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

Title/Name of the area: Balearic Islands Area

Presented by:
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Abstract

The Balearic Archipelago is one of the richest European regions in terms of marine animal species diversity and is characterized by a wide range of ecosystem types (e.g. maërl beds, Leptometra beds, soft red algae communities, Posidonia meadows, etc) (Aguilar et al.,2007b) . Some of these communities are considered rare on a European scale. The area's complex oceanography results in high levels of productivity, reflected by its importance as a feeding ground for a wide range of species, including fin and sperm whales, loggerhead turtles and as a crucial spawning ground for threatened Bluefin tuna. The area is also an important breeding ground for the endemic Balearic shearwater.

Introduction

In 2006 Greenpeace published a proposal for a regional network of large-scale marine reserves with the aim of protecting the full spectrum of life in the Mediterranean (see Figure 1) (Greenpeace 2006). The network of candidate sites is made up of 32 different areas stretching from the Alboran Sea in the west to the Phoenician coast in the east. The Balearics was identified as one of the areas to be protected within the network which was drawn up with the help of experts and used a variety of data sets including distribution of species, areas important for key life stages e.g. spawning grounds, important habitats such as seamounts and sites previously identified as priority sites for protection such as SPAMIs. The key principles of marine reserve networking were applied to the network design, ensuring that it is representative of the full range of habitats found in the Mediterranean Sea, has different habitat types replicated through the network, has sufficient levels of connectivity and is made up of sites that are sufficiently large to be viable. The total coverage of the network amounts to 40% of the Mediterranean.

The Balearic Promontory is a major feature of the Mediterranean Basin with a very complex tectonic history. (Sábat et al., 1995, Acosta et al., 2002). The Balearic Islands of Ibiza, Formentera, Dragonera, Mallorca, Cabrera and Menorca are located along this promontory which is 348 km long, 105 km wide and elevated from between 1000 to 2000 m above the surrounding marine basins. (Acosta et al., 2001a, 2002, 2004b). The Balearic Islands represent the natural boundary between two sub-basins of the Western Mediterranean (WMED): the Algerian sub basin (located in the southern part) and the Balearic basin (located to the north). The Balearic shelf can be divided into two: the Mallorca – Menorca shelf to the east reaching up to 200m depth and the smaller Ibiza - Formentera shelf to the west, (up to 800 m depth). The sediments of the Balearic shelf are mainly biogenic sands and gravels with a high percentage of carbonates (77– 84%) and up to seven lithofacies have been identified at different depths and with different communities (Acosta et al., 2002; Alonso et al., 1988; Fornós and Ahr, 1997).

The Ibiza and Formentera shelf varies in width and slope. The shelf width is 2km with a slope of 4.11° to the east of Formentera, ranging up to 25 km width with a 0.37° slope on the west side of the island (Acosta et al., 2002). The Mallorca-Menorca shelf breaks at an average depth of 139 m (Amblas et al., 2004). The coastline is predominantly rocky, while immediately offshore there are generally sandy bottoms with sea-grass meadows. In northern and southern Mallorca, however, embayments enlarge the shelf area and increase the presence of muddy-sand bottoms. The channels between Mallorca and Menorca and between Mallorca and Cabrera, where the maximum depth is 100 m, also effectively enlarge the continental shelf. The continental slope is steep, with an absence of submarine canyons, and the morphology is determined by emergent geological structures (Acosta et al., 2001a, 2004a) rather than by the input of sediment from the continental shelf.

At its deepest, the Balearic Sea can reach depths of 3000 m. Between Formentera and Mallorca a Central Depression reaches over 1000 m in depth. To the southeast of this lies the extensive SW Mallorca submarine Volcanic field which includes the Emile Baudot Seamount and is around 500km^2 in area (Acosta et al., 2001a; 2002). Two volcanic seamounts lie to the immediate east of Ibiza: Mont dels Oliva and Mont de Ausias Marc (Canals et al.,1982). The Algero-Balearic Basin, (ABB) to the south of the promontory is the largest feature of the physical geography of the Western Mediterranean Basin. It covers an area of 240,000km^2 and includes the Balearic Abyssal Plain which lies to the east of Menorca (Acosta et al., 2002). The ABB is bounded by the 2600 m isobath but reaches maximum depths of 2800 m (Acosta et al.,2002) (see Figure 3).

Current dynamics in the Balearic sub-basin are affected by atmospheric (mainly wind) forcings, (Hopkins 1978) making the Balearic region a transition zone where two important water masses with different physical, chemical and biological properties meet (Garcia et al., 2006).The area is characterized by the intense density driven (geostrophic) circulation of water masses. Mesoscale eddies and convergent fronts arise as a result of the interactions of the circulating water with the obstructions posed by the islands (López-Jurado et al.,1995, Pinot et al.,1995, 2002). As a result, the hydrodynamics differ markedly between the areas of sea to the north of the Balearics and those to the south (López-Jurado et al., 2008).

Hydrodynamics in the Balearic area are very complex with several mesoscale features (e.g. eddies, fronts, etc). The southern area, in particular, generates regular anticyclonic eddies due to the bottom topography. Hence, this area effectively represents a convergence zone and, therefore, a strong retention zone (e.g. Pinot et al.,2002; Millot 2005; Lòpez- Jurado et al.,2008). The southern area is also influenced by the instability of the Almeria-Oran front and by mesoscale features generated from the Algerian current (AC) (Millot 2005). Blocking conditions can also be caused by the presence of large gyres located to the south of Ibiza and Formentera Islands. These gyres damp circulation through the channels and divert Atlantic surface waters towards Cabrera (south of Mallorca) and the Menorca Islands (Font et al.,2004). In this area, very high salinity values (up to 38.6‰.) can be found in the intermediate layer. During the summer, the circulation of surface waters causes water of recent Atlantic origin to reach the Balearic Islands as eddies separated from the main current of Atlantic water that enters the Mediterranean through the Strait of Gibraltar. This is due to the instability of the Almeria-Oran front. Additionally, according to Acosta et al.,2001b (Lòpez-Jurado personal communication) more recent measurement of the southerly flowing bottom currents suggest the presence of a cyclonic gyre towards the east of the channel. This gyre could reach a width of some 500m and could block the flow of the Mediterranean Intermediate Water. The surface waters forming the Balearic Currents (BC) are all of Atlantic origin but some are more recent Atlantic origin, i.e. have different residence times in the Mediterranean.

The presence of both new and older AW in the channels gives rise to ocean fronts that affect the ecosystem dynamics in the area. Moreover, the Mallorca and Ibiza channels play an important role in the regional circulation of this area and their topography conditions the water exchange between these two sub-basins (Pinot et al., 2002). Inter-annual variations in the different water masses, as well as in their characteristic values, depths, thicknesses and areas of influence have been observed in this region (Pinot et al., 2002; López-Jurado et al., 2008). These conditions influence the eventual formation of mesoscale structures and hence the regional circulation. This large scale situation defines the Balearic Archipelago, and particularly its southern part, as a convergence area, and therefore as a strong retention zone. There are high concentrations of nutrients due to the presence of fronts and mixing zones associated with reefs, canyons, seamounts and islands (Hyrenbach, 2000) that constitute physical obstacles for water masses. See Figure 4 for the major currents affecting the Balearic Islands.

