Stiftung Drittes Millennium

OCEANA | Protecting the World's Oceans

THE SEAMOUNTS OF THE GORRINGE BANK

INDEX

1. INTRODUCTION

Seamounts are considered underwater features –usually of volcanic origin or associated to tectonic activity– rising from the seafloor and peaking below the sea level. From a geological perspective, these underwater elevations have been originally described as greater than 1,000 m in relief (Menard, 1964; International Hydrographic Organization, 2008). However, since no obvious ecological rationale seems to sustain the size-based criteria (Pitcher *et al.*, 2007; Wessel, 2007), later definitions contemplate any underwater elevation rising more than 100 m (Staudigel *et al.*, 2010; Morato *et al.*, 2013). Although scientific knowledge on seamounts is very sparse, the importance of the ecosystems associated to these elevations has been recently recognized by scientist, management authorities, the fisheries industry and conservationist (Stocks *et al.*, 2012). The reason of its unusual high species richness and biomass relies on two main factors:

1. Seamounts are generally formed by hard substrata –which is absent in the surrounding flat abyssal plains– that provides the suitable ruggedness and habitat complexity for the colonization and growth of diverse fauna (Santos & Morato, 2009).

2. Seamounts induce changes in the circulation of water masses, producing tides, eddies (so-called Taylor Columns) and upwellings (White *et al.* 2007). These variations concentrate zooplankton and fish, and they increase the vertical exchange in the water column, enhancing primary production, food supply and zooplankton growth rates (Santos & Morato, 2009; IUCN, 2013).

The combination of these characteristics enriches benthic and pelagic communities around seamounts, constituting them as hotspots of biological diversity and production (Morato *et al.*, 2010). The enhanced local currents originate a highly productive system, supplying organic matter to benthic suspension feeders. These organisms, typically deep-water corals, sponges, hydroids and ascidians, are able to create intricate structures that contribute to the habitat complexity, and thus sustain a wide variety of species living in close association (Gubbay, 2003; Rogers, 2004; Probert *et al.*, 2007). These associated species are represented by deep-sea and pelagic ones, and often hold a high commercial value such as orange roughy, alfonsino, tuna and sharks. Seamounts also concentrate other animals such as highly migratory species like cetaceans, seabirds and pinnipeds, which are also regular hosts in this environment (IUCN, 2013).

According to the geographic distances between seamounts and their special hydrographic conditions, different hypothesis have raised. The "Seamount Endemicity Hypothesis" (SMEH) states ideas of faunal isolation and the presence of highly endemic taxa (McCain, 2007). Oppositely, when seamounts lie close to the continental shelf or occur in chains, studies suggest that seamounts act as stepping stones for fauna, enabling exchange and connectivity fluxes of population in the deep abyss (Hubbs, 1959; Shank, 2010; Clark *et al.*, 2012). On the other hand, seamounts commonly present different Vulnerable Marine Ecosystems (VME) as coral gardens, deep-sea sponge aggregations and hydrothermal vents. These ecosystems are known to be of immense importance and value for deep-sea and the biodiversity they contain, and are currently threaten by anthropic practices (Auster, 2011).

1.1. Seamounts in Europe

Recent studies estimate the total number of large seamounts (<1,000 m height) worldwide from 25,000 to 140,000 and small ones (>100 m height) from 125,000 to 25 million approximately (Morato *et al*., 2013).

European basins present some of these features, mainly in the Atlantic but also in the Mediterranean waters. In the case of NE Atlantic, although OSPAR's database contemplates a total of 104 seamounts –spread out in Areas Beyond National Jurisdiction (ABNJ) and EEZ from Norway, Sweden, Faroe Islands, UK, Ireland, France, Spain and Portugal– a total of 557 large seamount-like features have been inferred through bathymetric grids (Morato *et al*., 2013). Most of them lie along the Mid Atlantic Ridge (MAR), between the Charlie-Gibbs Fracture Zone, south from Iceland and the Hayes Fracture Zone (Azores latitude). There are also seamount clusters situated on the Madeira-Tore Rise, along the south west of the Rockall Bank and west of Portugal (Gubbay, 2003).

In Mediterranean waters, underwater elevations were estimated to be 59 (Kitchingman *et al*., 2007), concentrated mainly in the Alboran and Tyrrhenian seas (OCEANA, 2011). However, recent studies have raised the number up to 101 (Morato *et al*., 2013).

Laminaria ochroleuca **© OCEANA / Carlos Suárez**

Scorphaena scrofa **© OCEANA**

1.2. Legal framework

The depletion of marine resources in coastal waters and continental shelves, coupled with the increase of technology and fish demand has led the industry to seek for new fishing grounds further out and deeper into the oceans (IUCN, 2013). These new places are often situated close to seamounts, taking advantage of the aforementioned values that occur in these formations. Due to the deleterious effects on seamount's VMEs caused by destructive fishing gears (Clark *et al.*, 2010) and the unfavorable ecological characteristics of deep-sea species for exploitation (e.g. long turn-over and low reproductive rates), concerns have been raised amongst the international community and several European Authorities have –or are intended to– declared measures aiming to alleviate the damage.

- UNGA **Resolution 61/105** calls upon States to "(...) to sustainably manage fish stocks and protect vulnerable marine ecosystems, including seamounts, hydrothermal vents and cold water corals, from destructive fishing practices recognizing the immense importance and value of deep sea ecosystems and the biodiversity they contain;".

