerel (JAA)	Blackspot seabream (SBR), blue jack mackerel (JAA), bluefin tuna (BFT), silver scabbardfish (SFS)
Total	36,407,948	105,518,657.32		

Fish market sales in the Gulf of Cádiz (January-September 2009)

The MARM indicates the main target catches based on fishing gear and the most relevant ports for each type of fleet as follows:

- The trawling fleet targeting mainly hake (*Merluccius merluccius*), deep-water shrimp (*Parapenaeus longirostris*), Norway lobster (*Nephrops norvegicus*), common cuttlefish (*Sepia officinalis*) or octopus (*Octopus vulgaris*), based mainly in the ports of Isla Cristina, Huelva, El Puerto de Santa María and Sanlúcar de Barrameda.
- The artisanal fleet based mainly in Conil, Chipiona and Tarifa, targeting octopus (*Octopus vulgaris*), wedge sole (*Dicologlossa cuneata*), common cuttlefish (*Sepia officinalis*), rubberlip grunt (*Plectorhynchus mediterraneus*) and common Pandora (*Pagellus erythrinus*).
- The purse seine fleet based in Punta Umbría, Isla Cristina, Lepe, Huelva, Sanlúcar de Barrameda and Barbate targeting pelagic species including sardine (*Sardina pilchardus*), European anchovy (*Engraulis encrasicolus*), mackerel (*Scomber* sp.) and horse mackerel (*Trachurus trachurus*).

Detailed data is unavailable for other commercially exploited species such as the chondrichthyans. The Spanish Oceanographic Institute (IEO) continues carrying out studies on fish and fishery resources in general in the Gulf of Cádiz. Some of these studies are included in scientific journals and books⁴², while others have not been published yet. Part of this information has been presented in posters⁴³ during scientific congresses, listing a wide variety of species and providing information about distribution and abundance, including various chondrichthyans like *Galeus melasmotums*, *Scylliorhinus canicula*, *Leucoraja naevus*, *Raja clavata*, *Neoraja iberica*, *Torpedo marmorata*, *Chimaera monstrosa*, etc. Perhaps the most heavily exploited species among those listed is the tope shark (*Galeorhinus galeus*), although the overexploitation suffered by this species has led to the targeting of other shark species including the smooth-hound (*Mustelus mustelus*), the bluntnose sixgill shark (*Hexanchus griseus*) and the hammerhead shark (*Sphyrna* spp.)⁴⁴.



A ray (*Raja montagui*) for sale. © OCEANA/ M. Cornax

Other samples of various taxa collected in the area have shed light on the species that exist in Doñana and the Gulf of Cádiz, in general. For example, studies carried out almost 30 years ago⁴⁵ on crustaceans list more than 30 different species. These are: *Solenocera membranacea*, *Aristaeomorpha foliacea*, *Aristeus antennatus*, *Parapenaeus longirostris*, *Penaeopsis serrata*, *Pasiphaea sivado*, *Alpheus glaber*, *Processa canaliculata*, *Chlorotocus cassicornis*, *Heterocarpus ensifer*, *Plesionika acanthonothus*, *P. edwardsii*, *P. heterocarpus*, *P. martia*, *Pontophilus spinosus*, *Philoceras echinulatus*, *Nephrops norvegicus*, *Dardanus arrosor*, *Pagurus alatus*, *Pagurus variabilis*, *Munida intermedia*, *Homolabarbata*, *Medoripelanata*, *Macropipus depurator*, *M. tuberculatus*, *Bathynectes maravigna*, *Monodaeus couchii*, *Goneplax rhomboides*, *Pinnotheres pinnotheres*, *Inachus leptochirus*, *Macropopia longipes*, *Maja squinado*, *Squilla mantis* and *Parasquilla ferussaci*.

Fishing grounds in the Gulf of Cádiz

The fishing pressure in the Gulf of Cádiz is also reflected in the description of the fishing grounds (Annex II), where flat fish are the main target species, including the wedge sole (*Dicologlossa cuneata*), captured in 21 of the 40 fishing grounds described by the IEO⁴⁶, and sole⁴⁷ (*Solea vulgaris*) capture in 27 fishing grounds.

Trawl gear is used in all of the fishing grounds. This implies 57.5000 hectares in waters of the gulf, where bottom trawling is described in all fishing grounds except *Chipiona* and *Poniente de la Ricias*. Elasmobranchs are also usually targeted, although this fishery is not well known and it is believed to be developed in fishing grounds with hooks, including the area known as *Área del Laberinto*.

The area proposed by Oceana does not affect any of these fishing grounds, with the exception of a small part of *Matalascañas* and *El Inglesito*. However, it is a proven fact that the capacity of the fishing grounds in the Gulf of Cádiz has been exceeded, so the expansion of the Doñana marine area along with correct management and control of the fishing fleet would positively affect these fishing areas.



Alcyonium acaule in Bajo del Mohío de Dentro. © OCEANA/ Carlos Minguell

FISHING IN THE AREA PROPOSED BY OCEANA

The area is characterised by high biological productivity that fosters fishing production of species of high commercial value, mainly sparidae (seabream, pandora, white seabream, etc.), pleuronictiformes (wedge sole, sole and Senegals sole), crustaceans (prawn) or molluscs (cuttlefish, striped venus clam, peppery furrow shell).



Hydraulic dredges in Doñana National Park.
© OCEANA/ Jesús Renedo

The area considered by Oceana is the marine area that corresponds to the coastline between Rota and Mazagón. Fishing activities in the area proposed by Oceana for protection can be divided into two main sub-sectors:

- Zone 1: Area between the cities of Mazagón and Matalascañas.

A wide variety of fishing gear is used in this area to target a wide variety of species, including traps to catch octopus (*Octopus vulgaris*), trammel nets for common cuttlefish (*Sepia officinalis*) and sole (*Solea solea* and *S. senegalensis*), bottom trawling to catch sparidae and caramote prawns (*Melicertus kerathurus*) or hydraulic dredges for peppery furrow clams striped venus (*Chamellea gallina*) and handpicking for venus striped clams and other clam species including *Venerupis* and *Ruditapes*, among others.

- Zones 2 and 3: Area between the current Fishing Reserve at the mouth of the Guadalquivir and Rota.

The most important commercial species and the ones most frequently caught by the local artisanal fleets in areas near the mouth of the Guadalquivir are⁴⁸: Caramote prawn (*Melicertus kerathurus*), wedge sole (*Dicologlossa cuneata*), common cuttlefish (*Sepia officinalis*), meager (*Argyrosomus regius*), white seabream (*Diplodus sargus*), common pandora (*Pagellus erythrinus*), European seabass (*Dicentrarchus labrax*), hake (*Merluccius merluccius*), striped seabream (*Lithognathus mormyrus*), sole (*Solea vulgaris*) and bluefish (*Pomatomus saltatrix*).

Oceana's proposal does not include the reserve's river area, mainly exploited by the Trebujena fishery targeting baby eels and shrimp, which has been partially or totally banned.

The most important ports in the area are Bonanza, Chipiona and Rota in Zone 2 and 3, on the east end; and Huelva and Punta Umbria in the west or Zone 1. Of these, the port of Huelva receives the most landings from the Huelva trawling and freezing fleet operating in third countries and, on a smaller scale, the fresh landings of the local fleet, based in that area, which lands its catch in Huelva for commercial reasons.

The different fleets operating in the area include purse seine for small pelagic species, small-scale gear targeting a wide variety of species and, on a smaller scale, bottom trawling and bottom trawling combined with purse seine on a seasonal basis.

Purse seine

In the case of the purse seine fleet, there are 36 registered vessels, distributed between the ports of Punta Umbria and Sanlúcar de Barrameda, mainly targeting the European anchovy (*Engraulis encrasicolus*). However, this number can increase because some trawlers in the area temporarily switch gear to use purse seine⁴⁹.

Nevertheless, the small pelagic fishery constitutes an important activity in the area. The main coastal areas for the Sanlúcar fleet are located near the Fishing Reserve of the Mouth of the Guadalquivir, except zone A where only handpicking is authorised. However, this restriction is frequently infringed upon. Landings occur in Bonanza, with a high percentage of illegal landings in Bajo de Guía.

The Punta Umbría fleet frequently moves to the Matalascañas-Mazagón area to operate, and Mazagón is a popular illegal landing point.

Small-scale gear

Roughly 244 vessels are currently active in the area according to the small-scale vessel census, with base ports in Huelva, Rota, Sanlúcar or Chipiona. This sector of the fleet is characterised by the use of a wide variety of fishing gear targeting a wide variety of species. This group includes gear for shellfish (hydraulic or traditional dredges, among others), nets and trammel nets, as well as hooks. Currently, there is a series of technical measures in effect for fishing with small-scale gear in the Gulf of Cádiz, focused on regulating effort and minimising the juvenile catch⁵⁰. However, the application and control of this regulation is still a pending issue for fisheries management in the area, especially in this segment where controlling the entire chain of custody is very complicated.



Artisanal dredge in the port of Mazagón. © OCEANA/ Juan Cuetos

Many of the vessels included in this group are not associated to their port of registration; they are distributed along the coast on beaches and other fishing areas, depending on the chosen fishing areas.

These fishing communities do not have markets or authorised points of sale and are often located close to popular tourist areas. This fact, and the lack of control, makes it possible for most of the fleet using these locations to illegally distribute their catch to restaurants, especially during the summer months.

Concentration of the fishing fleet in the area under consideration ⁵¹			
Cádiz		Huelva	
Ports	Fishing communities and/or docking areas	Ports	Fishing communities and/or docking areas
Bonanza Chipiona Rota	Trebujena Las Piletas Bonanza Sanlúcar-Bajo de Guía	Punta Umbría Huelva Isla Cristina (Occasionally)	Pueblo Andaluz Matalascañas Matalascañas Campground Torre la Higuera Mazagón Port of Mazagón Huelva estuary and port area (11)

In addition, the beaches are used as docks by fishing vessels measuring less than 6 meters in length that are not registered and do not have fishing licenses. These vessels use trammel nets or traps and illegally catch and sell their catch. These vessels have been identified in Zone 1 and develop their activities around the sandstone slabs previously described.

Bottom trawling, alone and combined

Bottom trawling in national fishing grounds has been excluded from this section, despite the fact that it constitutes the main segment of the fishing fleet of the Gulf of Cádiz in economic terms, because it is focused on species of high commercial value like the deep-water rose prawn. This is because this fishing activity must be carried out a minimum of 6 nautical miles from the coast⁵² and, as such, is outside the area initially taken into consideration.



Use of rollers and chain on the sea anchor of a trawling net, in the province of Huelva.
© OCEANA/ M. Cornax

However, it must be pointed out that the area suffers many incursions from the trawling fleet, both from the fleet based in Sanlúcar targeting the caramote prawn in prohibited areas inside the fishing reserve of the mouth of the Guadalquivir, and from the fleet based in Huelva and Punta Umbría in the area between Mazagón-Matalascañas, targeting sparidae in shallow sandstone slabs, infringing the six-mile restriction.

The Andalusian government has carried out preventive actions to control illegal bottom trawling, including placing mixed artificial reefs (production-protection) along the coast in different areas between Matalascañas and the mouth of the Guadalquivir River⁵³.

Other infringements committed by the trawling fleet in this area include the use of special riggings (“copos ciegos”) to catch as many fish, and small fish, as possible, or the use of a device known as “tren de bolos” (rollers) that was banned in 2006⁵⁴. This device is especially harmful in shallow areas where juveniles of many species aggregate, such as sole.