Multi-beam mapping surveys have identified three seamounts in the Balearic region: The Emile Baudot Seamount is located along the crest of the Emile Baudot Escarpment west of the Cabrera canyon and to the south of the Emile Baudot Escarpment (38°42'N and 002°20'E.). Of volcanic origin, this seamount rises more than 500m above the seafloor in waters of 650m depth and is flat-topped. The Mont Ausias Marc (northeast of Formentera) (38º.44'N and 001º.48'E.) rises from a depth of 300m and its summit lies at less than 125m depth. The Mont dels Oliva seamount is located east of Ibiza Island (38º.57'N and 002º.00'E) and rises from around 600 to a summit at 300m depth. (Acosta et al., 2001a, 2004a). Like the Mont Ausias Marc, this seamount is of tectonic rather than volcanic origin (Acosta et al., 2004a).

Very little information has been published regarding the benthic communities that inhabit these seamounts (J. Acosta pers. comm). Nonetheless, a recent ROV survey of the three seamounts identified nearly 300 species living there. Rhodolith beds found on these mounds and seamounts reached down to 140-150 meters depth, although the most important ones were between 80m and 120m. The formations were particularly common over the top of Ausias Marc, but could also be found on Emile Baudot. Three forms of coralligenous beds were detected: (i) large bio-concretions, (ii) "cobbled" bio-concretions and (iii) thin sheets and small patches (see Aguilar et al., 2007a).

Surveys carried out in the Ibiza Channel and on the east side of the Ibiza-Formentera platform have shown variously sized pockmarks to be present in these locations. (Acosta et al., 2001b). It is thought that these pockmarks have been formed by the escape of gases and water from an underlying hydrothermal field. Large pockmarks on the seafloor of the Mallorca channel (Acosta et al. 2004b) are attributed to venting of gases associated with the volcanic fields lying between Mallorca and Ibiza Islands and northwards to Valencia Trough.

Acosta et al. (2001a) have recently described a volcanic field in south Mallorca, located southeast of the Central Depression and in the vicinity of the Emile Baudot Seamount. The field includes some 118 cone-shaped volcanic structures varying from 8-501m elevation above the seafloor and with diameters of between 0.14 and 1.7km. These are thought to be of igneous origin based on a sample of basalt recovered in an earlier survey of the area (Acosta et al. 2004b).

Submarine canyons and ridges are considered to be key to biological and ecological processes in the Mediterranean basin. They channel energy and matter from coastal areas to the deep-sea, and also create local upwellings that are important in the life-cycles of many pelagic fish and of marine mammal species. Two main canyon systems have been identified on the continental slope of Mallorca-Menorca (Acosta et al., 2002), the Menorca Canyon System (MC) and the Mallorca-Cabrera canyon. Biological communities linked to deep sea corals *Lophelia pertusa* and *Madrepora oculata* are present on the flanks of the canyons.

The Balearic and the Algerian basins are separated by a submarine ridge at ca.600m beneath the Mallorca channel between the islands of Ibiza and Mallorca (Acosta et al.,2004b).

The Balearic Islands have been the subject of systematic research over a period of decades at both a national and international level. The IEO (Spanish Oceanographic Institute – Balearic Research Centre) and IMEDEACSIC (Mediterranean Institute for Advanced Studies - University of the Balearic Islands) are the main Spanish research bodies with projects which embrace a wide range of disciplines (e.g. fisheries, conservation, oceanography, marine ecology, etc.). Several Conservation Action Plans are being implemented involving National and Regional government as well as local, regional and national organizations. At International level, CISEM (the Mediterranean Science Commission) is a relevant research body with more than 2000 marine scientists from23 countries participating. In addition the area has been the subject of research under various EU and Global Programmes.

Location

The location of the area described in this paper is shown in Figure 1. The area incorporates part of the Spanish Fisheries Protection Zone and the surrounding high seas.

Feature description of the proposed area

1. Habitats

The Balearic Islands are the location of rare, sensitive, vulnerable and highly productive deep water habitats which require conservation and protection. Continental slopes exhibit a mosaic of habitats with mixed soft and hard bottom faunal communities, although much of the slope seabed is covered by soft sediments (Thistle, 2003). Maërl and Coralligenous beds have been described as areas of high diversity and two of the most productive marine ecosystems in temperate regions (Martin et al.,2007). Both soft red algae and maërl beds are important for carbonate production on the Mallorca–Menorca shelf. In the clear waters off the Balearic Islands these communities cover large and deep areas (up to ~80 and ~90 m, respectively) of the sea bottom (Ballesteros, 2003, 2006). Deep-sea white coral assemblages (*Madrepora oculata*, and *Lophelia pertusa*) at the hard bottom of the Balearic region are characterized by high-local productivity (Cartes et al., 2004). Leptometra beds in shelf-break high hydrodynamic areas with a high input of organic matter and plankton enhance habitat heterogeneity by developing three-dimensional communities, thus allowing high rates of primary and secondary production (Massuti and Ordinas, 2006).

a) Shallow shelf habitats

Maërl

Maërl grounds have a high diversity and also support a high level of macro-benthic secondary production,. This, in turn, may be important for species which are commercially exploited. These communities have a low rate of turnover (50-75 years lifespan). They are home to a number of economically important species (fishes, cephalopods, crustaceans). This habitat is subject to different anthropogenic stresses in particular the excessive sedimentation and damage from trawling. The latter results in fragmentation, dispersing of rhodoliths, and modification of the biological community (Barbera et al.,2003).

Maerl bottoms are widespread along all Balearic coasts between 20-90m depth. The beds are mainly built up of red algae of the family Corallinacea. The brown alga *Laminaria rodriguezii*, together with various species of echinoderm and ascidian is also found on these bottoms. Some trawl fishing grounds are active over these beds targeting fish associated with them. These include *Serranus cabrilla*, *Scorpaena scrofa*, *Scyliorhinus canicula*, *Pagellus erythrinus*, *Scorpena notata*, *Spicara smaris*, *Octopus vulgaris* and *Loligo vulgaris* (Massuti and Ordinas, 2006). Recently, examples of this type of bottom habitat in relatively undisturbed condition and, therefore excellent candidates for conservation measures have been discovered southeast of the Cabrera archipelago at 50 to 80m depth). In these areas *Lithothmanion valens* is the dominant species of encrusting red alga (Aguilar et al., 2007a).

Protected species named in the annexes of BARCOM (1995)-SPAM and which have been recorded mainly on coralligenous beds at the Balearic seamounts include *Paramuricea clavata*, *P. macrospina*, *Anthias anthias*, *Muraena helena*, *Lappanella fasciata* and *Phycis phycis* (see Aguilar et al., 2007a). The carnivorous sponge *Asbestopluma hypogea* although first found in deep areas is not always associated with bio-concretions. Since the discovery of *A. hypogea*, in 1995 (Vacelet and Boury-Esnault, 1996), it has generally only been recorded in shallow caves in France and Croatia. A specimen found on Ausias Marc seamount was on a coralligenous bio-concretion at 100 meters depth (Bakran-Petricioli et al. (2007).