  UNGA **Resolution 64/72** calls upon States to "(...) implement the 2008 International Guidelines for the Management of Deep-sea Fisheries in the High Seas of the FAO ("the Guidelines") in order to sustainably manage fish stocks and protect vulnerable marine ecosystems, including seamounts, hydrothermal vents and cold water corals, from destructive fishing practices (...)".

- FAO **International Guidelines for the Management of Deep-Sea Fisheries in the High Seas** includes "summits and flanks of seamounts, guyots, banks, knolls, and hills" as examples of topographical, hydrophysical or geological features, including fragile geological structures, that potentially support VMEs species groups or communities. These guidelines aim to serve as a reference to help States and RFMO/As in implementing appropriate measures for the management of deep-sea fisheries in the high seas.

- OSPAR has enlisted "seamounts" as "**Threatened and/or declining habitat**". Moreover, a **Recommendation** on seamounts' management is pending to be approved early in 2014.

- Barcelona Convention's "**Dark Habitats Action Plan**" considers especial habitats and species associated to seamounts. This tool has been endorsed at the end of 2013 during the COP Meeting.

- NEAFC has adopted **temporal fishing closures** to vessels with bottom-contacting gears in large NE Atlantic regions (Mid-Atlantic Ridge, Reykjanes Ridge, etc.) including several seamounts (e.g. Altair and Antialtari seamounts), in order to protect VMEs in line with ICES Recommendation.

- GFCM has included actions such as "Develop mid-term research programmes to identify conservation measures and to promote sustainable use of deep-sea habitats (seamounts, canyons and deep coral populations) and related fishing stocks" and "Collect environmental and biological information on marine seamounts" on its **Programme of Work for the Intercessional Period 2013-2014.**

Most of the aforementioned management measures involve different underwater elevations including seamounts and banks. In the NE Atlantic, that is the case of Charlie-Gibbs Fracture Zone Marine Protected Area (MPA) that presents seamounts as Minia, Hecate and Farday; and Mid Atlantic Ridge North of the Azores MPA, which includes Gnitsevich seamount. Other seamounts protected under OSPAR MPA Network are: Anton Dohrn, Altair, Antialtair, Milne, L'Esperance, Seldo, Dom João de Castro, Crumb, El Cachucho, and Josephine. Some of them coincide with protected areas designated by other Authorities, as for example Altair and Antialtair seamounts, closed to bottom-fisheries by

NEAFC, and El Cachucho, designated under Natura 2000 Network. Further Natura 2000 nominations are to be designated in underwater features like Galicia and Concepción Banks in 2014.

In the Mediterranean Sea, only the biggest seamount (Eratosthenes) is currently protected under a "Fisheries Restricted Area" from GFCM (REC.GFCM/2006/3). Further protections are planned to be implemented in 2014 as it is the case of Chella Bank in Spanish national waters under Natura 2000, and the seamounts of Mallorca Channel (Ausias March and Emile Baudot), whose summits (above 200 m depth) will be protected against bottom trawling under the EC Regulation 1967/2006.

Unfortunately, most of the European seamounts still fall out of existing MPAs' boundaries and lack an appropriate management regulation. Besides its high ecological value, these features are crucial for population connectivity and larval exchange, which induces resilience and impact mitigation to the whole system (Williams *et al.*, 2010). Therefore, its inclusion under a protection status would be essential in order to achieve the creation of a well-connected and well-managed MPA Network (recommended by CBD COP 7), which, to the date, isn't accomplished by European Authorities.

Balistes capriscus **© OCEANA / Carlos Suárez**

2. THE GORRINGE BANK

The Gorringe Bank, located 160 nautical miles SW off the Portuguese coast, has been object of several studies since it was discovered in 1875 by Captain Henry Honeychurch Gorringe and his crew. After that, in the twentieth century, Prince Alberto I of Monaco developed various campaigns in the area. Ever since, several studies have taken place in Gorringe Bank by means of different sampling tools (dragnets, bottom trawl nets, etc.) and sonar systems, although it was only in 1998 when the first divers documented the summits of its seamounts. Thanks to this previous work, it is now known that the base of the Gorringe Bank lies at 5,000 m depth, and that the peaks of the two main seamounts that form this elevation (Gettysburg and Ormonde) are placed at less than 50 m beneath the sea surface. This is, indeed, what confers to this underwater feature its peculiarity, allowing the occurrence of a wide range of species going from photosynthetic to abyssal ones, which live in complete darkness. In relation to this, it is also notorious the vast diversity of habitats and its high levels of productivity, especially in those ones that are placed in the euphotic zone.

Oceana has carried out various expeditions in the Gorringe Bank, cataloguing more than a hundred species and a wide variety of habitats. The first expedition took place in 2005, and subsequent ones in 2011 and 2012. In total, more than 52 ROV footage hours (during 21 dives), complemented with more than 10 hours recorded during scuba dives and around 2,200 pictures have been undertaken in Gorringe waters. During these dives, samples of different organisms have been collected for further identification. Mayor achievements involve the collection of comprehensive biological information and the documentation of important habitats and species such as commercial ones and VMEs indicators, never documented before in these area. These findings support the multiple evidences of the highly valuable enclave that the Gorringe Bank represents, and its high necessity for protection.

***Torpedo marmorata* © OCEANA / Carlos Suárez**

2.1. Species

Due to the high productivity that seamounts present, they are regularly frequented by widely-distributed or migratory species that spent important periods of their lifecycle, such as mating and reproduction.