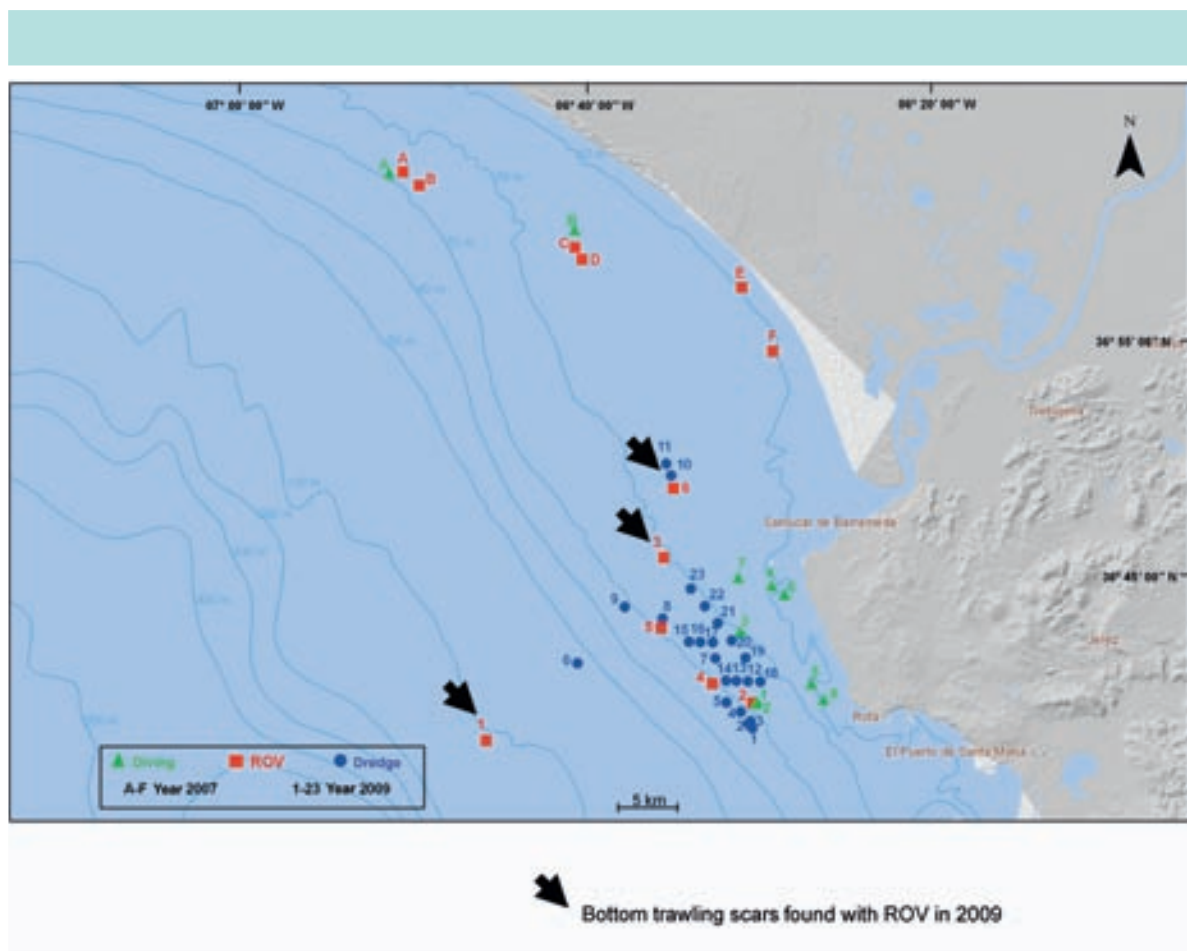


Figure 7. Bottom trawling scars found with ROV in 2009. © OCEANA

Recreational fishing

In 2004, the census of the 6th and 7th registries in the provinces of Cádiz and Huelva included 8,662 motor vessels⁵⁵, and most of these held recreational fishing licenses for the Autonomous Region or for fishing in waters managed by the federal government.

The ports in the area under consideration, that is Mazagón, El Puerto de Santa María, Chipiona and Rota alone, have roughly 1,619 moors⁵⁶, and most are occupied by motorboats equipped for recreational fishing.

Despite the autonomous regulations currently in effect, there are no control measures in place for these vessels. Their activity is developed both in the waters of the Mazagón-Matalascañas areas by the vessels in the port of Mazagón, and in the areas of the mouth of the Guadalquivir River and the fishing reserve by vessels from the ports of Chipiona and Rota.

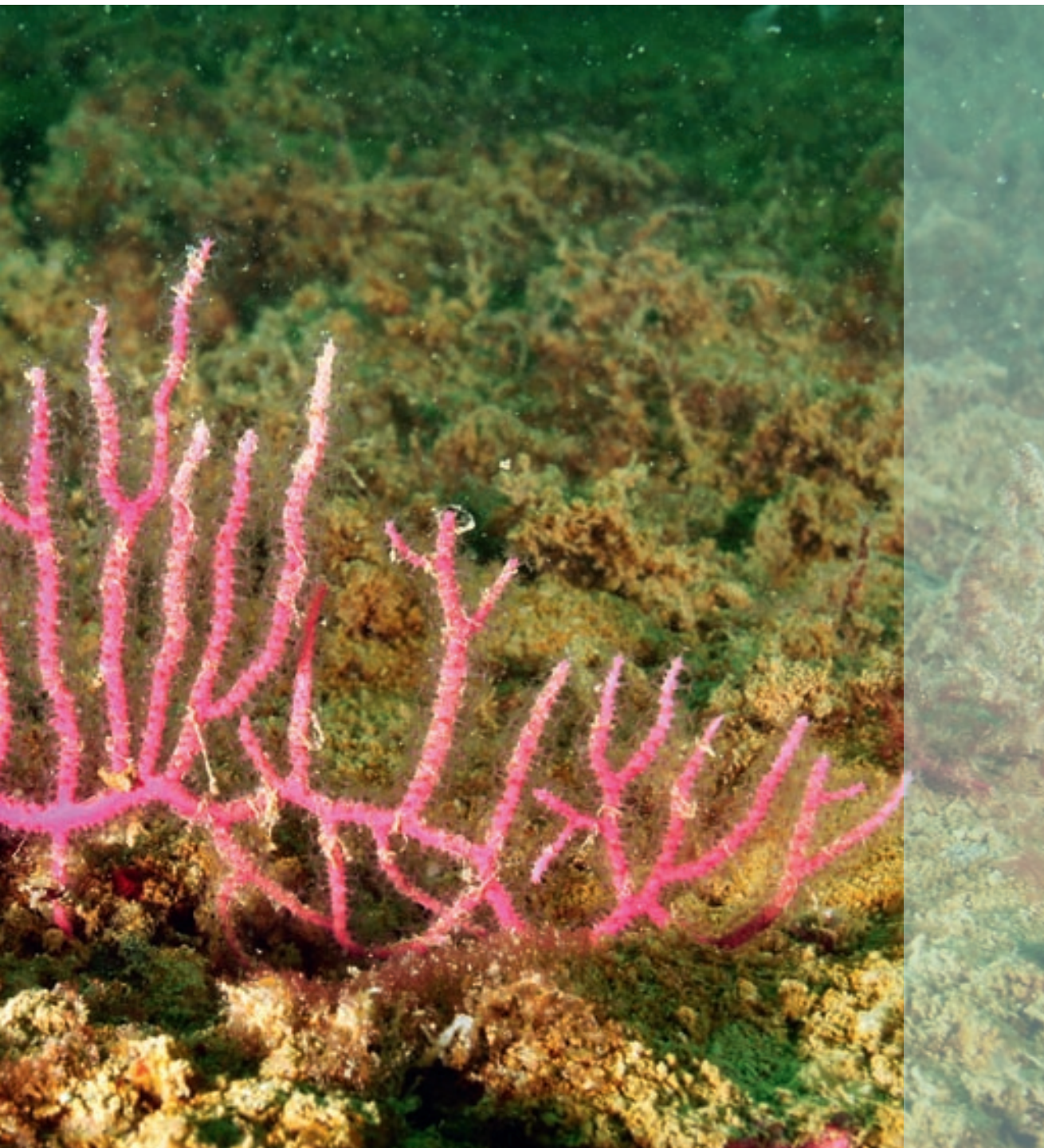
This fleet has a significant impact on fishing resources, and the effects of anchoring over ecologically important areas should be quantified and prevented if these habitats are to be adequately conserved and protected. Clear examples are the coral and gorgonian beds of the Mazagón-Matalascañas area, which is frequented by this fleet to catch sparidae.



Myriapora truncata in Bajo del Mohío de Dentro. © OCEANA/ Carlos Minguell

Gorgonian (*Leptogorgia sarmentosa*). Bajo del Mohío de Dentro, Cádiz. © OCEANA/ Carlos Minguell





ANNEX I

Species in the area proposed for protection

Plants		
<i>Zostera marina</i>		
Chlorophycean species		
<i>Blidingia mariginata</i>	<i>Blidingia minima</i>	
Phaeophycean species		
<i>Cystoseira usneoides</i>	<i>Dictyota dichotoma</i>	<i>Halopteris filicina</i>
<i>Sargassum vulgare</i>		
Rhodophycean species		
<i>Ceramium rubrum</i>	<i>Erythrotrichia carnea</i>	<i>Gelidium latifolium</i>
<i>Halymenia floresia</i>	<i>Lithophyllum</i> cf. <i>stictaeforme</i>	<i>Mesophyllum</i> sp.
<i>Peyssonnelia squamaria</i>	<i>Plocamium cartilagineum</i>	<i>Polyides rotundus</i>
<i>Polysiphonia scopulorum</i>		
Poriferans		
<i>Acanthella acuta</i>	<i>Aplysina aerophoba</i>	<i>Axinella damicornis</i>
<i>Crambe crambe</i>	<i>Hemymicale columella</i>	cf. <i>Phorbas fictitius</i>
Polychaetes		
<i>Hydroides</i> cf. <i>norvegicus</i>	<i>Myxicola infundibulum</i>	<i>Nereis diversicolor</i>
<i>Protula tubularia</i>	<i>Polydora</i> sp.	<i>Sabella pavonina</i>
<i>Serpula vermicularis</i>	<i>Streblospio shrubsolii</i>	
Echiuroids		
<i>Bonellia viridis</i>		
Cnidarians		
<i>Aiptasia mutabilis</i>	<i>Alcyonium palmatum</i>	<i>Alicia mirabilis</i>
<i>Anemonia sulcata</i>	<i>Aurelia aurita</i>	<i>Calliactis parasitica</i>
<i>Caryophyllia</i> cf. <i>smithii</i>	<i>Caryophyllia</i> sp.	cf. <i>Corynactis viridis</i>
<i>Dendrophyllia cornigera</i>	<i>Dendrophyllia ramea</i>	<i>Epizoanthus</i> cf. <i>arenaceus</i>
<i>Eunicella gazella</i>	<i>Eunicella verrucosa</i>	<i>Halocordyle disticha</i>
<i>Leptogorgia sarmentosa</i>	<i>Nemertesia anteninna</i>	<i>Parerythropodium coralloides</i>
<i>Paralcyonium spinulosum</i>	<i>Parazoanthus axinellae</i>	cf. <i>Polycyathus muellerae</i>
<i>Rhizostoma pulmo</i>	cf. <i>Synthecium evansi</i>	
Bryozoans		
cf. <i>Caberea ellisii</i>	<i>Chartella</i> sp.	<i>Myriapora truncata</i>
<i>Pentapora foliacea</i>	<i>Pentapora</i> cf. <i>ottomulleriana</i>	<i>Turbicellepora magnicostata</i>
Crustaceans		
<i>Alpheus glaber</i>	<i>Arctodiaptomus salinus</i>	<i>Arctodiaptomus wierzejskii</i>
<i>Atelecyclus undecimdentatus</i>	<i>Calappa granulata</i>	<i>Carcinus maenas</i>
<i>Chthamalus stellatus</i>	<i>Cibanarius arthropus</i>	<i>Corophium orientale</i>