Soft red algae

Deep-water Peyssonnelia beds have a widespread distribution from 40m to 80 m depth on the Balearic continental shelf and have been studied to some degree (Ballesteros, 1994). These beds are mainly comprised of the free-living red alga *Peysonellia squamaria* in the basal layer. Corallinacea are also present, but with very much lower biomass indices. The red algae *Phyllophora nervosa* and *Osmundaria volubilis* comprise the erect stratum. These beds have very high biomass indices, and some commercially important species are more abundant in these sensitive habitats. Management of these habitats therefore needs to take into account the resilience of these habitats and their importance to the life histories of targeted species. (Ordines and Massuti 2008).

b) Deep shelf habitats

Crinoid beds

The feather stars Leptometra spp. are suspension-feeding organisms which live in shelf break areas with a high hydrodynamic activity and which have a high input of organic matter and of planktonic organisms. (Flach et al., 1998; Lavaleye et al.,2002; Orsi Relini et al., 2006). They are found in the deep continental shelf and shelf-break in the western Mediterranean and represent a very important sensitive habitat (SH) (Abelló and Solá, 2006). Individual feather stars are very fragile and vulnerable to demersal trawling (Smith et al., 2000; Sánchez et al.,2004).

High densities of *L. phalangium* form crinoid beds which act to shelter small benthic and macroplanktonic organisms. Such beds also appear to act as spawning aggregation areas for some fish species, such as *Mullus barbatus* and *Lepidorhombus boscii*. Recruits of other fish species, such as *Merluccius merluccius*, *Helicolenus dactylopterus*, *Phycis blennoides* and of the octopus *Eledone cirrhosa* occasionally concentrate in these habitats (Colloca et al., 2004; Orsi Relini et al., 2006).

According to Massuti and Ordinas (2006) Leptometra beds (most commonly represented by the species *Leptometra phalangium*) are mainly distributed on the muddy-sand detritic bottoms of S and NE Mallorca and around Menorca, at between 90 and 250 m depth. In contrast to other deep shelf bottoms, these crinoid beds are characterised by a high biomass of invertebrates (mainly Echinus spp. and *Stichopus regalis*). These beds have a possible role in the production of some demersal resources, such as *Merluccius merluccius* and *Mullus barbatus* (Colloca et al., 2004).

White coral communities

Located at depths of between 300 and 1000m, these benthic communities are dominated by colonies of the scleractinians *Lophelia pertusa* and *Madrepora oculata*. Their current distribution is poorly known, although they appear to have been very common in the Mediterranean at the time of the last glaciation (Arzzidone 2006). These cold-water corals form reefs which support high local biodiversity and productivity. The occurrence of live colonies of *Madrepora oculata* have been reported from the Balearic Islands (Cartes et al., 2004; Tursi et al.,2004).

Gorgonians (Isidella elongata) communities

The octocoral *Isidella elongata* characteristically colonises mud substrates in waters of between 500 and 1200 m. Around the Balearics, high densities of Isidella sp. have been reported on the continental slope off N and S Ibiza Island. Areas of both live and dead corals support commercially exploited species. For example, hake (*Merluccius merluccius*), blue whiting (*Micromesistius poutassou*), deep water pink shrimp (*Parapenaeus longirostris*) and the giant red shrimp (*Aristaeomorpha foliacea*) are more abundant in areas with live corals over this depth range. The red shrimp *Aristeus antennatus*, which is the most important of the commercial species exploited in these habitats appears to be more abundant in areas with dead corals. In general, these octocoralline assemblages have been heavily compromised by trawl fishing. (Arzzidone 2006; Maynou and Cartes 2006).

Tall sea pen (*Funiculina quadrangularis*) communities

Throughout the Mediterranean, muddy deep shelf edge and upper slope areas support sometimes large colonies of the anthozoan *Funiculina quadrangularis* while other areas support the large brachipods *Gryphus vitreus*. Aguilar et al., (2007b) reported *Funiculina quadrangularis* communities along with other cnidarian species (e.g. Pennatula spp., *Pteroides griseum*, *Virgularia mirabilis*) on soft bottom substrates at many locations around the Cabrera archipelago. In common with the coral *I.elongata*, sea pen communities appear to have been seriously degraded by bottom trawling at many locations in the Mediterranean (Arzzidone 2006).

Cold seeps

The recent discovery of sea floor pockmarks in the Ibiza Channel (Acosta et al., 2001b) and in the Mallorca Channel (Acosta et al.,2004b) suggests that cold seep type communities may be a feature of these areas.

c) Pelagic

Both hydrodynamic forces in the area as well as the complex topographic features in the Balearics determine its productivity. Particularly its southern part is a convergence area and therefore a strong retention zone where there is a high concentration of nutrients due to the presence of fronts and mixing zones associated with reefs, canyons, seamounts and islands (Hyrenbach, 2000).

The Mallorca Channel acts as a meeting point of the MAW and LAW water masses and the strong frontal systems generated along the northern side of Mallorca Island could explain the higher zooplankton biomass reported there (Cartes et al.,2008). In addition, the Balearic Currents are also associated with the transport of nutrients accounting for the high concentrations of chlorophyll found in open sea waters off the Balearic Islands in summer (Jansá et al., 2004; Sabatés et al.,2007). Other relevant mechanisms that enhance the local productivity in the Mediterranean off the Balearics Islands are associated with changes in the slope orientation, the presence of canyons and shallow seamounts that interact with the currents creating upward vertical components typically upstream from these topographic features (Font et al.,1990; Masó et al.,1990). The existence of these mechanisms would explain the moderate levels of primary production recorded, especially in the western basin, as well as the relatively high fishery yield (Sabatés et al.,2007).

Productivity occurs all along the water column, with seasonal variations. The upper layer of the water column shifts from well mixed water during autumn & winter to a strongly stratified one during spring and summer. The development of a thermocline in spring prevents vertical water mixing and nutrient supply to the surface waters is interrupted, causing a depletion of nutrients in the surface while deep chlorophyll maximum (DCM) can be found at the bottom of the photic zone (Estrada, 1985).

2. Species

a) Endemic species

According to Cartes and Sorbes, (1999), 25.4% of bathyal malacostracan crustacean peracarida in the Catalano-Balearic Basin can be considered as endemic. In the Algerian Basin, at depths between 249 and 1622 m, the percentage of endemic species among suprabenthic peracarida was slightly lower than in the Catalan Sea (18.2%: calculated from Cartes et al., 2003). Below 2500-3000 m the number of endemic species is low, particularly in the deep bathyal domain. New sampling programmes are increasingly reporting new endemic taxa in the deep Mediterranean, and the faunal composition of deep-sea communities is far from being completely recognized, especially for small faunal groups (Cartes et al.,2009).

Three species of seabirds are endemic to the Mediterranean region, and one of these, the Balearic shearwater (*Puffinus mauretanicus*), is restricted to the Balearic Archipelago. The Balearic shearwater is the rarest Mediterranean seabird with an estimated breeding population of only 3300 pairs (Aguilar 1991). The lack of specific knowledge about this threatened shearwater is of particular concern since a good understanding of its biology is important in order to design appropriate conservation strategies (Oro et al.,2009).

b) Bluefin tuna

BFT are of considerable commercial importance and the eastern stock of BFT ranges over the eastern part of the Atlantic Ocean, from Iceland to Cape Blanco off the Moroccan coasts. Migration towards the Mediterranean takes place during the reproductive season with spawning mainly taking place in June (Rodríguez-Roda, 1967). BFT appear to exhibit spawning site fidelity in both the Mediterranean Sea and the Gulf of Mexico, the two main spawning areas which have been clearly identified (Block et al., 2005; Teo et al.,2007). Hence, adults born in the Mediterranean Sea return to the western and central areas to spawn. The southern Balearic area is considered one of the most important spawning sites for the species along with others which have been identified in Sicilian waters and in the eastern basin off the coasts of Turkey and northern Cyprus (García et al.,2003; Karakulak et al., 2004).