Underwater features peaking in shallow waters –as is the case of Gorringe Bank– tend to concentrate similar species to the surrounding areas (Gullet & Dauvin, 2000). Indeed, this place may serve as an important spot for species' extension and recolonization in the West Mediterranean and Macaronesian zones, but it also presents different endemisms. Two examples of what could be regarded as unique species in this area are the hydrozoa *Pseudoplumaria sabinae* and the Picnogonida *Austrodecus conifer* (Stock, 1991), although more research have to be done in this line.

In this study, more than 350 species have been identified along the 3 campaigns that Oceana has conducted. The most numerous phylum found was Chordata (81 species), followed by Cnidarian (67 species) and Porifera (41 species). After those, most recognized species belonged to Mollusca (37 species) and Echinodermata (25 species), followed by algae phylum (Rodhophyta - 22 species, Orchophita - 14 species and Chlorophyta - 4 species). On the contrary, only one species was identified for phylum Ctenophore (Bolinopsis infundibulum) and Foraminifera (*Miniacina miniacea*). Detailed list is available in Annex I.

Marine mammals are commonly seen in these waters, and some species have been spotted during Oceana's campaigns: *Delphinus delphis, Balaenoptera acutorostrata, B. physalus, Grampus griseus,* Stenella *coeruleoalba* and *S. frontalis*. Other highly migratory pelagic species seen in Gorringe Bank are sharks as *Deania calcea* and *D. profundorum*, and the fish *Xiphias gladius*, with high commercial value. One sub-adult individual of *Caretta caretta* was also detected in the sea surface.

Regarding the ichthyologic fauna, the most widespread species are *Coris julis* and *Anthias anthias*. Others very frequently found are: *Ammodytes tobianus, Seriola rivoliana* (and in lesser numbers *S. dumerilii), Serranus atricauda* and *Helicolenus dactylopterus*. Occasionally, species such as *Phycis phycis, Scorpaena scrofa, Labrus bergylta, Leidorhombus whiffiagonis, Arnoglossus rueppeli* and several macrourids were spotted in the ROV footage. Endemic species from the Macaronesian area as *Abudefduf luridus* and *Scorpaena maderensis* were also detected.

Other punctual encounters occurred with fishes as *Torpedo marmorata* in groups –as they are typically found– and one individual of *Mola mola* (whose sale is forbidden in Europe- Directive 91/493/CEE).

Species	Protection status	Species	Protection status
Antiopathes furcata	CITES Annex II	*Funiculina quadrangularis*	OSPAR
Antipathella subpinnata	CITES Annex II	*Flabellum chunii*	CITES Annex II
Antipathella wolastoni	CITES Annex II	*Hoplostethus atlanticus*	OSPAR
Balaenoptera acutorostrata	CITES Annex II	*Lithithamnion coralloides*	Natura 2000 - Habitats Directive Annex II
Bebryce mollis	VME	*Narella bellissima*	VME
Callogorgia verticillata	VME	*Paramuricea clavata*	VME
Caretta caretta	Natura 2000 - Habitats Directive Annex II and V / OSPAR	*Pennatula phosphorea*	OSPAR
Caryophyllia cyatus	CITES Annex II	*Ranella olearium*	Berna Annex II
Caryophyllia smithii	CITES Annex II	*Stichopathes* sp.	CITES Annex II
Centrostephanus longispinus	Natura 2000 - Habitats Directive Annex II and V / OSPAR	*Scyllarides latus*	Natura 2000 - Habitats Directive Annex V
Deltocyantus sp.	CITES Annex II	*Villogorgia bebrycoides*	VME
Dendrophyllia cornigera	CITES Annex II	cf. *Geodia atlantica*	VME
Geodia barretti	VME	*Geodia* sp.	VME
Pachastrella monilifera	VME	*Pheronema carpenteri*	VME

Regarding benthic species, various echinoderms as *Diadema africana*, *Echinus melo*, *Sphaerechinus granularis* and *Centrostefanus longispinus*, and crustaceans as *Palinurus elephas* and *Paramola cuvieri*, were identified. Mollusk like various species of *Calliostoma* and cephalopods as *Octopus vulgaris* and *Sepia orbygniana* are highly frequent. The oyster *Neopycnodonte cochlear* is very abundant and forms wide aggregations in hard substrates.

A high variety of cnidarians was also described in Gorringe bottoms, as the anemone *Corynactis viridis* and several types of corals. Gorgonians as *Villogorgia bebrycoides*, *Paramuricea clavata*, *Viminella flagellum* and *Callogorgia verticilata* –last two typically forming mixed habitats– and soft corals as *Siphonogorgia* sp., *Alcyonium acaule* and *A. palmatum* were commonly found.

Scleractinian corals were also frequent, as the solitary ones *Caryophyllia cyantus*, *C. smithii* and *Flabellum* chunii, the last one regularly inhabiting deep, sedimentary bottoms (around 400 m). The scleractinian coral *Dendrophyllia cornigera* was extendedly spread in rocky bottoms and hard substrates along a wide depth range, although it concentrates around the depth circalittoral zone. Regarding black corals, species such as *Antipathella wollastonii, A. subpinnata, Anthipathes furcata, Cirripathes* sp., *Parantipathes hirondelle, Leiopathes glaberrima, Stichopathes* sp. and *Tanacetiphates* sp. were spotted in hard and soft substrates.

Deep-sea sponges are typically found in Gorringe bottoms. Some of the most extended ones are the hexactinellid *Asconema setubalense* and *Pheronema carpenteri*. Demospongies belonging to genus

Phakellia, *Poecillastra* and *Pachastrella* are very common, and in shallower depths the calcareous sponge *Sycon* sp. covers wide rocky substrates.