<i>Crangon crangon</i>	<i>Dorippe lanata</i>	<i>Dromia personata</i>
<i>Eriocheir sinensis</i>	<i>Goneplax rhomboides</i>	<i>Homola barbata</i>
<i>Ilia nucleus</i>	<i>Liocarcinus depurator</i>	<i>Liocarcinus holsatus</i>
<i>Necora puber</i>	<i>Liocarcinus vernalis</i>	<i>Maja squinado</i>
<i>Melicertus kerathurus</i>	<i>Macropodia</i> sp.	<i>Mesopodopsis slabberi</i>
<i>Neomysis integer</i>	<i>Nephrops norvegicus</i>	<i>Oithona nana</i>
<i>Paguristes</i> sp.	<i>Pagurus alatus</i>	<i>Pagurus prideauxi</i>
<i>Palaemon adspersus</i>	<i>Palaemon elegans</i>	<i>Palaemon longirostris</i>
<i>Palaemon macrodactylus</i>	<i>Palaemon serratus</i>	<i>Palaemonetes varians</i>
<i>Parapenaeus longirostris</i>	<i>Derilambrus angulifrons</i>	<i>Pilumnus hirtellus</i>
<i>Polybius henslowii</i>	<i>Pontocaris lacaseis</i>	<i>Pilumnus villosissimus</i>
<i>Rhithropanopeus harrisi</i>	<i>Rhopalophthalmus tartessicus</i>	<i>Processa</i> sp.
<i>Sicyonia carinata</i>	<i>Squilla mantis</i>	<i>Rissoides desmaresti</i>
<i>Upogebia deltaura</i>		
Molluscs		
<i>Acanthocardia aculeata</i>	<i>Acanthocardia echinata</i>	<i>Acanthocardia paucicostata</i>
<i>Acanthocardia</i> sp.	<i>Acanthocardia tuberculata</i>	<i>Acirsa</i> sp.
<i>Alloteuthis media</i>	<i>Alloteuthis subulata</i>	<i>Anadara corbuloides</i>
<i>Anadara diluvii</i>	<i>Anomia ehippium</i>	<i>Aplysia depilans</i>
<i>Aporrhais pespelicani</i>	<i>Atrina pectinata</i>	<i>Calliostoma zizyphinum</i>
<i>Calyptrea chilensis</i>	<i>Cerastoderma edule</i>	<i>Cerithium</i> sp.
<i>Chamelea gallina</i>	<i>Chauvetia</i> sp.	<i>Chiton olivaceus</i>
<i>Chlamys flexuosus</i>	<i>Circomphalus casinus</i>	<i>Crassostrea angulata</i>
<i>Cymbium olla</i>	<i>Dentalium</i> sp.	<i>Donax trunculus</i>
<i>Donax venustus</i>	<i>Dosinia lupinus</i>	<i>Eledone moschata</i>
<i>Ensis</i> sp.	<i>Flabellina</i> sp.	<i>Gibbula divaricata</i>
<i>Hexaplex trunculus</i>	<i>Hypselodoris tricolor</i>	<i>Loligo vulgaris</i>
<i>Mactra corallina</i>	<i>Monodonta turbinata</i>	<i>Bolinus brandaris</i>
<i>Nassarius corniculus</i>	<i>Nassarius reticulatus</i>	<i>Octopus vulgaris</i>
<i>Ostrea edulis</i>	<i>Pecten Maximus</i>	<i>Peringia ulvae</i>
<i>Pharus legumen</i>	<i>Pisidium</i> sp.	<i>Ruditapes decussatus</i>
<i>Ruditapes philippinarum</i>	<i>Scrobicularia plana</i>	<i>Sepia officinalis</i>
<i>Sepietta neglecta</i>	<i>Sepiola atlantica</i>	<i>Solen marginatus</i>
<i>Thracia</i> cf. <i>villosiuscula</i>	<i>Turritella communis</i>	<i>Umbraculum mediterraneum</i>
<i>Venerupis rhomboides</i>		
Echinoderms		
<i>Astropecten aranciacus</i>	<i>Astropecten irregularis</i>	<i>Echinaster sepositus</i>

<i>Echinocardium cordatum</i>	<i>Coscinasterias tenuispina</i>	<i>Holothuria</i> sp.
<i>Holothuria tubulosa</i>	<i>Ophiura texturata</i>	<i>Paracentrotus lividus</i>
<i>Scichaster canaliferus</i>	<i>Spatangus purpureus</i>	
Tunicates		
<i>Didemnum</i> sp.	<i>Diplosoma</i> sp.	<i>Microcosmus</i> sp.
cf. <i>Molgula</i> sp.	<i>Phallusia mamillata</i>	<i>Polycitor</i> cf. <i>adriaticus</i>
<i>Polysincraton lacazei</i>	<i>Pycnoclavella taureanensis</i>	cf. <i>Stolonica socialis</i>
<i>Styela clava</i>	<i>Styela plicata</i>	<i>Synoicum</i> sp.
Fish		
<i>Accipenser sturio</i>	<i>Alosa alosa</i>	<i>Alosa fallax</i>
<i>Ammodytes tobianus</i>	<i>Anguilla anguilla</i>	<i>Aphia minuta</i>
<i>Argyrosomus regius</i>	<i>Arnoglossus imperialis</i>	<i>Arnoglossus linterna</i>
<i>Arnoglossus thori</i>	<i>Aspitrigla obscura</i>	<i>Atherina boyeri</i>
<i>Balistes capriscus</i>	<i>Belone belone</i>	<i>Boops, boops</i>
<i>Bothus podas</i>	<i>Brama brama</i>	<i>Buglossidium luteum</i>
<i>Callyonimus maculatus</i>	<i>Callyonimus pusillus</i>	<i>Callyonimus reticulotes</i>
<i>Caranx ronchus</i>	<i>Cepola rubescens</i>	<i>Chelon labrosus</i>
<i>Citharus linguatula</i>	<i>Conger coger</i>	<i>Coris julis</i>
<i>Coryphaena hippurus</i>	<i>Ctenolabrus rupestris</i>	<i>Dactylopterus volitans</i>
<i>Dasyatis pastinaca</i>	<i>Dentex canariensis</i>	<i>Dentex gibbosus</i>
<i>Dicentrarchus labrax</i>	<i>Dicentrarchus punctatus</i>	<i>Dicologlossa cuneata</i>
<i>Dicologlossa hexophthalma</i>	<i>Diplorus annularis</i>	<i>Diplorus bellotti</i>
<i>Diplorus cervinus</i>	<i>Diplorus puntazzo</i>	<i>Diplorus sargus</i>
<i>Diplorus vulgaris</i>	<i>Echelus myrus</i>	<i>Echiichthys vipera</i>
<i>Engraulis encrasicolus</i>	<i>Euthynnus alleteratus</i>	<i>Fundulus heteroclitus</i>
<i>Gadus morhua</i>	<i>Galeorhinus galeus</i>	<i>Galeus melastomus</i>
<i>Gobius niger</i>	<i>Gobius paganellus</i>	<i>Gymnura altavela</i>
<i>Halobatrachus didactylus</i>	<i>Hemiramphus picarti</i>	<i>Hippocampus guttulatus</i>
<i>Hippocampus hippocampus</i>	<i>Lepidotrigla cavillone</i>	<i>Lesueurigobius Sanzio</i>
<i>Leucoraja naevus</i>	<i>Lichia amia</i>	<i>Lipophrys pavo</i>
<i>Lipophrys trigloides</i>	<i>Lithognathus mormyrus</i>	<i>Liza aurata</i>
<i>Liza ramada</i>	<i>Liza saliens</i>	<i>Lophius budegassa</i>
<i>Megalops atlanticus</i>	<i>Merluccius merluccius</i>	<i>Microchirus boscanion</i>
<i>Mola mola</i>	<i>Mugil cephalus</i>	<i>Mullus barbatus</i>
<i>Mullus surmuletus</i>	<i>Mustelus mustelus</i>	<i>Neoraja iberica</i>
<i>Myliobatis aquila</i>	<i>Pseudotolithus</i> sp.	<i>Nerophis ophidion</i>
<i>Oblada melanura</i>	<i>Opeatogenys gracilis</i>	<i>Pagellus bellotti</i>

<i>Ophisurus serpens</i>	<i>Pagellus acarne</i>	<i>Pagrus auriga</i>
<i>Pagellus bogaraveo</i>	<i>Pagellus erythrinus</i>	<i>Parapristipoma octolineatum</i>
<i>Pagrus pagrus</i>	<i>Parablennius gattorugine</i>	<i>Pomadasy s incisus</i>
<i>Phycis phycis</i>	<i>Plectorhinchus mediterraneus</i>	<i>Pomatoschistus minutus</i>
<i>Pomatomus saltatrix</i>	<i>Pomatoschistus microps</i>	<i>Rachycentron canadum</i>
<i>Psetta maxima</i>	<i>Pteromylaeus bovinus</i>	<i>Raja asterias</i>
<i>Raja brachyura</i>	<i>Raja undulata</i>	<i>Ranzamia laevis</i>
<i>Raja clavata</i>	<i>Raja miraletus</i>	<i>Sarda sarda</i>
<i>Rhinobatos cemiculus</i>	<i>Rhinobatos rhinobatos</i>	<i>Sarpa salpa</i>
<i>Sardina pilchardus</i>	<i>Sardinella aurita</i>	<i>Scophtalmus rhombus</i>
<i>Scomber japonicus</i>	<i>Scomber scombrus</i>	<i>Scorpaena scrofa</i>
<i>Scorpaena notata</i>	<i>Scorpaena porcus</i>	<i>Serranus hepatus</i>
<i>Scylliorhinus canicula</i>	<i>Serranus cabrilla</i>	<i>Solea senegalensis</i>
<i>Serranus scriba</i>	<i>Solea lascaris</i>	<i>Sphoeroides spengleri</i>
<i>Solea vulgaris</i>	<i>Sparus aurata</i>	<i>Spicara flexuosa</i>
<i>Sphyaena sphyaena</i>	<i>Sphyrna</i> sp.	<i>Squatina squatina</i>
<i>Spicara maena</i>	<i>Spondylosoma cantharus</i>	<i>Symphodus cinereus</i>
<i>Stromateus fiatola</i>	<i>Symphodus bailloni</i>	<i>Synaptura lusitanica</i>
<i>Symphodus roissali</i>	<i>Symphodus tinca</i>	<i>Syngnathus acus</i>
<i>Syngnathus abaster</i>	<i>Synodus saurus</i>	<i>Torpedo nobiliana</i>
<i>Thunnus thynnus</i>	<i>Torpedo marmorata</i>	<i>Trachinus draco</i>
<i>Torpedo torpedo</i>	<i>Trachinotus ovatus</i>	<i>Trigla lucerna</i>
<i>Trachurus trachurus</i>	<i>Trachynotus ovatus</i>	<i>Trisopterus luscus</i>
<i>Trigla lyra</i>	<i>Trigloporus lastoviza</i>	<i>Uranoscopus scaber</i>
<i>Umbrina canariensis</i>	<i>Umbrina cirrhosa</i>	<i>Xiphias gladius</i>
Cefalaspodomorphi		
<i>Petromyzon marinus</i>		
Cetaceans		
<i>Balaenoptera acutorostrata</i>	<i>Balaenoptera edeni</i>	<i>Balaenoptera physalus</i>
<i>Delphinus delphis</i>	<i>Globicephala melas</i>	<i>Grampus griseus</i>
<i>Stenella coeruleoalba</i>	<i>Tursiops truncatus</i>	<i>Orcinus orca</i>
<i>Phocoena phocoena</i>	<i>Kogia breviceps</i>	<i>Kogia simus</i>
<i>Physeter macrocephalus</i>	<i>Megaptera novaeangliae</i>	<i>Mesoplodon densirostris</i>
<i>Mesoplodon europaeus</i>		
Reptiles		
<i>Caretta caretta</i>	<i>Chelonia mydas</i>	<i>Eretmochelys imbricata</i>
<i>Dermochelys coriacea</i>		

Hydraulic dredge in Doñana, in the B Area of the Guadalquivir river mouth fishing reserve, where this fishing gear is forbidden. Huelva.
© OCEANA/ Juan Cuetos