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

In May 2008 WWF published a proposal, supported by Greenpeace, to permanently close the waters surrounding the Balearics to fishing in order to protect the tuna spawning grounds (WWF, 2008b). The report, *Spatial management to support recovery of the Atlantic bluefin tuna in the Mediterranean*, lays out the evidence for the continued importance of Balearic waters as a spawning ground for bluefin tuna and other large pelagics as well as setting out the political arguments. On the basis of the scientific evidence presented it also sets out the geographical boundaries for the area as presented in Figure 2.

c) Other pelagic fish

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

d) Marine mammals

In addition to species of marine mammals present throughout the year, such as the bottlenose dolphin, other marine mammals are sighted around the Balearic Islands and these waters may be important to them as possible feeding and mating ground.

The fin whale is the largest free-ranging predator found in the Mediterranean Sea. Recent studies (Cotté et al., 2009) suggest that fin whales have a year round presence to the North of the Balearic Islands with winter distribution patterns being more dispersed. It appears that whales were observed mostly within the mean cyclonic circulation in the northern part of the Western Mediterranean, limited to the north by the Northern

Current and to the south by the North Balearic front (Rio et al., 2007). This species is known to favour upwelling and frontal zones with high zooplankton concentrations.

In the Mediterranean Sea, the sperm whale mostly inhabits the continental slope waters where mesopelagic cephalopods, the species' preferred prey, are most abundant (Reeves and Notarbartolo 2006). Buchan (2005) concluded that oceanographic parameters together with depth and topography were most relevant to sperm whale presence in Balearic waters. In the eastern Mediterranean, both solitary males and social units may remain in a limited area for more than a month, or may visit that area repeatedly during the same summer season, indicating that they stay in neighbouring waters (see Reeves and Notarbartolo 2006) Genetic data suggest that sperm whales in the Mediterranean constitute a separate population (see Drouot et al. (2004).

e) Marine turtles

The Balearic Archipelago is an important developmental habitat for loggerhead turtles. The loggerhead turtle has a complex life cycle (Carreras et al., 2004). Large numbers of late juvenile loggerhead turtles occur all year round off the Balearic Islands (e.g. Mejías and Amengual, 2001) while juvenile loggerhead sea turtles from rookeries located in the eastern Mediterranean and the north-western Atlantic use feeding grounds in the Western Mediterranean (Carreras et al., 2006) but there they experience high levels of attrition due to long-line by-catch. A recent study of loggerhead feeding in those living near the Balearic Archipelago suggested that the bulk of the diet of turtles is represented by squid and the Mediterranean jelly, *Cotylorhiza tuberculata*. Jellyfish and squid are the staple food for immature loggerhead turtles off the Archipelago and longline bait is the most likely source of some prey species, explaining the high levels of turtle interaction with longline fisheries (Carreras et al., 2004; Revelles et al., 2007). In addition boat collision, debris ingestion, and pollution have been identified as potential threats to turtles at sea (Lutcavage et al., 1997). However available information suggests that fishing is the most important one, as some declining populations are known to have recovered once fishing mortality was reduced (NMFS-SEFSC 2001). Loggerhead by-catch off the Balearic archipelago is likely to have a detrimental effect on the numbers nesting on beaches elsewhere (Carreras et al., 2004).

f) Sharks

71 species of cartilaginous fishes live and breed in the Mediterranean and many of these are present in the Balearic region (Cavanagh and Gibson 2007). For many species, there is very little information available.

Aggregations of basking shark (*Cetorhinus maximus*), have been observed in the northern Balearic region, (Walker et al. 2005). A strong correlation between the presence of *C. maximus*, chlorophyll concentration and prey abundance in these areas indicates that they are important feeding sites (Sims 2003; Sims et al. 2003).

Feature condition and future outlook of the proposed area

1. Overfishing and impacts of fishing activities

a) Fishing activity

According to (2009) data provided from the Balearic Parliament (Consellería d'Agricultura i Pesca del Govern Balear), the fishing fleet of the Balearic Islands is mainly represented by artisanal fishing boats (349 fishing boats which use gillnets as the main fishing gear). The second in importance is the bottom-trawling fleet with a total of 55 trawlers with fishing permits in the area. Others include purse seiners and longliners with 12 fishing boats active in each fishery.

b) Bluefin tuna and swordfish under threat

The bluefin tuna is one of the main target species for the purse seine fleets that operate to the south of Balearic Islands, southwest of Mallorca Island, between Mallorca and Ibiza (WWF 2008a, Garcia et al.,2003, 2004). This is a known spawning area for this species that is now closed to purse seiners and large long-liners during the July spawning period. Long-term over-fishing and mismanagement of bluefin tuna in the Mediterranean has led to a rapid decline and the incipient collapse of the stock. Serious concerns are now attached to the long term survival of this valuable resource species (ICCAT, 2008a; WWF 2008a). The Standing Committee for Research and Statistics (SCRS) for ICCAT produces a biannual stock assessment for the species. In 2008 the SCRS made an evaluation from the ICCAT vessel list and estimated a probable catch in 2007 of 47,8000t for the Mediterranean. Combined with a further 13,200t for the East Atlantic the total catch for the stock came to 61,100t. This figure is twice the legal quota which is set at 29,500t and over four times the level of 15,000t recommended by ICCAT's own scientific advisors. As acknowledged by the Committee there is also significant underreporting which is substantiated by markets data (ICCAT 2008a). The fleet that operates around the Balearic Islands are of French and Catalan origin rather than from the local Balearic fleet.

Swordfish is also known to spawn in these waters and has been similarly over-fished with the fishery taking many large catches of small fish under three years old, many of which have never spawned. The total 2006 catch has been estimated to be around to 14,000 t. ICCAT's SCRS believes that the spawning stock level is less than half that necessary to achieve the ICCAT Convention objective and that its estimates of recent fishing mortality rates are more than twice the amount, which if allowed to continue unabated is expected to drive the spawning biomass to a very low level within a generation (ICCAT 2008b).

c) Use of destructive fishing techniques – bottom trawling

The trawl fisheries operating around the Balearic Islands target around 104 species (Massuti et al.,1996). Target species include the red shrimp (*Aristeus antennatus*), red mullet (*Mullus surmuletus*), hake (*Merluccius merluccius*), Norwegian lobster (*Nephrops norvegicus*), picarel (*Spicara smaris*), blue whiting (*Micromesistius poutassou)*, In the Balearic Islands, there are two main fishing grounds where the fleet mainly operates: The Ibiza-Formentera and the Mallorca-Menorca channels (Canals et al., 1982). Exploitation of demersal resources extends from 800m to 1000m depth in some northern areas. On the shelf break and upper slope there are two main target species: the European hake, fished at the shelf break and the beginning of the slope between 120 and 350 m depth, and the red shrimp, which is fished on the upper slope between 550m and 800m depth. Currently, the Mallorca trawl fleet operates in greater depths of water during the summer (Moranta et al.,2008).

Trawling is known to have extremely marked direct impacts on the sea-bottom (Demestre et al., 2000, Tudela 2004). The biological communities found in submarine canyons, cold seeps, cold-water coral reefs, seamounts and brine pools are threatened by uncontrolled bottom trawling fishing (Cartes et al.,2004). Gorgonian communities (e.g. *Isidella elongata*) (which can harbour target species such as red shrimps) and other sessile organisms are immediately removed from soft bottoms by trawling. This changes the associated benthic community . Trawling on Isidella spp. communities causes direct impacts on the slope assemblages, by removing the habitat-forming corals. This decreases the species diversity of this habitat and shifts the biological community to one more dominated by benthophagous species (Maynou and Cartes 2006).