Some of the mentioned species dominate in a certain area forming habitats and communities. Further description can be found in the next section 2.2. Apart from the cited ones, multitude of different phylum was also identified associated to Gorringe's benthic habitats: tunicates as *Diazona violacea* and *Ascidia conchilega*, hydrozoans as *Nemertesia* cf *antenina* and *N. ramosa*, bryozoans as *Hornera frondiculata* and *Schizomavella mamillata*, etc.

Several of these species are considered of a high ecological value and/or endangered and, therefore, are included on international treaties as CITES and the aforementioned ICES Recommended list of VMEs species indicators. Table 1 (page 6) lists those species described by Oceana in Gorringe Bank.

Besides the extensive work that Oceana has realized to identify all the different species spotted during the campaigns – approximately 125 per hectare sampled – there are still others that require more sophisticated sampling techniques and, to the date, remain unidentified.

Lophius piscatorius © OCEANA

2.2. Habitats and communities

As it was mentioned, a high variety of habitats and communities take place in this seamount due to its special characteristics. Oceana has registered several ones at a wide depth range. Further description is grouped according to depth zones.

Deep infralittoral/upper circa-littoral zone

The upper layers are where the most productive communities can be found. In the summits of Gettysburg and Ormonde seamounts, habitats dominated by the presence of different algae and rocky bottoms are common. The main communities occurring above approximately 80 m depth are:

- **Kelp forests:** these communities are commonly covered with algae such as *Saccorhiza polyschides* and *Laminaria ochroleuca*. The last one is more abundant and presents a wider range, whilst *Saccorhiza* is more abundant on top of the summits. An understory of brown and red algae grows under these two kelps, with species as *Zonaria tournefortii* accompanied by *Dyctiopteris membranacea* and suspension feeders as porifera, cnidarians, echinoderms and crustaceans.
- ***Zonaria tournefortii* forests:** in more exposed rocky bottoms, the presence of kelps decreases and *Zonaria tournefortii* takes place in higher densities, forming notably dense blankets of vegetation. It is frequently accompanied by *Dyctiopteris* spp., *Desmarestiua*

ligulata and several red algae (*Polyneura bonnemaisonia*, *Plocamiun cartilagineum*, etc.) as well as suspensivorous invertebrates (porifera and cnidaria), echinoderms and crustaceans.

- **Maërl beds:** *Lithothamnion corallioides* is situated in areas without steep slopes, mainly in sedimentary bottoms with small rocks. It covers wide extensions where transitional patches of other algae such as *Laminaria ochroleuca* and different epibionts are also common.

Rocky bottoms with calcareous algae: huge extensions of red calcareous and incrusting algae (genus *Mesophyllum*, *Lithophyllum*, *Peyssonnelia*, etc.) are found, covering exposed rocky bottoms and, occasionally, kelps' haptera. Epibionts as hydrozoans sporadically colonize these calcareous beds, and the presence of *Valoniaceae* green algae intercalated is common in this community.

***Diazona violacea* © OCEANA**

- **Rocky walls with *Paramuricea clavata*:** these gorgonian habitats take place in rocky substrata and vertical walls where it forms dense aggregations. It can also be found forming patches among kelp and *Zonaria* forests, and in sheltered rock cracks with no sediment.
- **Rocky beds with *Corynactis viridis*:** this jewel anemone covers wide surfaces, mainly vertical walls but also horizontal rocky substrates. Different brown and calcareous algae, corals, sponges and polichaetes as *Filograna implexa* can co-occur in this habitat.
- **Rocky bottoms with calcareous sponges (Turf):** these communities are characterized by a vast mixture of different organisms as bryozoans, hydrozoans, polychaete, ascidians and sponges. The last ones normally dominate over the others, being those calcareous or demospongiae, according to the depth. Coral species can occasionally appear in these turf aggregations.

Deep circalittoral zone

This deeper zone is characterized by the gradual reduction of photosynthetic algae (directly related to light attenuation) and the progressive occurrence of black and scleractinian corals. It descends down to 140 m approximately and, apart from the rockybeds, other substrate types appear as soft detritic bottoms and oyster beds.

- **Black coral beds (*Antipathella* spp. and *Tanacetiphates* sp.):** black corals forming mixed forests are developed on boulders and abrupt rocky areas with little sediment. The main species that constitute these aggregations are *Antipathella wollastoni, Antipathella subpinnata* and *Tanacetipathes sp*. Other black corals can be associated as *Antipathes furcata* and the gorgonian *Ellisella paraplexauroides* appears occasionally. This seamount is located on the border of distribution of these two *Antipatharians*, therefore constituting one of the few places where these mixed forests exist.

- **Circalittoral caves:** these caves create habitats that are frequented by several fishes as *Phycis phycis*, *Conger conger*, *Muraena helena*, etc. The cave walls are commonly covered with turf aggregations, presenting ground-covering sponges, bryozoans, hydrozoans, etc.

- **Oyster beds:** *Neopycnodonte cochlear* is able to create thick mantles, serving as hard substrate for multitude species of foraminifera, bryozoan, ascidians, coral, sponges, etc. Few

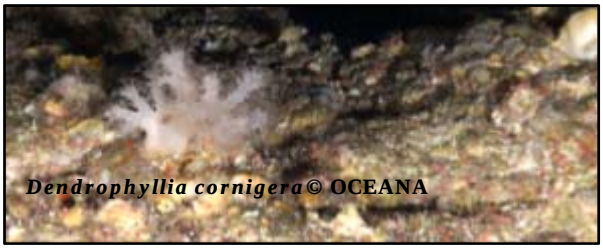
algae can also be spotted here and the lobster *Palinurus elephas* is commonly found feeding on the oysters.