ANNEX II

Fishing grounds in the Gulf of Cádiz

Description of the fishing grounds in the Gulf of Cádiz ⁵⁷				
No.	Fishing ground	Ha	Declared target species	Fishing gear
1	La Escama	3,938.66	Wedge sole-Sole-Small squid-Cuttlefish-Octopus-Horse mackerel-European anchovy-Sparidae-Squid	Traditional-Breca or Raspita-Cadenero-Boquerón
2	La Antilla-Punta Umbría area	41,800	Wedge sole-Sole-Small squid-Cuttlefish-Octopus-Horse mackerel-European anchovy-Hake-Sparidae-Squid	Traditional-Breca or Raspita-Cadenero-Boquerón
2a	El Labra	1,599.64	Wedge sole-Sole-Prawn-Cuttlefish-Octopus-Sparidae-Sand steenbras	Traditional-Breca or Raspita-Cadenero-Boquerón
2b	Los Toreros-La Abierta	2,808.5	Wedge sole-Sole-Prawn-Cuttlefish-Octopus-Sparidae-Sand steenbras	Traditional-Breca or Raspita-Cadenero-Boquerón
2c	El Zapato	1351,91	Wedge sole-Sole-Cuttlefish-Octopus-Sparidae	Traditional-Breca or Raspita-Cadenero-Boquerón
3	El Picacho - Torre del Loro area	15,900	Wedge sole-Sole-Small squid-Cuttlefish-Octopus-Horse mackerel-European anchovy-Hake-Sparidae-Squid	Traditional-Breca or Raspita-Cadenero-Boquerón
3a	El Loro	637.578	Wedge sole-Sole-Cuttlefish-Octopus-Hake-Sparidae-Sand steenbras-Squid	Traditional-Breca or Raspita-Cadenero-Boquerón
4	La Higuera area	16,400	Wedge sole-Sole-Small squid-Cuttlefish-Octopus-Horse mackerel-European anchovy-Hake-Sparidae-Squid	Traditional-Breca or Raspita-Cadenero-Boquerón
4a	La Higuera	2,849.17	Wedge sole-Sole-Cuttlefish-Octopus-Hake-Sparidae-Squid	Traditional-Breca or Raspita-Cadenero-Boquerón
4b	Las Arenas	3,278.98	Wedge sole-Sole-Cuttlefish-Octopus-Hake-Sparidae-Squid	Traditional-Breca or Raspita-Cadenero-Boquerón
4c	Cuerpo de las Arenas	9,336.54	Wedge sole-Sole-Cuttlefish-Octopus-Hake-Sparidae-Squid	Traditional-Breca or Raspita-Cadenero-Boquerón
5	Matalascañas area	17,800	Wedge sole-Sole-Small squid-Cuttlefish-Octopus-Horse mackerel-European anchovy-Hake-Sparidae-Squid	Traditional-Breca or Raspita-Cadenero-Boquerón
5a	Matalascañas	7,740.1	Wedge sole-Sole-Prawn-Cuttlefish-Octopus-Hake-Sparidae-Squid	Traditional-Breca or Raspita-Cadenero
5b	La Barrosa	5,596.95	Wedge sole-Sole-Prawn-Cuttlefish-Octopus-Hake-Sparidae-Squid	Traditional-Breca or Raspita-Cadenero
5c	Las Veinte	1,536.37	Wedge sole-Sole-Cuttlefish-Octopus-Hake-Sparidae-Squid	Traditional-Breca or Raspita-Cadenero
6	Placer de Sanlucar-Carbonero area	12,500	Wedge sole-Sole-Cuttlefish-Horse mackerel-European anchovy-Sparidae-Sand steenbras-Squid	Traditional-Breca or Raspita-Cadenero-Boquerón
6a	El Chucho	5,041.1	Wedge sole-Sole-Prawn-Cuttlefish-Octopus-Hake-Sparidae-Sand steenbras-Squid	Traditional-Breca or Raspita-Cadenero
6b	El Inglesillo	1,450.11	Wedge sole-Sole-Prawn-Cuttlefish-Octopus-Hake-Sparidae-Sand steenbras-Squid	Traditional-Breca or Raspita-Cadenero

Description of the fishing grounds in the Gulf of Cádiz⁵⁷

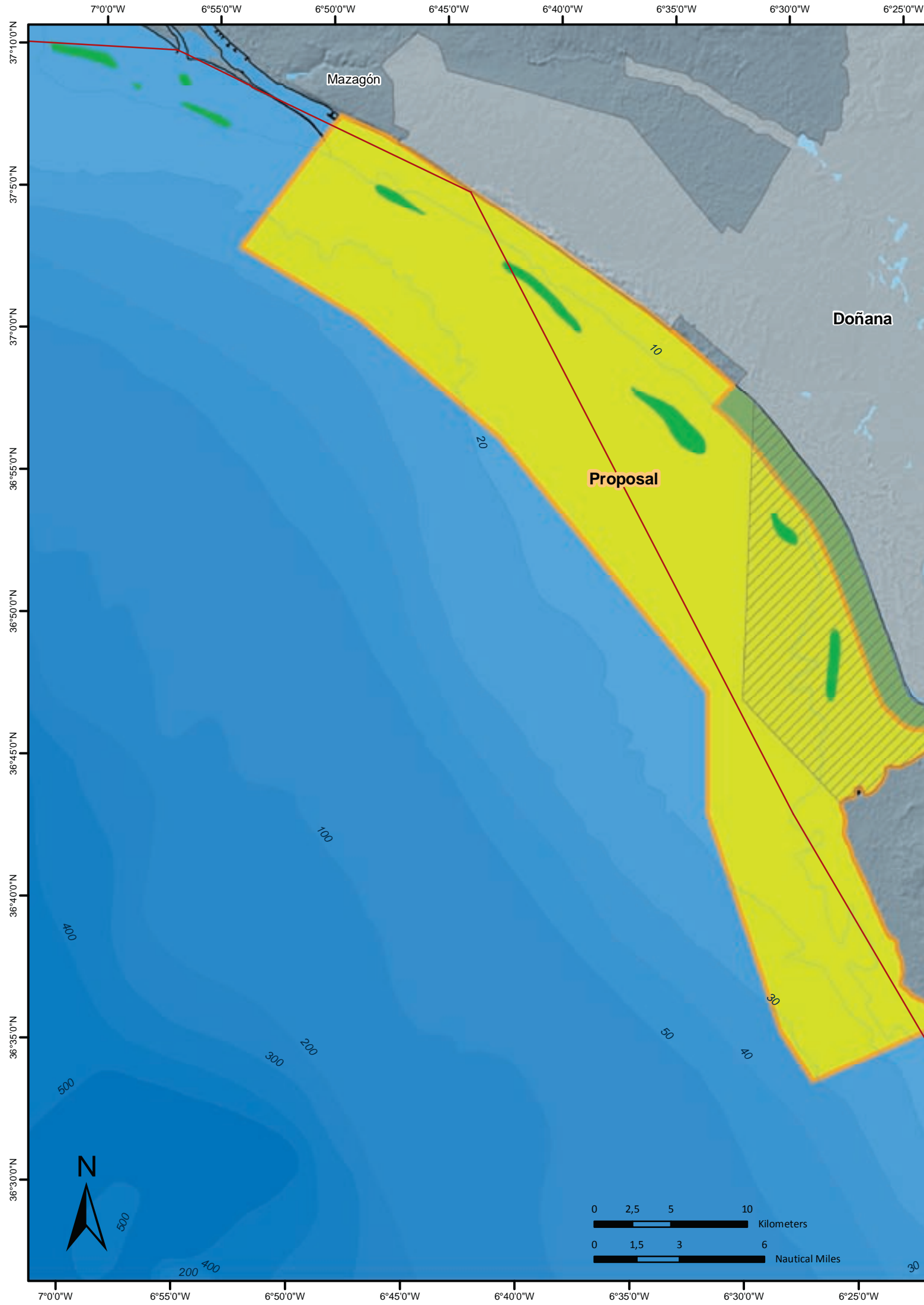
No.	Fishing ground	Ha	Declared target species	Fishing gear
6c	De Canto a Canto	5,522.37	Wedge sole-Sole-Prawn-Cuttlefish-Octopus-Hake-Sparidae-Sand steenbras-Squid	Traditional-Breca or Raspita-Cadenero
7a	La Foraira	50,300	Wedge sole-Sole-Cuttlefish-Horse mackerel-Hake-Sparidae-Sand steenbras-Squid	Traditional-Breca or Raspita-Cadenero-Boquerón
7b	La Culata	18,000	Wedge sole-Sole-Small cuttlefish-Small squid-Cuttlefish-Horse mackerel-Hake-Sparidae-Sand steenbras-Mullet	Traditional-Breca or Raspita-Cadenero-Boquerón
8	El Limpio	15,100	Sole-Cuttlefish-Octopus-Horse mackerel-Hake-Sparidae-Squid-Mullet	Traditional-Breca or Raspita-Cadenero-Boquerón
9	El Azotal	14,500	Sole-Cuttlefish-Octopus-Horse mackerel-Sparidae-Mullet	Traditional-Breca or Raspita-Cadenero-Boquerón-Tablilla
10	Poniente de las Ricias	2,373.34	Sole-Cuttlefish-Octopus-Sparidae-Mullet	Trammel nets-Solta-Rastro-Squid hooks-Online-Tablilla
11a	El Cerro del Pasto	1,069.72	Sole-Cuttlefish-Octopus-Monkfish-Sparidae-Mullet	Traditional-Breca or Raspita-Cadenero-Tablilla
11b	La Noria	7,770	Sole-Cuttlefish-Octopus-Monkfish-Sparidae-Mullet	Traditional -Breca or Raspita-Cadenero-Tablilla
11c	La Piojera	5,404.51	Sole-Cuttlefish-Monkfish-Sparidae-Mullet	Traditional-Breca or Raspita-Cadenero
12	El Banco	27,300	Seabream-Octopus-Hexaplex-Humboldt squid-Banded chione-	Traditional-Breca or Raspita-Cadenero-Boquerón-Tangonero
13	El Terrón	21,200	Shrimp-Norway lobster-Small cuttlefish-Horse mackerel-Monkfish-Blue whiting-Hake	Traditional-Breca or Raspita-Cadenero-Boquerón-Tangonero
14	Chipiona	24,300	Shrimp-Norway lobster-Small cuttlefish-Horse mackerel-Monkfish-Blue whiting-Hake-Squid	Tangonero-Traditional-Breca or Raspita-Cadenero-Boquerón
15	El Carrichal	40,600	Norway lobster-Monkfish-Blue whiting	Traditional-Breca or Raspita-Cadenero-Tangonero
16	Laberinto area	53,500	Norway lobster	Traditional-Tangonero
16a	Punta del Laberinto	5,740.25	Norway lobster	Traditional-Tangonero
16b	Cabezos del Laberinto	8,907.55	Norway lobster	Traditional-Tangonero
16c	Cabezo Chico	1,856.53	Norway lobster	Traditional-Tangonero
16d	Playa Fuera de Morunos	9,751.32	Norway lobster	Traditional-Tangonero
16e	La Condesa	14,800	Norway lobster	Traditional-Tangonero
17	Playa Chica	8,261.35	Norway lobster-Monkfish-Blue whiting	Traditional-Tangonero
18	El Gorrión	43,300	Shrimp-Monkfish-Hake	Traditional-Tangonero
19	El Cruce	25,700	Monkfish-Blue whiting-Hake	Traditional