As a result of trawling damage, biological assemblages change from those dominated by filter feeders (e.g. sponges, brachiopods such as *Gryphus vitreus*) and low-trophic level predators (gorgonians) towards other communities dominated by deposit feeders and their predators. Trawling may also have a negative impact on colonies of other hard-bottom dwelling and rare corals (e.g. *Lophelia pertusa* and *Madrepora oculata*), living in the deep Mediterranean. Maërl beds in the channel between Mallorca and Menorca and neighbouring areas are also threatened by bottom trawling (Massuti and Ordinas 2006). In addition to the red coralline algae which slowly form the maerl, the beds also support the brown algal species *Laminaria rodriguezii*, which is well represented in the Cabrera archipelago (Aguilar et al.,2007b) Trawl fishery bycatch is considered to be the single greatest threat to cartilaginous fish species in the Mediterranean according to the last IUCN Red List assessment results. All species are affected or are potentially affected, although for certain pelagic species such as blue shark (*Prionace glauca*) and makos (Isurus spp.) the impacts may predominantly affect specific life stages. The K-selected life history characteristics of most chondrichthyan fishes render them intrinsically vulnerable to fishing pressure since they mature slowly and produce few young. Populations, once depleted, have little capacity to recover (Cavanagh and Gibson, 2007).

d) Bycatch

Longline fishing gear is a significant source of seabird mortality through bycatch (Oro et al., 2004; Arcos et al., 2008). Turtles are also vulnerable (Aguilar et at., 1995, Tómas et al., 2002), together with sharks (Cavanagh and Gibson, 2007), and cetaceans (see: Reeves and Notarbartolo di Sciara 2006)). Longline fisheries targeting swordfish and tunas also pose a great threat to susceptible chondrichthyans taken as bycatch in this fishery (ICCAT, 2001).

In addition, cetacean species may be affected by the artisanal fleet operations (Silvani et al., 1992, Reeves and Nortabalo di Sciara, 2006). In the Balearic Islands, the inshore occurrence of bottlenose dolphins coupled with the fact that the local fleet is extensive and mostly operates near the coast, has made interactions between these cetaceans and fisheries particularly common. According to fishermen, interactions are particularly intense in trammel net fishing for red mullet (*Mullus surmuletus*). Dolphins are held responsible for damaging nets and causing significant losses to the catch.In the past, this has led to the harassment and deliberate killing of dolphins by fishermen (Silvani et al.,1992).

2. Pollution

Organochlorine compounds have been identified as contaminants of the deep Mediterranean, as evidenced by both the physical detection of xenobiotic chemicals in deep water organisms and the activation of enzymes systems such as the P450 cytochrome system in contaminated organisms which indicate exposure to persistent xenobiotics. Elevated enzyme activity has been detected in deep-sea fish living between 1500-1800m depth (Porte et al., 2000). Polluting chemicals can contaminate food resources, concentrating in animals at the top of the food chain such as marine mammals, sharks and seabirds. At high levels these chemicals can affect physiological and reproductive functioning (UNEP MAP RAC/SPA 2003). A number of studies have shown that some Mediterranean elasmobranch fish such as the spiny dogfish (*Squalus acanthias*), have flesh concentrations of mercury high enough to render them dangerous for human consumption. Trace metals and organochlorine residues have been found in the eggs, muscles, liver and kidneys of deep sea sharks such as gulper shark (*Centrophorus granulosus*) and blackmouth catshark (*Galeus melastomus*), also confirming that deepwater species are also being affected by pollution (UNEP RAC/SPA 2002).

In addition to impacts from chemicals entering the Mediterranean Sea from land based sources, large amounts of plastic debris also enter the sea from land based activities and the operation of recreational and commercial fishing boats. Fishing gear, plastics and a variety of unidentified objects were found in many of the areas of the Cabrera Archipelago studied (Aguilar et al., 2007b).

3. Alien species

Introduced alien species are a major driver of biodiversity loss in the Mediterranean. Six of the eight marine macroalgae known to behave as invasive species in Mediterranean benthic communities have been recorded in the Balearic Islands during the last fifteen years (Holmer et al., 2009). There has been an invasion of the green algae *Caulerpa taxifolia* and *Caulerpa racemosa* which outcompete seagrass species, particularly Posidonia meadows (Galil 2007). *Caulerpa racemosa* has not been studied as intensively, as *C. taxifolia*, but it is becoming clear that it may adopt different morphological characteristics in different regions, that it can colonise all types of substrata including rock, sand, mud and dead Posidonia meadows, down to 60 m depth. It can interfere with marine coastal biocenoses and its expansion in range, may alter marine habitats. A recent study involving ROV techniques conducted in the National- Maritime Park “Cabrera archipelago” (south of Mallorca Is) showed abundant presence of *Caulerpa racemosa* and the red invasive algae *Lophocladia lallemadi*, particularly in the northern and southern extremities of the studied area (Aguilar et al., 2007b).

One of the invasive species that represents the greatest danger to coralligenous beds is *Womersleyella (Polysiphonia) setacea*. This species grows quickly and reduces the amount of light that reaches the constructing algae (Perez et al.,2000) and also diminishes biodiversity in this community (Airoldi et al.,1995). Other invasive species that can affect the growth and development of this habitat are *Lophocladia lallemandii*, *Asparagopsis taxiformis* and *Caulerpa taxifolia* (Aguilar et al., 2007b). There is evidence that already degraded habitats can be more easily overwhelmed by invasive alien species (Galil, 2000; Occhipinti-Ambrogi and Savini 2003).

4. Tourism

Tourism is the main industry in Majorca and Menorca. In 2005 they together received 9.3 million visitors and there are 35,000 leisure boats registered in the islands, amounting to one boat for every 25m of coastline. Many boats anchor without any kind of control over all types of seabed habitat. In particular, frequent diving activities in areas of high ecological value can bring about serious damage from repeated anchoring in coralligenous zones. The increase of human population in coastal regions, particularly during the summer months (Blue Plan 2006) has altered breeding sites of many marine species. Some of these are listed as endangered (e.g. Loggerhead turtle (*Caretta caretta*) and the Balearic shearwater (*Puffinus mauretanicus*) (IUCN, 2013). Human disturbance of birds can cause them to abandon their young. In the case of the Balearic shearwater it has been estimated that if disturbances and impacts are maintained at their current level, there is a 50% chance that the species could become extinct within the following three generations (Arcos and Oro 2003).

5. Climate change and ocean acidification

Although assessments have been made of the potential impacts of climate change within the various European regions (see: Schroter et al 2005), the potential changes in marine systems have not been well characterized to date. In relation to the Mediterranean, sea water temperature and salinity are likely to increase over the whole of the Mediterranean Sea, with variations existing between different regions. Modelling of the impact of such changes suggests that the deep water circulation processes in the Mediterranean Sea could be disrupted, and the intensity of winter convection decreased (Somot et al.2004). Analysis of changes in the Western Mediterranean Deep Water (WMDW) circulation suggests that the WMDW could be highly sensitive to rapid climate change (Frigola et al.2008).