- **Sandy-detritic soft bottoms:** this habitat is formed by flat sediments composed by biogenic detritus with some boulders intercalated. It hosts several species as echinoderms (*Diadema africana, Centrostephanus longispinus*), fishes (*Macroramphosus scolophax* and *Capros aper*) and hydrozoans (*Nemertesia* sp.). These associated species may vary along the wide depth range that this habitat presents (from 80 to 170 m, approximately).

- **Rocky bottoms with *Dendrophyllia cornigera*:** this coral has a wide bathymetric range, being present in circalittoral and bathial zones, but is at this depth were it is more abundant. It forms gardens in hard substrates, usually poorly sedimented.

- **Rocky beds with *Villogorgia bebrycoides*:** *Villogorgia bebrycoides* is a small gorgonian that dominates in certain hard substrata. Other associated organisms that can be found here are lollipop sponges, mainly *Podospongia* sp., and the echinoderm *Hacelia superba*. These habitats are typically situated in transition areas –between deep circalittoral and upper bathial zones– being complemented by calcareous algae or sponges and corals, respectively.


Syphonogorgia sp. © OCEANA


Dendrophyllia cornigera © OCEANA

Upper Bathial zone

This zone lacks from any algae, and sponges and corals –both gorgonians and black ones– are the main elements providing structure and habitat complexity. These habitats are present until approximately 250 m depth.

- **Rocky beds with *Callogorgia verticilata* and *Viminella flagellum*:** The habitat occurs in the shallowest part of the bathymetric range of *Callogorgia verticilata*, which forms mixed gardens with *Viminella flagellum*. They settle in rocky substrate, on a sandy-rocky mixed bottom, together with other species as the gorgonian *Narella* cf. *bellissima* and sponges such as *Tedania* sp. and more demospongies not identified.

- **Bathial caves:** these caves create habitats that are frequented by several fishes as *Hoplosthetus* sp., *Gephyroberyx* sp., *Conger conger*, *Laemonema* sp., *Epigonus* sp., etc., and decapods as *Plesionika edwarsi*. Equally to the circalittoral caves, their walls are covered with turf, although main species forming these aggregations might change with the depth.

- **Rocky bottoms with arborescent demosponges:** in these communities, *Haliclona* sp. is the predominant dermosponge. It is normally assembled in rocky substrata. Other species like gorgonians *Viminella flagellum* and *Callogorgia verticilata* can be present, taking place in this habitat.

- ***Stichopathes* sp. beds:** the spiral black coral forms aggregations in horizontal, sandy-rocky mixed bottoms, where it can be attached to both substrates. Other associated species in this habitat are the black coral *Antipathes furcata* and the hydrozoan *Nemertesia antennina*.

- ***Phakellia, Poecillastra* and *Pachastrella* bottoms:** these sponges are also present in deeper bathial zones (down to 500 m depth), associated with deep corals. At these depths, they

form mixed communities in soft-sediment bottoms, in presence of associated species as bryozoans and brachiopods like *Gryphus vitreus*.

Deep bathial zone

At these depths (from 250 m to more than 500 m), there are hard substrates presenting a high level of sedimentation. Soft-detritic bottoms occupy also large extensions. The existing communities are dominated by different sponges (hexactinellid and demosponges) and also by solitary corals, ophiures and bivalves.

- ***Asconema setubalense* bottoms:** this hexactinellid sponge is very common in Gorringe Bank and dominates rocky bottoms and boulders surrounded by soft sediments at the deepest layers, usually below 200 m. In these communities, the presence of other sponges as *Geodia* sp. and *Hymedesmia* sp., and corals like *Callogorgia verticilata* and *Viminella flagellum* are very common.

- **Lithistid sponges beds:** the stone sponges form dense aggregations of several species, mixed with other type of sponges as *Geodia* sp. They develop on soft bottoms at the deepest layers (from 300 to 500 m approximately), although they can be present in a wider bathymetric range and different substrata. These sponges frequently serve as substrate for other organisms, and can be found covered by hydrozoans, bryozoans, corals, etc. These communities are also composed by gorgonian corals associated as *Viminella flagellum* and *Callogorgia verticilata*.

- **Lollipop sponges beds:** these habitats are composed by *Podospongia* sp. and various unidentified species of lollipop sponges. They dominate in highly sedimented bottoms at the deepest layers. This community is also composed by other hexactinellid and demosponges, and dispersed corals as *Viminella flagellum*.

- **Rocky bottoms with hydrocorals:** At least three genera of hydrocoral (*Stylaster*, *Errina* and *Crypthelia*) are placed on rocky bottoms, boulders surrounded by soft sediments and detritic bottoms. Although they are the predominant organisms, other organisms as sponges and ophiures are also forming this community. Further, hydrocorals' exoskeletons serve as hard substrate to a great variety of invertebrates.

- ***Pheronema carpenteri* bottoms:** nest sponges are abundantly found at deeps around 500 m, forming habitats on detritic sedimentary bottoms. These detritus are mainly formed by dead hydrocorals, although it is possible to find alive ones forming part of this community. Brachiopods as *Gryphus vitreus* are also common here.

- **Bottoms dominated by mixed sponges:** a mixture of all aforementioned sponges takes place here, forming a community where most of them occur at different proportions, but without any predominating one. Similarly to the rest of sponge communities, the presence of gorgonians like *Nicella granifera* is also common and other organisms such as crinoids, hydrozoans, bryozoan, fish, etc.