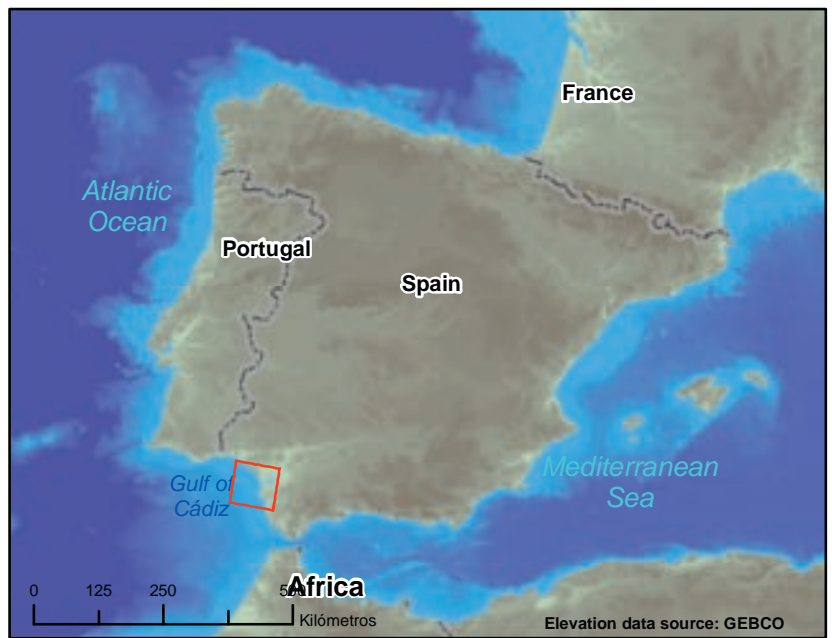
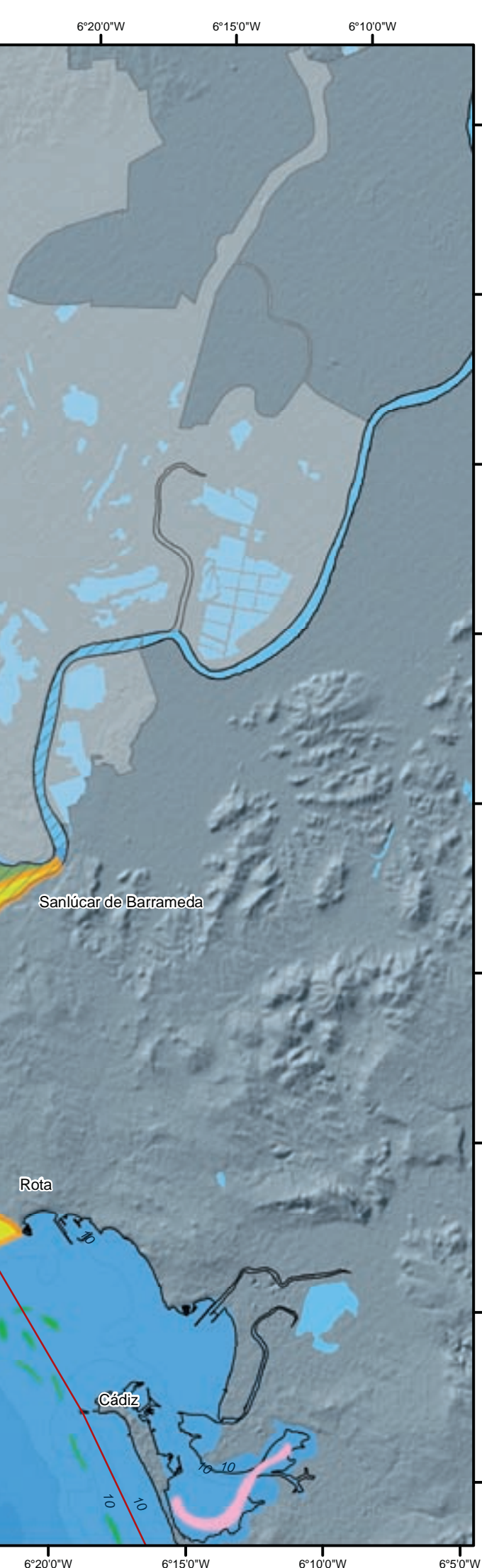
Coral (*Dendrophyllia ramea*) in the protection area proposed by Oceana. South of Salmédina seamount, Cádiz. © OCEANA/ Eduardo Sorensen






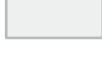

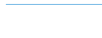
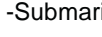


ANNEX III Cartography







Legend

-  Extention Proposal (Oceana)
-  Marine Area. National Park of Doñana
-  Fishing Reserve
-  Doñana SCI
-  Straight baseline (REDIAM)
-  Bathymetry (REDIAM)
-  -Submarine vegetation (REDIAM)


Species name:

-  *Zostera marina*
-  *Zostera noltii*

***REDIAM: Environmental Information Network. Andalusian Regional Government.**

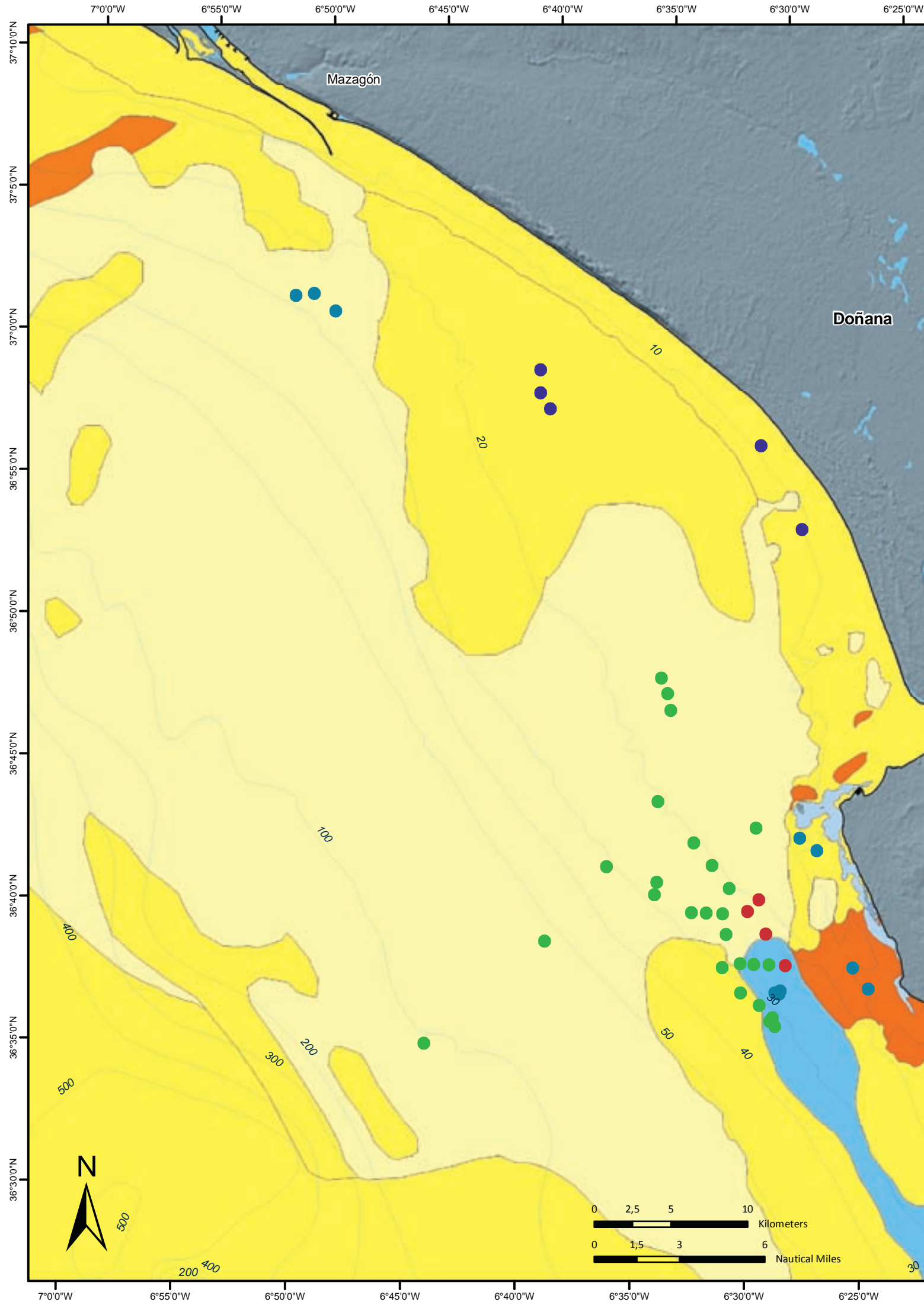
Protection in the marine area of Doñana

Map of the zone with the marine protection area proposal.



March 2010

Scales 1:300.000 (main) 1:15.000.000 (situation)
 Projections:
 UTM zone 30 N. Datum ETRS89 (main)
 Lambert Azimutal Equal Area. Datum ETRS89 (situation)
 Geographic coordinates.



7°0'0"W 6°55'0"W 6°50'0"W 6°45'0"W 6°40'0"W 6°35'0"W 6°30'0"W 6°25'0"W

37°10'0"N
37°5'0"N
37°0'0"N
36°55'0"N
36°50'0"N
36°45'0"N
36°40'0"N
36°35'0"N
36°30'0"N

Mazagón

Doñana

10

20

100

400

500

300

200

50

40

500

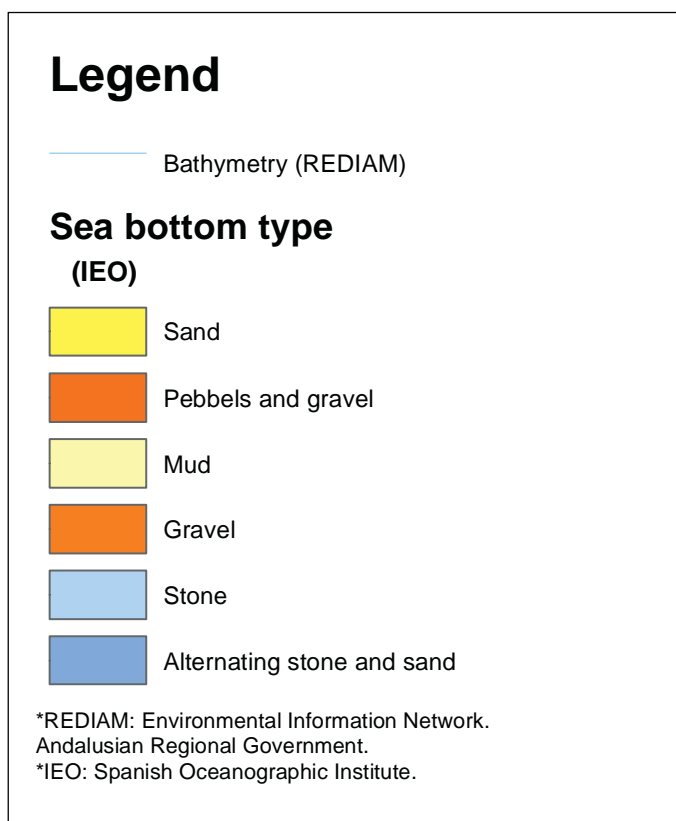
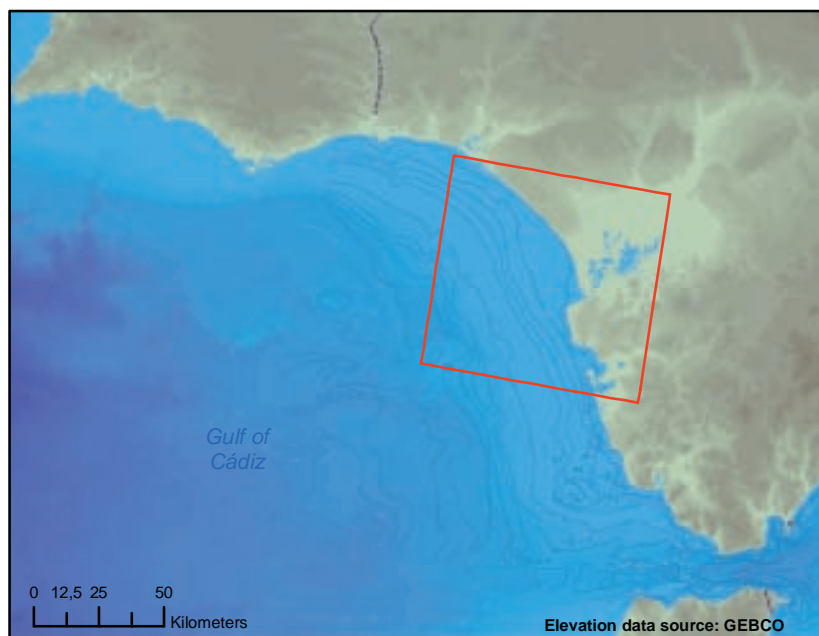
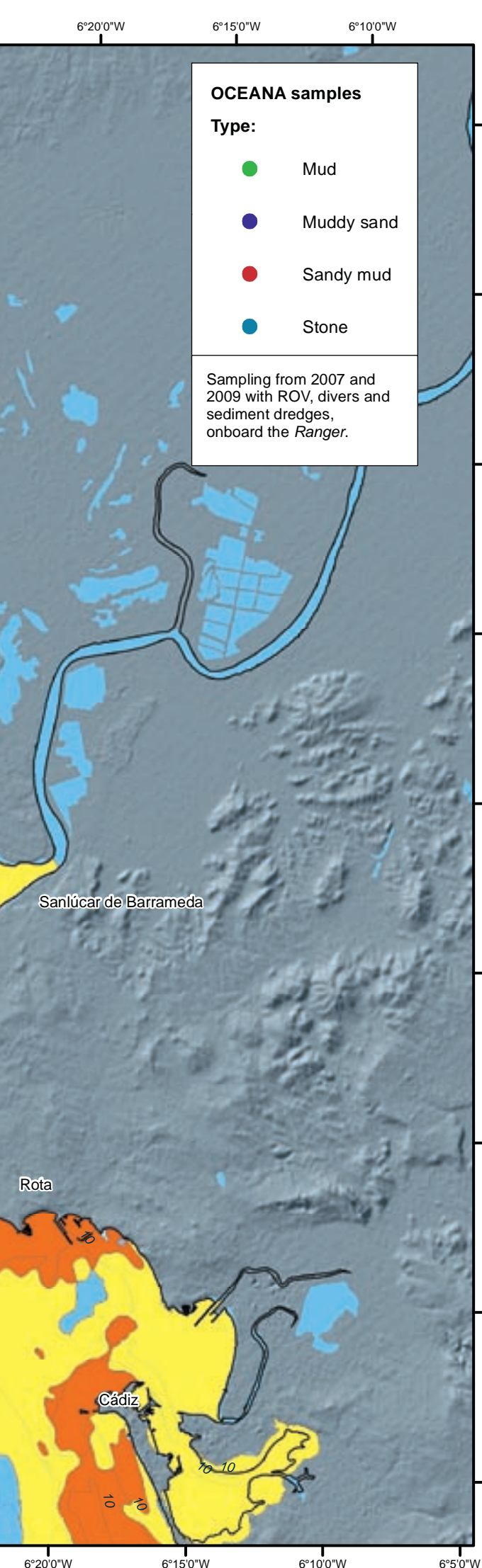
200 400