The impacts of anthropogenically driven climate change upon biological systems remain highly speculative. Nonetheless, it is likely that they will be profound. Such impacts could include changes in the natural boundaries of the different biogeographic regions of the Western Mediterranean. Hence, some warm water species could be driven north into areas from which they were previously absent (European Science Foundation, 2007). This is supported by the fact that the temperature of the western Mediterranean has been rising for the last 20 -30 years and scientists have already recorded a concomitant increase in the abundance of some thermophilic species, including algae, echinoderms and fish (Allsopp et al.2009). A recent study has also concluded that the Mediterranean Sea, a hotspot of endemism, is under increasing threat from invasions of exotic fish species from further south which are benefitting from global warming by expanding their ranges northwards (Lasram and Mouillot 2009).

Large scale atmospheric variability in the North Atlantic Ocean has been shown to be a major driver of the regional meteorological variations and hydrographic patterns in the Balearic Sea area. In turn these control the abundance of copepods both directly and indirectly (Fernández de Puelles and Molinero 2007). A 2005 study showed that the increased temperatures experienced in the western Mediterranean during the 1980s led to increases in the numbers of jellyfish. These predated upon zooplanktonic species resulting, among other things, in a strong decrease in copepod abundance (Molinero et al.2005). Changes in the availability of plankton due to climate change are likely to result in significant cascade effects throughout the marine foodweb.

The favoured food of the fin whales *Balaenoptera physalus* inhabiting the Mediterranean is the coldwater euphausid species *Meganyctiphanes norvegica* and the whales' distribution appears to be closely linked to the distribution of their prey (Cotté et al.2009). If environmental conditions become unsuitable for this euphausid, it is not likely to be able to adapt since its scope for northwards movement is restricted by the enclosed nature of the Mediterranean. This will have significant consequences for the fin whales and for other predators (Gambaiani et al. 2009).

The rise of atmospheric CO_2 is also predicted to make the oceans more acidic. As CO_2 is absorbed by the ocean it combines with the water resulting in the formation of carbonic acid, so lowering the pH. As the seawater becomes more acidic so the concentration of calcium carbonate in the form of calcite and aragonite decreases with serious consequences for those organisms that rely on calcification for building their shells and other skeletal structures. The marine species most likely to be affected by this acidification will be small and thin-shelled organisms that use $CaCO_3$. These include calcifying plankton (e.g. coccolithophores), coralline algae, pteropod molluscs and coral polyps (e.g. reef-building scleractinian corals) (see Turley and Findlay, 2009).

Climate change and ocean acidification together pose serious threats to maërl and coralligenous beds, as changes in sea temperatures as well as in pH can affect calcification rates of the algae involved in these communities. Several episodes of mass mortality of suspension-feeding animals in large areas of coralligenous beds in the Mediterranean Sea (Ballesteros 2003) have been related to the high temperatures that were reached in these waters (Vacelet 1991). The impacts of climate change upon migrating bird populations remain unclear. Potential changes in the migration sites and winter grounds for the endangered Balearic shearwater, for example, are poorly documented and understood (Arcos and Oro, 2004). While climate change has been considered to be a determining factor of changes in winter distribution of the species in the Atlantic (Wynn et al., 2007), this has been disputed and remains unresolved (Votier et al., 2008).

Assessment of the area against CBD EBSA Criteria

CBD EBSA Criteria (Annex I to decision IX/20)	**Description** (Annex I to decision IX/20)	**Ranking of criterion relevance** (please mark one column with an X)			
		No information	**Low**	**Medium**	**High**
Uniqueness or rarity	Habitats present that could be considered rare, dependent on the scale of observations, include: maerl beds and other coralligenous beds; Peyssonnelia (soft red algae) beds at 40m – 80m; Leptometra (crinoid) beds; stands of the deepwater scleractinian corals *Lophelia pertusa* and *Mardrepora oculata*; colonies of the deepwater octocoral *Isidella elongata*; and *Funiculina quadrangularis* (cnidarian) communities (Massutí and Ordinas, 2006; Aguilar et al, 2007a; Ballesteros, 1994; Tursi et al, 2004; Massutí and Reñones, 2005). The potential presence of cold seep communities is indicated by pockmarks in the Ibiza and Mallorca Channels (Acosta et al, 2001b). Balearic shearwater *Puffinus mauretanicus* is an endemic species, which breeds only in the Balearic Islands (Mayol et al, 2000). It has been estimated that 25.4% of bathyal pericarid crustaceans in the Catalano-Balearic Basin are endemics (Cartes and Sorbe, 1999).			X	
Explanation for ranking A number of rare and endemic habitats and species can be found in the Balearics area, including maerls and coral beds, the Balearic shearwater. The presence of cold seeps is indicated by pockmarks.					
Special importance for life-history stages of species	Complex oceanography creates conditions suitable for the spawning of a large number of pelagic fish species. This is an important spawning area for the eastern stock of Atlantic bluefin tuna *Thunnus thynnus* (García et al, 2003). Other species that spawn here include: albacore *Thunnus alalunga*, bullet *Auxis rochei*, frigate *Auxis thazard* and skipjack *Katsuwonus pelamis* tuna; little tunny *Euthynnus alletteratus*; Atlantic bonito *Sarda sarda*; common dolphinfish *Coryphaena hippurus*; swordfish *Xiphias gladius*; Tetrapturus sp. (marlins and spearfish); and foragefish species including anchovy *Engraulis encrasicolus* and round sardinella *Sardinella aurita* (Alemany and Vélez-Belchi, 2005; Alemany et al, 2006). The Balearic Islands contain breeding colonies of Balearic shearwater (endemic) (Mayol et al, 2000); Audouin's gull *Ichthyaetus audouinii* (one of three western Mediterranean breeding colonies, that together account for 80% of the global population, is located at Cabrera archipelago) (Oro and Muntaner, 2000); Yelkouan shearwater *Puffinus yelkouan* (a colony of 100 – 150 pairs breeds at Minorca) (Birdlife, 2009); Cory's shearwater *Calonectris diomedea* (GOB, 2005); European shag *Phalacrocorax aristotelis* (estimated 96.6% of the Mediterranean subspecies) (Alvarez and Velando, 2006). Sperm whales *Physeter macrocephalus* are regularly observed in the vicinity of the Balearic Islands, where the complex oceanographic and topographic conditions are suitable for feeding (Buchan, 2005). Social units				X