- ***Flabellum chunii, ophiures and Gryphus vitreus* mixed beds:** these species are abundant in gravel-detritic soft bottoms with sediments mainly composed by biogenic rests, at 400-500 m depth. Sometimes one of the species proliferates and dominates over the rest, generating a micro-habitat. These habitats are connected and frequently overlapped, being thus difficult to separate them. *Gryphus vitreus* can be also found in hard substrata. These communities are highly associated with the presence of crinoids, commonly growing around small sedimentary rocks. Other species as fishes (*Nezumia sclerorhynchus*, *Capros aper and Lophius piscatorius*), sponges (*Pheronema carpenteri*), cephalopods (*Sepia orbignyana*) and bryozoans can be found.

Some of the habitats described coincide with those included in the "OSPAR List of threatened and/or declining habitats" and/or in "ICES VMEs Recommendation list". Habitats such as **Rocky walls with *Paramuricea clavata***, **Rocky beds with *Callogorgia verticilata* and *Viminella flagellum*** and **Rocky beds with *Villogorgia bebrycoides*** are contemplated in the VME category "2.A.i. Hard-bottom gorgonian and black coral garden". Moreover, **Rocky bottoms with hydrocorals** are included in the category "2.A.v.Hydrocorals". On the other hand, these coral habitats plus **Black coral beds (*Antipathella* sp. and *Tanacetiphates* sp.)** and ***Stichopathes* sp. beds,** are considered endangered and/or declining under the OSPAR category "Coral gardens".

Regarding habitats with sponge predomination, VME "3.A. Ostur sponge aggregations" include habitats found in Gorringe Bank such as ***Phakellia* spp., *Geodia* spp., *Poecillastra* and *Pachastrella* bottoms**. This habitat, together with **Bottoms dominated by mixed sponges**, ***Pheronema carpentieri* bottoms**, **Lollipop sponges beds**, **Lithistid sponges beds**, ***Asconema setubalense* bottoms**, **Rocky bottoms with arborescent demosponges** and **Rocky bottoms with calcareous sponges (Turf)**, is collected under OSPAR "Deep-sea sponge aggregations".

Maërl beds are also considered in OSPAR enlisted habitats.


Unknown demosponge © OCEANA


Asconema setubalense © OCEANA


Geodia sp. © OCEANA


Phakellia robusta © OCEANA


Geodia sp. © OCEANA

3. ANTROPHIC THREATS IN GORRINGE BANK

As it was mentioned, seamounts present an enormous ecological value and concentrate fragile ecosystems due to their special geological and hydrographical characteristics. Because of that, these features present a high level of vulnerability that can be threatened by various anthropic activities, such as fisheries or pollution.

3.1 Fisheries activity

Portuguese government allows fishing over the seamounts placed at the south of the country, such as Gorringe Bank, Seine, Josephine, Ampere and Dacia, by national and foreign vessels (Regulatory Law n°43/87 of 17 July 1987).

According to the Portuguese Directorate-General for Natural Resources, Security and Maritime Services, in 2012 there was a substantial diminution of captures' registration, comparing to 2011 and 2010 (only referred to Portuguese fleet) (Albuquerque, 2013). Thus, 0.6 t, 75,076 t and 225,5816 t where respectively fished, attributed to 1, 17 and 22 vessels. Main captured species were *Conger conger* and sharks such as *Centrophorus lusitanicus*, *Prionace glauca* and *Isurus oxyrhynchu* (Albuquerque, 2013). Information on VMS (Vessel Monitory System) and fishing gears is not available, unknowing thus the true scope of the fishing effort in the area and the impacts caused to the habitats and community structure.

During its campaigns, Oceana has observed indications of fishing activity in the area as buoys marking fishing pots for crustaceans and numerous abandoned fishing gears.

3.2 Marine litter

In 2005, Oceana registered, for the first time in the area, the presence of marine litter. In successive campaigns, more marine debris were found, manly fishing gears as crustacean traps, nets, ropes, etc., but also crystal bottles and plastics. Other expeditions have turned out similar results (e.g.: Hermione Project, 2012), finding marine litter from the surface to down to 3,000 m depth. This waste is mainly originated in land and by fishing vessels.


Fishing line © OCEANA


Fishing trap © OCEANA


Cristal bottle © OCEANA


Fishing weight © OCEANA

4. CONCLUSION

In light of what was exposed along this report, Oceana's expeditions have succeeded in the detection and characterization of multiple valuable habitats and species present in Gorringe Bank. With this information, Oceana has provided the Portuguese Government and OSPAR Convention with solid reasons to perform the necessary scientific studies and incorporate the area to the OSPAR MPA Network.

Oceana has consolidated fruitful relationships with the Portuguese Government and with different scientific institutions. All of them are currently collaborating in developments for the future designation of the Gorringe Bank as MPA. Indeed, Oceana has supported this proposal providing data and images gathered.

Oceana is very grateful to the Foundation for the Third Millennium for the support received during this project. We continue working towards the achievement of the formal designation of this important seamount under a legal protection status, and we believe, according to the last developments, that we are in the right track.

According to the obtained results, we look forward to have future collaboration opportunities with the Foundation for the Third Millennium.