0 2,5 5 10 Kilometers

0 1,5 3 6 Nautical Miles


30

7°0'0"W 6°55'0"W 6°50'0"W 6°45'0"W 6°40'0"W 6°35'0"W 6°30'0"W 6°25'0"W



Protection in the marine area of Doñana

Map of the study area with seabed typology.



March 2010

Scales 1:300.000 (main) 1:3.000.000 (situation)
 Projections:
 UTM zone 30 N. Datum ETRS89 (main)
 Lambert Azimutal Equal Area. Datum ETRS89 (situation)
 Geographic coordinates.

7°0'0"W

6°30'0"W

Huelva

Mazagón

Doñana

Sanlúcar de Barrameda

Rota

Cádiz

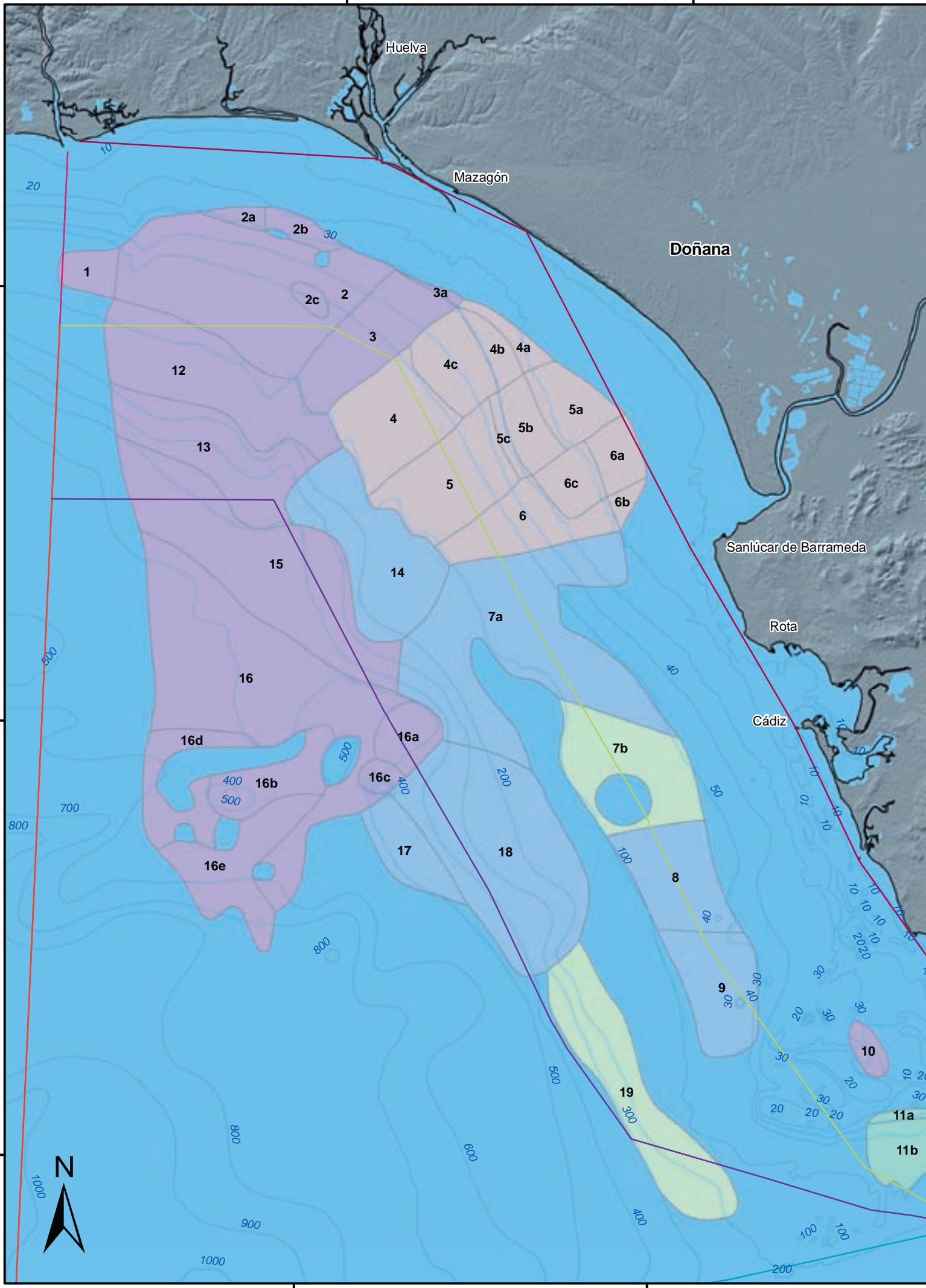
37°0'0"N

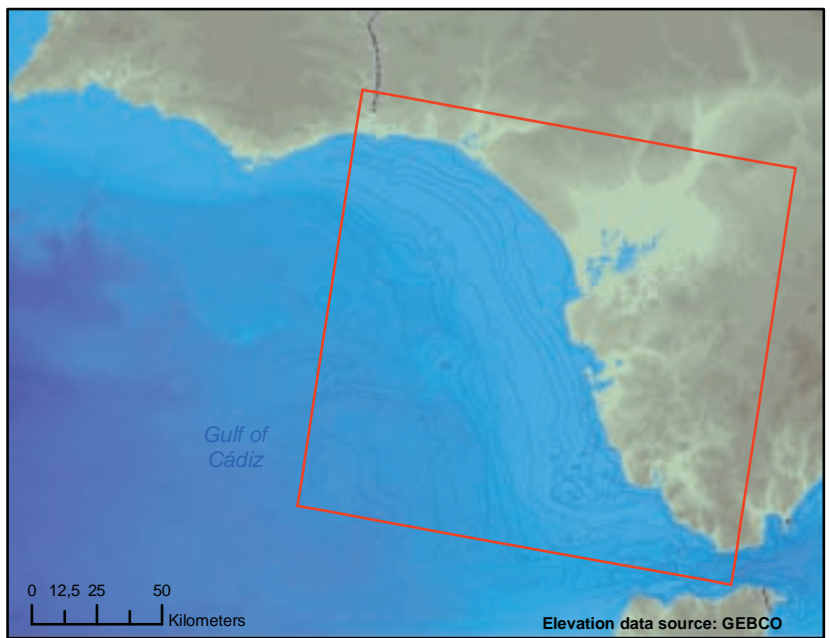
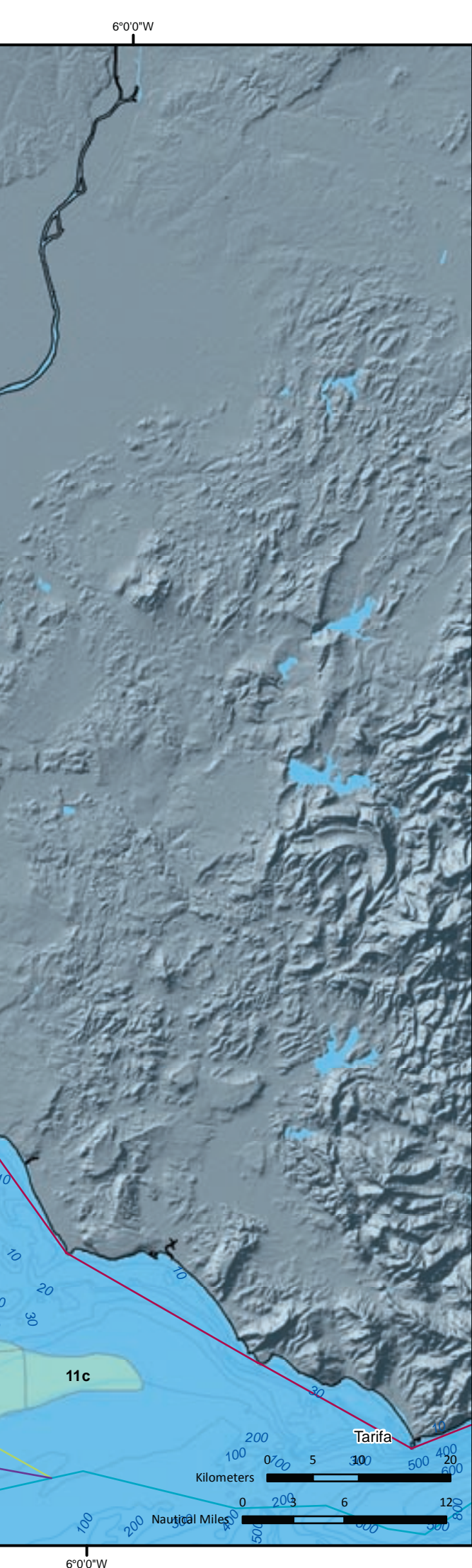
36°30'0"N

36°0'0"N

7°0'0"W







6°30'0"W










Legend

Jurisdictional limits (REDIAM):

-  Contiguous zone
-  Straight baselines
-  Territorial waters
-  Economic Exclusive Zone
-  Portugal and Spain continental shelf divisory line
-  Portugal and Spain territorial waters divisory line

Fishing grounds (REDIAM)

Fleets:

-  Barbate
-  Huelva
-  Huelva-Sanlúcar de Barrameda
-  Huelva-Sanlúcar de Barrameda-Puerto de Santa María
-  Sanlúcar de Barrameda-Puerto de Santa María

*REDIAM: Environmental Information Network.
Andalusian Regional Government.

Protection in the marine area of Doñana

Andalusian fishing grounds in the Gulf of Cádiz shown by their origin fleets.