	with calves were observed historically on a frequent basis, suggesting that calving sites could potentially occur (Reeves and Notarbartolo di Sciara, 2006). Fin whales *Balaenoptera physalus* are sighted year-round in the vicinity of the Balearic Islands – frontal zones, such as the North Balearic Front, provide areas of high zooplankton concentration suitable for feeding (Cotté et al, 2009). A putative subpopulation of bottlenose dolphins *Tursiops truncatus* in the Balearic Islands is considered to be amongst the best preserved in the Spanish Mediterranean (Forcada et al, 2004). Important feeding area for late juvenile loggerhead turtles *Caretta caretta* from rookeries in the eastern Mediterranean and NW Atlantic (Carreras et al, 2006; Mejías and Amengual, 2001). Aggregations of basking sharks *Cetorhinus maximus* have been observed in the Balearic region (Walker et al, 2005). Strong correlation with basking shark prey abundance suggests that this could be an important feeding area (Sims et al, 2003).				
Explanation for ranking The area is an important spawning ground for a large number of pelagic species, including bluefin tuna, other smaller tuna species and small pelagics. It is an important breeding area for the Balearic shearwater, Audouin's gull, Yelkouan shearwater, Cory's shearwater *and* European shag. It is also the feeding and potentially calving site for Sperm whales and Fin whales, feeding area for loggerhead turtles and basking sharks.					
Importance for threatened, endangered or declining species and/or habitats	Balearic shearwater (CR) – estimated population of 3300 breeding pairs in early 1990s (Aguilar, 1991), has declined to an estimated population of <2000 breeding pairs (Oro et al, 2009). There is a predicted 50% probability of extinction over three generations if current trends continue (Arcos and Oro, 2003). Yelkouan shearwater – breeding numbers are declining rapidly and has recently been upgraded to VU (Birdlife, 2009). Atlantic Bluefin tuna (EN). Bottlenose dolphin (VU); sperm whale (EN); fin whale (VU); short-beaked common dolphin *Delphinus delphis* (EN); striped dolphin *Stenella coeruleoalba* (VU) (Reeves and Notarbartolo di Sciara, 2006; Bearzi et al, 2003) . Blue shark *Prionace glauca* is listed as NT globally, but one study has found that its status is VU in the Mediterranean*;* great white shark (Morey et al, 2003) *Carcharadon carcharias* (VU but study found status is EN in the Mediterranean)*;* Squatina spp. (angel shark and sawback and smoothback angel shark); the rabbitfish is classified as NT but high levels of fishing mortality have led to concerns that it may soon qualify as VU (Cavanagh and Gibson, 2007; Sion et al, 2003). Loggerhead turtle (EN); leatherback turtle *Dermochelys coriacea* (VU) (Casale et al, 2003). Protected species included in the annexes of the Protocol concerning Specially Protected Areas and Biodiversity in the Mediterranean (BARCOM-SPAM) occur on the Emile Baudot and Aurias March seamounts, including triton snail *Charonia lampas*, elephant ear sponge *Spongia agaricina* and the carnivorous sponge *Asbestopluma hypogea* (previously known only from shallow-water environments) (Cartes				X

<table>
<tr><td></td><td>et al, 2008; Aguilar et al, 2007a).

The Balearic Islands are within the historical range of the Mediterranean monk seal Monachus monachus (CR), which is considered to be the world's most endangered pinniped (IUCN, 2013).</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="6">Explanation for ranking
This area hosts a number of threatened and endangered species ranging from sharks, dolphins and whales to bluefin tuna, snails and sponges. The area is also important for the Balearic shearwater which has 50% probability of extinction over three generations if current trends continue.</td></tr>
<tr><td>Vulnerability, fragility, sensitivity, or slow recovery</td><td>Vulnerable and fragile benthic habitats include: maerl beds, which occur on sandy and gravelly bottom at depths to 90m; maerl and other forms of red algal bio-concretion (thin sheets, 'cobbles' and large bio-concretions), which occur on the Emile Baudot and Aurias March seamounts to depths of 160m; Leptometra (crinoid) beds; stands of the deepwater scleractinian corals Lophelia pertusa and Madrepora oculata; colonies of the deepwater octocoral Isidella elongata; Funiculina quadrangularis (cnidarian) communities (Massutí and Ordinas, 2006; Aguilar et al, 2007a and b; Tursi et al, 2004; Massutí and Reñones, 2005).

Species with vulnerable life histories include: Balearic shearwater; sperm whales; fin whales; bottlenose dolphins; striped dolphins; common dolphins; chondrichthyan species; loggerhead and leatherback turtles.</td><td></td><td></td><td>X</td><td></td></tr>
<tr><td colspan="6">Explanation for ranking
The Balearics hosts vulnerable and fragile benthic habitats including maerl beds and corals which are characterized by slow recovery. A large number of specie with vulnerable life histories are found in the Balearics.</td></tr>
<tr><td>Biological productivity</td><td>Areas of high primary productivity and zooplankton concentration are created by oceanographic features that result from interaction between two water masses and complex island topography. Plankton biomass is concentrated by a strong front in the Mallorca Channel (Cartes et al, 2008). Frontal oscillations associated with the Balearic Currents create areas of high chlorophyll concentration in the Deep Chlorophyll Maximum layer (Jansá et al, 2004). Areas of elevated primary productivity result from upwelling of nutrient-rich deepwater associated with topographic features, such as canyons and seamounts (Font et al, 1990).

Productive benthic habitats include: maerl beds; other forms of red algal bio-concretion; stands of the deepwater scleractinian corals Lophelia pertusa and Madrepora oculata; colonies of the octocoral Isidella elongata; Funiculina quadrangularis (cnidarian) communities; Peysonnelia (soft red algae) beds; Leptometra (crinoid) beds; and cold seeps. Seamounts and canyons create area suitable for the development of productive deepwater habitats, eg. large specimens of yellow tree coral Dendrophyllia cornigera have been observed on the flanks of Menorca Canyon (Oceana, 2006).</td><td></td><td></td><td>X</td><td></td></tr>
<tr><td colspan="6">Explanation for ranking
The Balearic islands are areas with high primary productivity and zooplankton concentration resulting from upwelling of nutrient-rich deepwater associated with topographic features, such as canyons and seamounts.</td></tr>
<tr><td>Biological diversity</td><td>High pelagic fish species diversity, as a result of oceanographic features, which create conditions suitable for feeding and spawning. High ichthyoplankton diversity in summer months due to the</td><td></td><td></td><td>X</td><td></td></tr>
</table>

	large number of pelagic fish species that spawn in the vicinity of the Balearic Islands (Alemany and Vélez-Belchi, 2005; Alemany et al, 2006). Benthic habitats with high associated levels of species diversity include: maerl beds; other forms of red algal bio-concretion - ~300 species were identified at coralligenous beds on Emile Baudot and Aurias March seamounts, of which ~150 were particularly associated with that habitat (Aguilar et al, 2007a); stands of the deepwater scleractinian corals *Lophelia pertusa* and *Madrepora oculata*; colonies of the octocoral *Isidella elongata*, which are associated with elevated levels of invertebrate species diversity (Maynou and Cartes, 2006); *Funiculina quadrangularis* (cnidarian) communities, which provide habitat for some commercial crustacean species (Massutí and Reñones, 2005); Peysonnelia (soft red algae) beds; Leptometra (crinoid) beds, which provide habitat for juveniles and adults of commercially important fish species (Maynou and Cartes, 2006).				
Explanation for ranking The area is of high pelagic fish species diversity, as a result of oceanographic features, which create conditions suitable for feeding and spawning. There is also a large diversity of benthic habitats with high associated species diversity.					
Naturalness	The islands and coasts of the Mediterranean have been highly populated for millennia and throughout history the Mediterranean and its marine life have played a major part in the lives and cultures of the people living there. Fishing and gathering seafood have been, and continue to be, of major importance to millions of people and some of the world's busiest shipping routes are to be found in the Mediterranean. Given the multiple ocean and land based anthropogenic drivers, it is unsurprising that the global map of human impact on marine impacts drawn up by Halpern and colleagues shows the Mediterranean to be an area of high human impact (Halpern et al, 2008). It would be hard to argue that this criterion is applicable to any area in the Mediterranean and certainly not in the Western Mediterranean; this of course does not mean that areas should not be selected for protection in the Mediterranean.	X			
Explanation for ranking This is an area of high human impact. Despite the high levels of anthropogenic impacts in these areas, a subpopulation of bottlenose dolphins *Tursiops truncatus* in the Balearic Islands is considered to be amongst the best preserved in the Spanish Mediterranean (Forcada et al, 2004).					