Chaunax pictus © OCEANA

Coris julis © OCEANA / Carlos Suárez

Corynactis viridis © OCEANA

4. ANNEX

I. Table of species identified in Gorringe Bank (358 species)

Algae (Rodophyta)		
Acrosorium uncinatum	*Aglaothamnion sp.*	*Botryocladia* sp.
Callophyllis laciniata	*Cryptopleura ramosa*	*Cryptonemia* sp.
Dasya hutchinsiae	*Gigartina* sp.	*Halymenia floresii*
Kallymenia reniformis	*Lithophyllum incrustans*	*Lithothamnion coralloides*
Mesophyllum lichenoides	*Palmaria palmata*	*Peyssonnelia inamoena*
Peyssonnelia rubra	*Peyssonnelia* sp.	*Plocamium cartilagineum*
Polyneura bonnemaisonii	*Rhodophyllis divaricata*	*Sebdenia* cf. *monardiana*
Sphaerococcus coronopifolius		
Algae (Orchophyta)		
Arthrocladia villosa	*Carpomitra costata*	*Cladophora* sp.
Cutleria multifida	*Desmarestia ligulata*	*Dictyopteris* cf. *plagiogramma*
Dictyopteris polypodioides	*Dictyota dichotoma*	*Halopteris filicina*
Laminaria ochroleuca	*Petalonia fascia*	*Saccorhiza polyschides*
Sporochnus pedunculatus	*Zonaria tourneforti*	
Algae (Chlorophyta)		
Codium elisabethiae	*Palmophyllum crassum*	*Valonia utricularis*
Valonia sp.		
Annelida		
Chloeia cf. *venusta*	*Filograna implexa*	*Hermodice carunculata*

Myxicola aesthetica	*Protula tubularia*	*Sabella* sp.
Spirorbis sp.		
Chordata		
Abudefduf luridus	*Acantholabrus palloni*	*Ammodytes tobianus*
Anthias anthias	*Antigonia capros*	*Arnoglossus rueppelii*
Aulopus filamentosus	*Balaenoptera acutorostrata*	*Balaenoptera physalus*
Balistes capriscus	*Benthocometes robustus*	*Boops boops*
Callanthias ruber	*Canthigaster capistrata*	*Capros aper*
Caretta caretta	*Centrodraco acanthopoma*	*Centrolabrus trutta*
Chaunax pictus	*Chelidonichthys cuculus*	*Chlorophthalmus agassizi*
Chromis limbata	*Coelorhynchus coelorhynchus*	*Conger conger*
Coris julis	cf. *Coryphaenoides guentheri*	*Ctenolabrus rupestris*
Cyttopsis rosea	*Deania calcea*	*Deania profundorum*
Delphinus delphis	*Dipturus oxyrinchus*	*Epigonus constanciae*
Epigonus telescopus	*Gadella maraldi*	*Gadiculus argenteus*
Gephyroberyx darwinii	*Grammicolepis brachiusculus*	*Grampus griseus*
Helicolenus dactylopterus	*Hoplostethus atlanticus*	*Hymenocephalus italicus*
Kyphosus sectatrix	*Labrus bergylta*	*Laemonema* sp.
Laemonema yarrellii	*Lappanella fasciata*	*Lepidorhombus whiffiagonis*
Lophius budegassa	*Lophius piscatorius*	*Macroramphosus scolopax*
Malacocephalus laevis	*Maurolicus muelleri*	*Mola mola*
Muraena augusti	*Muraena helena*	*Phycis phycis*
Physiculus dalwigki	*Pontinus kuhlii*	*Sarda sarda*
Scomber colias	*Scorpaena maderensis*	*Scorpaena scrofa*
Scorpaenodes sp.	*Seriola dumerili*	*Seriola rivoliana*

Serranus atricauda	*Setarches guentheri*	*Sphyraena viridensis*
Stenella coeruleoalba	*Stenella frontalis*	*Symphodus mediterraneus*
Symphodus roissali	*Symphodus tinca*	*Synchiropus phaeton*
Thalassoma pavo	*Torpedo marmorata*	*Xiphias gladius*
Cnidaria		
Abietinaria abietina	*Adamsia carciniopados*	*Aglaophenia acacia*
Aglaophenia kirchenpaueri	*Aglaophenia* cf. *octodonta*	*Aglaophenia* cf. *tubulifera*
Aglaophenia pluma	*Aglaophenia* sp.	*Alcyonium acaule*
Alcyonium palmatum	*Alcyonium coralloides*	*Antennella secundaria*
Antipathella subpinnata	*Antipathella wollastoni*	*Antipathes furcata*
Bebryce mollis	*Callogorgia verticillata*	*Caryophyllia cyathus*
Caryophyllia smithii	*Caryophyllia* sp.	*Cerianthus membranaceus*
Cirrhipathes sp.	*Clytia* sp.	*Corymorpha nutans*
Corynactis viridis	*Crypthelia* sp.	*Deltocyathus* sp.
Dendrophyllia cornigera	*Diphasia* cf. *margareta*	*Ellisella paraplexauroides*
Eundendrium cf *racemosum*	*Eudendrium ramosum*	*Eunicella* cf *singularis*
Eunicella verrucosa	*Errina* sp.	*Flabellum chunii*
Funiculina quadrangularis	*Halecium* sp.	*Kirchenpaueria pinnata*
Laomedea cf. *flexuosa*	*Leiopathes* sp.	*Lytocarpia* sp.
Narella bellissima	*Nemertesia* cf. *antennina*	*Nemertesia ramosa*
Nicella granifera	*Obelia geniculata*	*Paralcyonium spinulosum*
Paramuricea clavata	*Parantipathes hirondelle*	*Parerythropodium coralloides*
Pelagia noctiluca	*Pennatula phosphorea*	*Placogorgia* sp.
Pseudoplumaria cf. *sabinae*	*Pteroeides griseum*	*Sertularella* cf. *gayi*
Sertularella gaudichaudi	*Sertularella polyzonias*	*Siphonogorgia sclerapharingea*