March 2010

Scales 1:600.000 (main) 1:3.000.000 (situation)

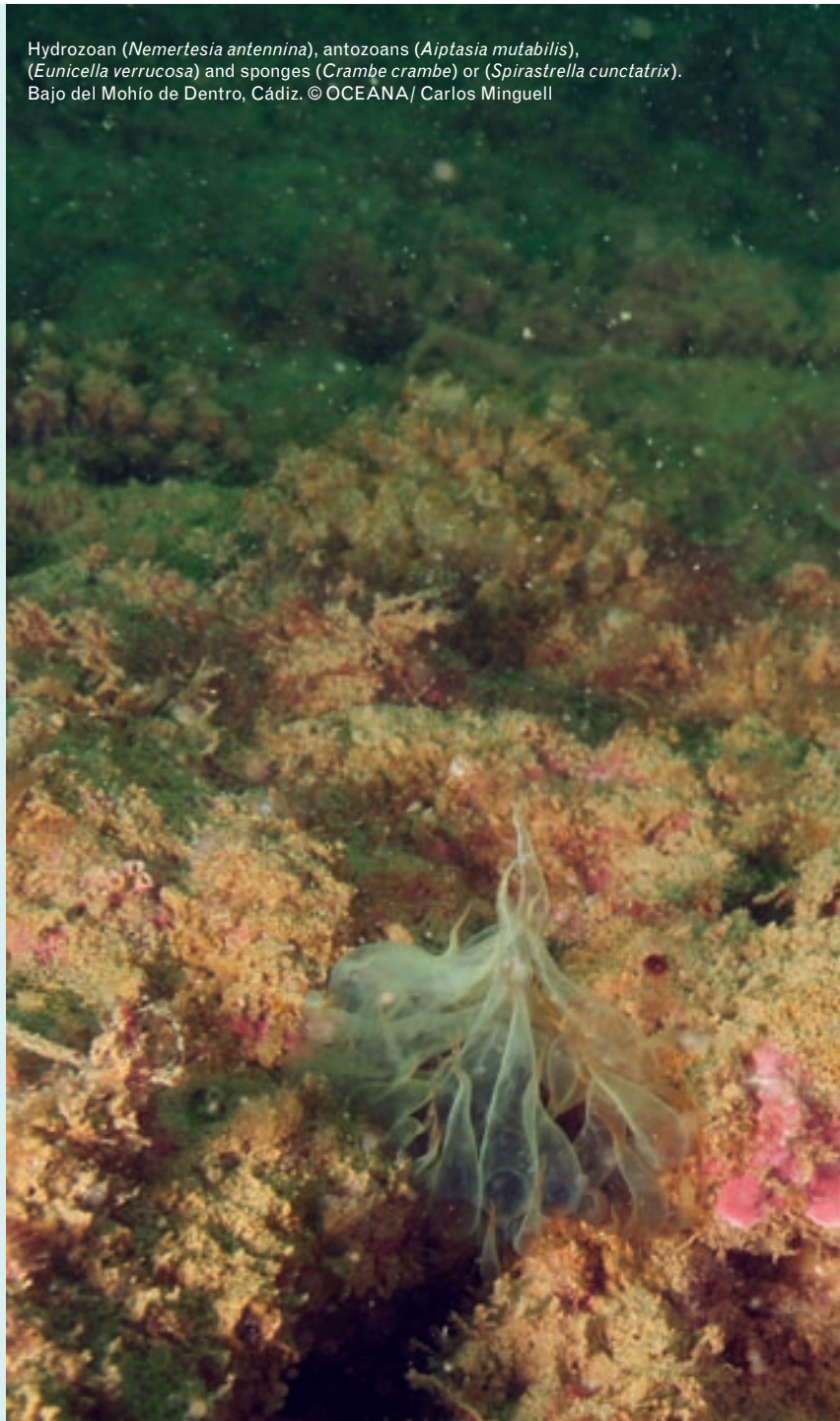
Projections:

UTM zone 30 N. Datum ETRS89 (main)

Lambert Azimutal Equal Area. Datum ETRS89 (situation)

Geographic coordinates.

Hydrozoan (*Nemertesia antennina*), antozoans (*Aiptasia mutabilis*,
Eunicella verrucosa) and sponges (*Crambe crambe*) or (*Spirastrella cunctatrix*).
Bajo del Mohío de Dentro, Cádiz. © OCEANA/ Carlos Minguell





REFERENCES

GEOGRAPHIC AND OCEANOGRAPHIC CONTEXT

- 1._ Stevenson R. E. (1977). Huelva Front and Málaga Spain. Eddy chain as defined by satellite and oceanographic data. *Deutsche Hydrographische Zeitschrift* Jahrgang 30: 2.
- 2._ Navarro G. & J. Ruiz (2006). El color oceánico como herramienta para el estudio de fluctuaciones pesqueras: Doñana and Gulf of Cádiz. *Revista de teledetección: Revista de la Asociación Española de Teledetección* N° 25: 65-69.
- 3._ Navarro G. & J. Ruiz (2004). Elements of spatial and temporal variability of plankton in the gulf of Cádiz: an analysis based on EOF decomposition of SeaWiFS images. *Proc. SPIE* 5233: 34-42.

OCEANA STUDIES AND PROPOSALS

- 4._ Aguilar R., Torriente A. & S. García (2008). Propuesta de áreas marinas de Importancia Ecológica: *South Atlantic and Mediterranean*. - Fundación Biodiversidad Diciembre 2006. 127 pp.
- 5._ Excelentísimo Ayuntamiento de Rota (No date). Memoria del diagnóstico medioambiental de la Agenda 21 local en el municipio de Rota (Cádiz). Bloque II: Diagnóstico Técnico. Entorno Físico Biótico. http://www.aytorota.es/doc/medio_ambiente/presentacion_mpio/2_-_%20Entorno%20Fisico%20Biotico.pdf
- 6._ OSPAR (2008). OSPAR List of Threatened and/or Declining Species and Habitats. OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic. (Reference Number: 2008-6).
- 7._ Plan de Uso y Gestión del Parque Natural del Estrecho.
- 8._ EC (1992). Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. *Official Journal L 206*, 22/07/1992 P. 0007-0050.
- 9._ BOE (2007). Ley 42/2007, de 13 de diciembre, del Patrimonio Natural y de la Biodiversidad. Viernes, 14 diciembre 2007. BOE N° 299: 51275-51327.
- 10._ BOE (2007). Ley 5/2007, de 3 de abril, de la Red de Parques Nacionales. Miércoles, 4 abril 2007. BOE N° 81: 14639-14649.
- 11._ EEA (no date). EUNIS habitat type hierarchical view <http://eunis.eea.europa.eu/habitats-code-browser.jsp> European Environment Agency.
- 12._ Navarro y J. Ruiz (2006). El color oceánico como herramienta para el estudio de fluctuaciones pesqueras: Doñana and Gulf of Cádiz. *Revista de Teledetección* Número Especial: 65-69; *Navarro G. & J. Ruiz (2005)*. Variabilidad espacio-temporal del fitoplancton en el Golfo de Cádiz a través de imágenes térmicas y de color oceánico. *XI Congreso Nacional de Teledetección, 21-23 septiembre 2005. Puerto de la Cruz. Tenerife*.
- 13._ Catalán I. A., Jiménez M. T., Alconchel J.I., Prieto L. & J. L. Muñoz (2006) Spatial and temporal changes of coastal demersal assemblages in the Gulf of Cádiz (SW Spain) in relation to environmental conditions. *Deep Sea Research Part II: Topical Studies in Oceanography*. Volume 53, Numbers 11-13: 1402-1419.
- 14._ O'Leary D. P., Vilches-Troya J., Dunn R. F. & A. Campos (1981). Magnets in guitarfish vestibular receptors. *Cellular and Molecular Life Sciences*. Volume 37 (1): 86-88.
- 15._ DOUE (2009). Sentencia del Tribunal de Justicia (Sala Segunda) del 22 de Diciembre de 2008. Comisión de las Comunidades Europeas/ Reino de España. Asunto C-189/07. Diario Oficial de la Unión Europea C 95; 24.04.2007. 21.2.2009. Páginas 44/9-44/10.

DESCRIPTION OF MARINE ECOSYSTEMS

- 16._ Tescione G. (1990). Topología de Dunas Eólicas. Procesos de Erosión-Sedimentación Costera y Evolución Litoral de la Provincia de Huelva (Golfo de Cádiz Occidental, Sur de España). *Estudios geol.*, 46: 99-109.
- 17._ Gacia Novo F. (1997). The Ecosystem of Doñana National Park. In the Ecology and Conservation of European Dunes (García Novo F., Crawford R. M. M. & M. C. Barradas -editors-). Universidad de Sevilla, Serie Ciencia 38. Pp. 97-116; Valdés B., Girón V., Sánchez Gullón E. & Carmona I. 2007. *Catálogo florístico del espacio natural de doñana (SO de España). Plantas vasculares*. Lagascalia 27: 73-362. Sevilla.
- 18._ CSIC (2000). Listado de especies de flora catalogada. Estación Biológica de Doñana - Consejo Superior de Investigaciones Científicas (CSIC); Rivas Martínez S., Valdés E., Costa M., Castroviejo S. 1980. *Vegetación de Doñana (Huelva)*. Lazaroa 2: 5-190. Madrid.
- 19._ Navarro Toro M. J. & T. Gallardo García (1994). Aportación al conocimiento de la flora bentónica marina de las costas de Huelva. *Studia Botanica* 13: 51-60.
- 20._ BOE (2009). ORDEN ARM/1995/2009, de 6 de julio, por la que se hacen públicas las nuevas relaciones de zonas de producción de moluscos y otros invertebrados marinos en el litoral español. Núm. 177. Jueves 23 de julio de 2009 Sec. III. Págs. 63072-63100; END (2008). Informe sobre el marisqueo de la conquina (*Donax trunculus*) en el Parque Nacional de Doñana. Año 2007. Informe del Espacio Natural de Doñana, Consejería de Medio Ambiente, Junta de Andalucía, 15pp. BOJA (2008). Orden de 24 de septiembre de 2008, por la que se regula la obtención, renovación y utilización de los carnés profesionales de marisqueo a pie en el litoral de la Comunidad Autónoma de Andalucía. Boletín Oficial de la Junta de Andalucía N° 195 de 30 de septiembre de 2008.