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Maps and Figures

Figure 1: Proposed marine reserves in the Mediterranean – A: Balearic Islands

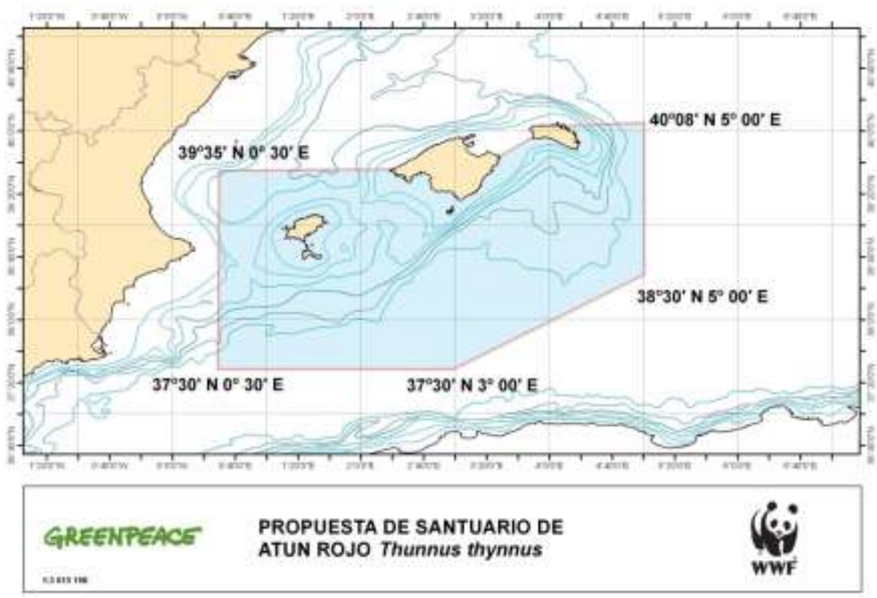
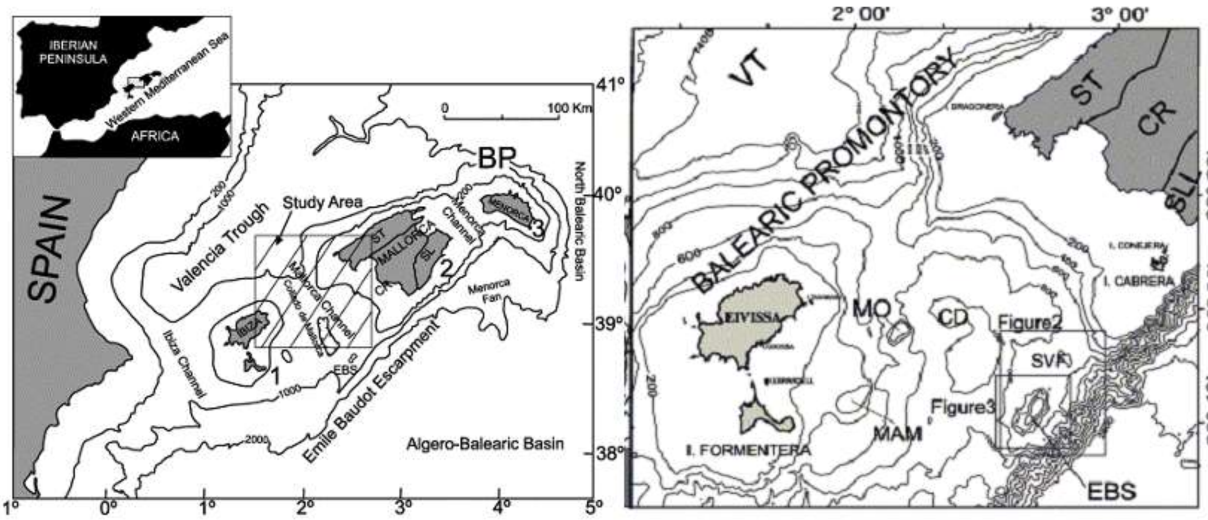


Figure 2: Area proposed by WWF and Greenpeace as a no-take marine reserve to protect the Balearic spawning grounds of the bluefin tuna.



NOTE: Contours of both maps are in meters
NOTE: AS = Alboran Sea; BP= Balearic Promontory; C= Corsica; CI = Columbretes Islands; CD = Central Depression; EBE= Emile Baudot Escarpment; EBS = Emile Baudot Seamount; F = Formentera; I = Ibiza; LB = Ligurian Basin; M= Menorca; MA= Mallorca; MAM= Mont Ausias Marc; MO= Mont dels Oliva; NB–PB = North Balearic– Provenc_al Basin; S = Sardinia; SB–AB = South Balearic–Algerian Basin; SBP= South Balearic Plateau; SVF= Southwest Volcanic Field; VT=Valencia Trough; ST = Serra Tramuntana, SLL= Serra Llevant, CR = Central Rift

Figure 3: Bathymetry of the Balearic Promontory (Source: Acosta, J., Canals, M., Carbó, A., Muñoz, A., Urgeles, R., Muñoz- Martín, A., Uchupi, E. 2004. Seafloor morphology and Plio-Quaternary sedimentary cover of the Mallorca Channel, Balearic Islands, western Mediterranean. Marine Geology, 206/1-4, pp. 165 – 179).

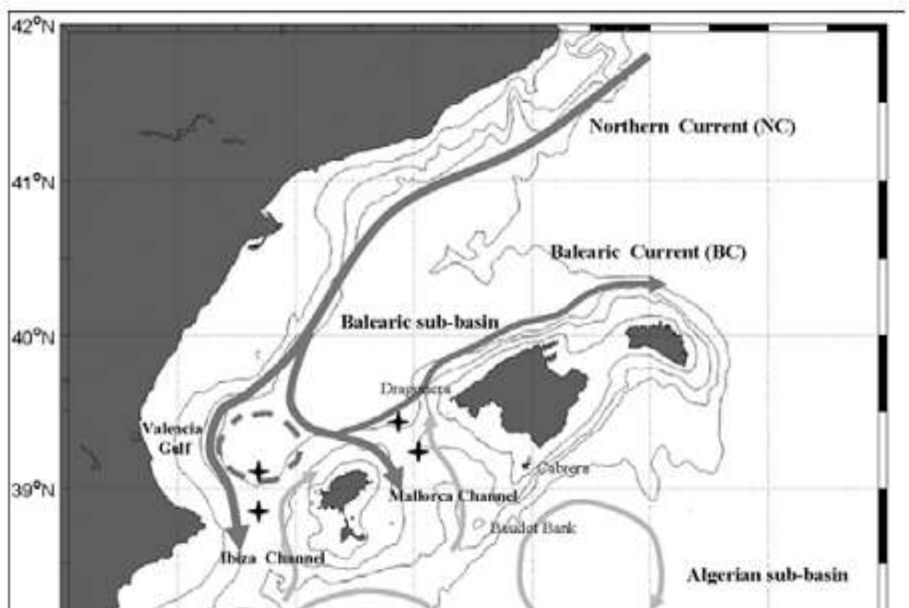


Figure 4: The Balearic Islands and the major currents characterising the regional circulation (Source: López-Jurado, J.L., Marcos, M., and S. Monserrat, S. (2008). Condiciones hidrográficas durante el desarrollo del proyecto IDEA (2003-2004). Journal of Marine Systems,71: pp. 303-315).

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