21. Juárez A. M., García-Isarch E., Jiménez P. & J. Ruiz (2006). Spawning and nursery habitat of the wedge sole *Dicologlossa cuneata* (Moreau, 1881) in the Gulf of Cádiz (SW Spain). *Scientia Marina*, 2006 Vol.: 70, N°. Extra 2, pags. 123-136; *García-Isarch E., Silva L., García A. & I. Sobrino (2003). Distribución espacio-temporal de la acedia *Dicologlossa cuneata* (Moreau, 1881) en la desembocadura del río Guadalquivir (golfo de Cádiz, suroeste de la península Ibérica). *Bol. Inst. Esp. Oceanogr.* 19 (1-4): 493-503.*
22. Fernández-Delgado, C., P. Drake, A. M. Arias y D. García. 2000. *Peces del Parque Nacional de Doñana y su Entorno*. Organismo Autónomo Parques Nacionales, Ministerio de Medio Ambiente. Madrid 272 pp.
23. Blasco J., Arias A. M. & V. Saenz (2002). Heavy metal concentrations in *Squilla mantis* (L.) (crustacea, stomatopoda) from the Gulf of Cádiz evaluation of the impact of the Aznalcollar mining spill. *Environment International*, 28 (1-2), pp. 111-116; CSIC (1999). Grupo de expertos del Consejo Superior de Investigaciones Científicas y otros organismos colaboradores sobre la emergencia ecológica del río Guadiamar. 11º informe. Madrid 3 de mayo de 1999. CSIC (1999). Grupo de expertos del Consejo Superior de Investigaciones Científicas y otros organismos colaboradores sobre la emergencia ecológica del río Guadiamar. 12º Informe. Madrid, 23.12.99.
24. Baldó F., Arias A. M. & P. Drake (2001). La comunidad macrobentónica del estuario del Guadalquivir. *Bol. Inst. Esp. Oceanogr.* 17 (1 y 2): 137-148; Vilas-Fernández C., Drake P. & J. C. Sorbe (2008). *Rhopalophthalmus tartessicus* sp. nov. (Crustacea: Mysidacea), a new mysid species from the Guadalquivir estuary (SW Spain). *Organisms, Diversity & Evolution* 7 (2008) 292e1-292e13; Vilas C., Drake P. & E. Pascual (2009). Inter- and intra-specific differences in euryhalinity determine the spatial distribution of mysids in a temperate European estuary. *Journal of Experimental Marine Biology and Ecology* 369: 165–176.
25. Sobrino I., García A., García E., Silva L., Baro J. & L. Mas (2005). Estudio previo para la delimitación de una reserva de pesca en la desembocadura del Guadalquivir. Undersecretary of the Environment. Junta de Andalucía Vol (76): 215 pp; Sobrino I., Baldo F., García-González D., Cuesta J. A., Silva-García A., Fernández-Delgado C. Arias A. M. & P. Drake (2005). The effect of estuarine fisheries on juvenile fish observed within the Guadalquivir Estuary (SW Spain). *Fisheries Research*. Vol (76): 229-242.
26. BOJA (2004). ORDEN de 16 de junio de 2004, por la que se declara una Reserva de Pesca en la desembocadura del río Guadalquivir. Boletín Oficial de la Junta de Andalucía (BOJA) N° 123: 14.000-14.003. Sevilla, 24 de junio 2004.
27. Fahd K., Arechederra A., Florencio M., León D. & L. Serrano (2009). Copepods and branchiopods of temporary ponds in the Donana Natural Area (SW Spain): a four-decade record (1964–2007). *Hydrobiologia* 634:219-230.
28. Rivilla J. C & S. Alís (2008). Control de los varamientos de mamíferos y quelonios marinos en el Espacio Natural de Doñana. Informe Anual 2008. *GRAMPUS. Colectivo para el Estudio y Conservación del Medio Marino*. 28 pp.
29. EBD: <http://161.111.232.183/CuadernosEnLaRed/Extranet/Default.aspx>
30. BOJA (2004). Orden de 16 de junio de 2004 por la que se declara una Reserva de Pesca en la desembocadura del río Guadalquivir. BOJA de 24 de junio de 2004. N° 123: 14000-14002.
31. DOUE (2009). Decisión de la Comisión de 12 de diciembre de 2008 por la que se adopta, de conformidad con la Directiva 92/43/CEE del Consejo, una segunda lista actualizada de lugares de importancia comunitaria de la región biogeográfica mediterránea. *[notificada con el número C(2008) 8049]*. (2009/95/CE). Diario Oficial de la Unión Europea 13.2.2009 Páginas 43/393-43/465.
32. Arcos J. M., Bécarea J., Rodríguez B. & A. Ruiz (2009). Áreas Importantes para la Conservación de las Aves marinas en España. LIFE04NAT/ES/000049. Sociedad Española de Ornitología (SEO/Birdlife). Madrid 379 pp.
33. Fundación Biodiversidad (no date). <http://www.indemares.es/>
34. Medialdea T., Somoza L., Pinheiro L. M., Fernández-Puga M. C., Vasquez J.T., León R., Ivanov M., Magalhães V., Díaz-del-Río V. & R. Vegas (2009) Tectonics and mud volcano development in the Gulf of Cádiz. *Marine Geology* . 209 (1), 173-198; *González F.J., Somoza L., Lunar R., Martínez-Frías J., Martín Rubi J. A., Torres T., Ortíz J. E. & V. Díaz-del-Río (2007). Fe-Mn nodules associated with hydrocarbon seeps: A new discovery in the Gulf of Cádiz (eastern central Atlantic). *Episodes*, Vol. 30, no. 3: 187-196; Martín-Puertas C., Fernández-Puga M. C., Mata M. P., Vázquez Garrido J. T., Díaz del Río V. & L. Somoza (2006). Naturaleza de la brecha fangosa de volcanes de fango del Golfo de Cádiz: sistema diapírico del Guadalquivir y zona Tasyo. *Revista de la Sociedad Geológica de España*, 19(3-4), 2005. 257-270; Magalhães V. H., Pinheiro L. M., Ivanov M. K., Díaz-del-Río V., Somoza L. & J. Gardner (2005). Distribution of Mud volcanism and control of seafloor seepage related authigenic carbonates in the Gulf of Cádiz. *Geophysical Research Abstracts*, Vol. 7, 05589; Somoza L., Díaz del Río V., León R., Ivanov I., Fernández Puga M. C., Gardner J. M., Hernández Molina F. J., Pinheiro L. M., Rodero J., Lobato A., Maestro A., Vázquez J. T., Medialdea T. & L. M. Fernández-Salas (2003). Seabed morphology and hydrocarbon seepage in the Gulf of Cádiz mud volcano area: Acoustic imagery, multibeam and ultra-high resolution seismic data. *Marine Geology*, 195 (1-4), 153-176; etc.*
35. León R., Somoza L., Medialdea T., González F. J., Díaz-del-Río V., Fernández-Puga M. C., Maestro A. & M. P. Mata (2007). Sea-floor features related to hydrocarbon seeps in deepwater carbonate-mud mounds of the Gulf of Cádiz: from mud flows to carbonate precipitates. *Geo-Mar Lett* 27:237–247
36. *Hilário A. & M. R. Cunha (2008). On some frenulate species (Annelida: Polychaeta: Siboglinidae) from mud volcanoes in the Gulf of Cádiz (NE Atlantic). *Scientia Marina*, 72 Vol.: 361-371.*

- 37._ Pinheiro L. M. , Ivanov M. K., Sautkin A., Akhmanov G., Magalhaes V. H., Volkonskaya A., Monteiro J. H. , Somoza L. , Gardner J., Hamouni N. & M. R. Cunha (2003). Mud volcanism in the Gulf of Cádiz: results from the TTR-10 cruise. *Marine geology* vol. 195, nº1-4, pp. 131-151.

STATE OF THE FISHING SECTOR

- 38._ MAPA (2008). Programa de Recopilación y Gestión de datos de España. Año 2008. Secretaría General de Pesca Marítima. Dirección General de Recursos Pesqueros. Subdirección General de Asuntos Comunitarios. Ministerio de Agricultura, Pesca y Alimentación. Madrid, 31.05.07.
- 39._ Censo de flota pesquera operativa (<http://www.mapa.es/es/pesca/pags/flota/censo.htm>)
- 40._ BOJA (1996). ORDEN de 24 de junio de 1996, por la que se regula provisionalmente la pesca de la chirla con draga hidráulica en el Golfo de Cádiz. Boletín Oficial de la Junta de Andalucía (BOJA) Nº 78: 7.740-7.743. Sevilla, 9 de julio 1996.
- 41._ Gil J. & I. Sobrino (2006). La pesquería del voraz en el Estrecho de Gibraltar. En: *Acuicultura, pesca y marisqueo en el Golfo de Cádiz*. Consejería de Agricultura y Pesca. Junta de Andalucía. Sevilla, 2005. Pp. 171-203.
- 42._ Ver, entre otros. VV. AA. (2006). *Acuicultura, Pesca y Marisqueo en el golfo de Cádiz*. Pesca y Acuicultura. Consejería de Agricultura y Pesca. Junta de Andalucía. Sevilla, 2005; Manzano J. C., Márquez I., Sánchez-Lamadri A., Muñoz J. L., García E., Jiménez T., Járez A., Ruiz J., Sobrino I., Jiménez M. P., Bruno M. & G. Navarro (2004). Fleet in the Gulf of Cádiz Junta de Andalucía, Consejería de Agricultura y Pesca. *Colección pesca y acuicultura*, 248 pp; Fernandez A. & A. C. Fariña (1988). Contribution to the knowledge of the bottom and accompanying species of the Norway lobster (*Nephrops norvegicus* L.) in the Gulf of Cádiz. *Boletín del Instituto Espanol de Oceanografía. Madrid.*, 1, 2, 126-133.
- 43._ Por ejemplo: Gil J., Canoura J., Vila Y., Sobrino I. & J. Baro (2009). Information about main Batoids species caught from ARSA Bottom Trawl Surveys in the Spanish Gulf of Cádiz waters. 13th European Elasmobranch Association Conference. 19th - 22nd November 2009. Palma de Mallorca, Spain.
- 44._ VV. AA. (2003). Catálogo de artes, aparejos y utensilios de pesca del litoral andaluz. Consejería de Agricultura y Pesca. Junta de Andalucía. ISBN: 9788484741183
- 45._ Sardá F., Valladares F. J & P. Abelló (1982). Crustáceos decápodos y estomatópodos capturados durante la campaña "Golfo de Cádiz 81". *Res. Exp. Cient.*10: 89-100.
- 46._ IEO. (1989). Las Pesquerías locales de la Región Surmediterránea Española (Entre Punta Europa y Cabo de Gata). Proyecto de colaboración IEO/CEE/DGXIV-B-1/2871. IEO. Fuengirola. Málaga.
- 47._ Compan Vazquez D. (1990) La pesca marítima en Andalucía. En *Geografía de Andalucía*. Tomo V. Ed. Tartessos.
- 48._ Silva L., Sobrino I., García E. & A. García (2006). Exploitation pattern of the artisanal fleet in the area of the Guadalquivir river mouth (Gulf of Cádiz, SW Spain). *Thalassas: An international journal of marine sciences*, Vol. 22 (1): 39-44.
- 49._ Hernando J. A. *In press*.
- 50._ BOE (1997). Real Decreto 284/1997 del 15 de Septiembre por el que se regula la pesca con artes menores en el caladero del Golfo de Cádiz. Boletín Oficial del Estado. N.235.17 de Octubre de 1997. pp: 28585-28587.
- 51._ VV. AA. (2003). Catálogo de artes, aparejos y utensilios de pesca del litoral andaluz. Consejería de Agricultura y Pesca. Junta de Andalucía. ISBN: 9788484741183
- 52._ BOE (1993). Real Decreto del 3 de Mayo por el que se regula el ejercicio de la pesca de arrastre de fondo en el Golfo de Cádiz. Boletín Oficial del Estado. N.118. 18/05/1993. Q. 14863-14865.
- 53._ MARM. http://www.mapa.es/es/pesca/pags/arrecifes/arrecifes_espana/arrecifes_espana.htm
- 54._ BOE (2006). Orden APA/910/2006 del 21 de Marzo por el que se regulan determinados tipos de arrastre de fondo en el caladero nacional. Boletín Oficial del Estado, num.76, 12445 pp. Jueves 30 de Marzo de 2006.
- 55._ Confederación de Pesca Recreativa Responsable. <http://www.pescaresponsable.es/>
- 56._ Agencia Pública de Puertos de Andalucía. Consejería de Obras Públicas y Transportes (<http://web.eppa.es/GContenidos/index.php/inicio>)

ANNEX II. FISHING GROUNDS IN THE GULF OF CÁDIZ

- 57._ Ramos F., Sobrino I. & M. P. Jimenez (1996) Cartografía de Especies y caladeros Golfo de Cádiz. *Informaciones Técnicas N°45/96*. Junta de Andalucía. Consejería de Agricultura y Pesca. Sevilla.

The research work and this publication have been produced by Oceana with the support of the Doñana National Park council and its management bodies, as well as the Doñana Biological Station.

Project Directors • Xavier Pastor

Authors • Ricardo Aguilar, Enrique Pardo, María José Cornax, Silvia García, Jorge Ubero

Editor • Marta Madina

Editorial Assistants • Aitor Lascurain, Angela Pauly, Ángeles Sáez, Natividad Sánchez

Cover • Nudibranchs (*Flabellina affinis*) on hydrozoan (*Eudendrium* cf. *Racemosum*). Chipiona, Cádiz, Spain.
© OCEANA/ Eduardo Sorensen

Design and layout • NEO Estudio Gráfico, S.L.

Photo montage and printer • Imprenta Roal, S.L.

Portions of this report are intellectual property of ESRI and its licensors and are used under license. Copyright © 2010 ESRI and its licensors. All rights reserved.

Reproduction of the information gathered in this report is permitted as long as © OCEANA is cited as the source.

July 2010



Plaza de España - Leganitos, 47
28013 Madrid (Spain)
Tel.: + 34 911 440 880
Fax: + 34 911 440 890
europe@oceana.org
www.oceana.org

Rue Montoyer, 39
1000 Bruselas (Belgium)
Tel.: + 32 (0) 2 513 22 42
Fax: + 32 (0) 2 513 22 46
europe@oceana.org

1350 Connecticut Ave., NW, 5th Floor
Washington D.C., 20036 USA
Tel.: + 1 (202) 833 3900
Fax: + 1 (202) 833 2070
info@oceana.org

175 South Franklin Street - Suite 418
Juneau, Alaska 99801 (USA)
Tel.: + 1 (907) 586 40 50
Fax: + 1(907) 586 49 44
northpacific@oceana.org

Avenida General Bustamante, 24,
Departamento 2C
750-0776 Providencia, Santiago (Chile)
Tel.: + 56 2 795 7140
Fax: + 56 2 795 7144
americadelsur@oceana.org