Siphonogorgia sp.	*Stichopathes* sp.	*Stylaster* sp.
Swiftia rosea/pallida	*Tanacetipathes* sp.	*Villogorgia bebrycoides*
Viminella flagellum	*Zygophylax* sp.	
Crustacea		
Anamathia rissoana	*Anapagurus* cf. *pusillus*	*Aristeus antennatus*
Balanus balanus	*Bathynectes maravigna*	*Cancer bellianus*
Homola barbata	*Inachus* sp.	*Maja brachydactyla*
Meganyctiphanes norvegica	*Munida* sp.	*Pagurus* sp.
Palinurus elephas	*Paromola cuvieri*	*Pisa* cf. *muscosa*
Plesionika edwardsii	*Plesionika gigliolii*	*Plesionika martia*
Polybius henslowi	*Scyllarides latus*	*Scyllarus arctus*
Ctenophora		
Bolinopsis infundibulum		
Echinodermata		
Anseropoda placenta	*Antedon* sp.	*Centrostephanus longispinus*
Chaetaster longipes	*Cidaris cidaris*	*Coscinasterias tenuispina*
Coronaster volsellatus	cf. *Democrinus rawsonii*	*Diadema africana*
Echinus melo	*Gracilechinus acutus*	*Hacelia attenuata*
Hacelia superba	*Holothuria* cf. *tubulosa*	*Holothuria forskali*
Koehlermetra porrecta	*Leptasterias* sp.	*Leptometra celtica*
Marthasterias glacialis	*Neocomatella europaea*	*Ophiothrix fragilis*
Ophiura ophiura	*Sclerasterias* cf. *neglecta*	*Spatangus purpureus*
Sphaerechinus granularis		

Foraminifera		
Miniacina miniacea		
Mollusca		
Aequipecten sp.	*Berthella aurantiaca*	*Calliostoma conulus*
Calliostoma sp.	*Calliostoma zizyphinum*	*Cavolinia inflexa*
Charonia lampas	*Clio pyramidata*	*Colus* sp.
Coralliophila cf. *meyendorffii*	*Eledone cirrhosa*	*Epitonium pulchellum*
Eudolium bairdii	*Glycymeris glycymeris*	*Gouldia minima*
Hadriania craticulata	*Hypselodoris picta*	*Jujubinus exasperatus*
Janthina pallida	*Laevicardium* sp.	*Limaria hians*
Marionia blainville	*Neopycnodonte cochlear*	*Neopycnodonte zibrowi*
Octopus salutii	*Octopus vulgaris*	*Papillicardium papillosum*
Pleurobranchaea meckeli	*Pseudosimnia* cf. *juanjosensii*	*Pteria hirundo*
Ranella olearium	*Raphitoma* sp.	*Scaeurgus unicirrhus*
Sepia orbignyana	*Spondylus gussonii*	*Talochlamys cf. multistriata*
Tapes philippinarum		
Porifera		
Aplysilla sulfurea	*Ascandra contorta*	*Axinella rugosa*
Axinyssa cf. *digitata*	*Chondrosia reniformis*	*Ciocalypta* sp.
Clathria sp.	*Corticium candelabrum*	*Diplastrella bistellata*
cf. *Discodermia sp.*	*Dysidea fragilis*	*Eurypon* sp.
cf. *Geodia atlantica*	*Geodia barretti*	*Geodia* sp.
Grantia compressa	*Guancha lacunosa*	*Haliclona mucosa*
Haliclona perlucida	*Haliclona* sp.	*Haliclona urceolus*

Hexadella pruvoti	*Hexadella racovitzai*	cf. *Hyalonema infundibulum*
cf. *Hymedesmia coriacea*	*Hymedesmia paupertas*	*Ircinia oros*
Leiodermatium sp.	*Munida* cf. *sarsi*	cf. *Myxilla rosacea*
Pachastrella monilifera	*Phakellia robusta*	*Phakellia ventilabrum*
Pheronema carpenteri	cf. *Pleraplysilla spinifera*	*Podospongia loveni*
Poecillastra compressa	*Polymastia* sp.	*Spongia officinalis*
Spongosorites flavens	*Sycon* sp.	cf. *Sympagella* sp.
Terpios gelatinosa		
Tunicata		
Ascidia conchilega	*Diazona violacea*	*Didemnum album*
Didemnum cf. *fulgens*	*Diplosoma listerianum*	*Rhopalaea* sp.
Polysyncraton lacazei		

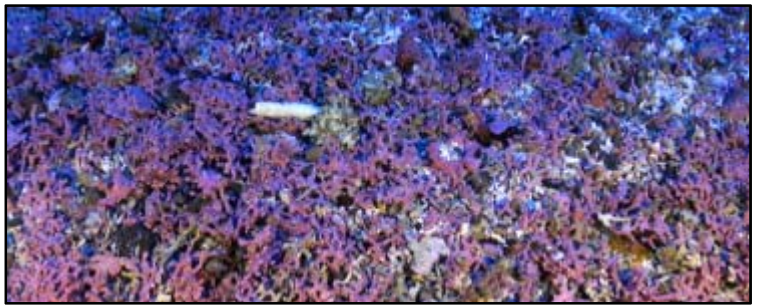
II. Table of habitats identified in Gorringe Bank

Deep infralittoral/upper circa-littoral zone: The upper layers are where the most productive communities can be found. In the summits of Gettysburg and Ormonde seamounts, habitats dominated by the presence of different algae and rocky bottoms are common. The main communities occurring above approximately 80 m depth are:

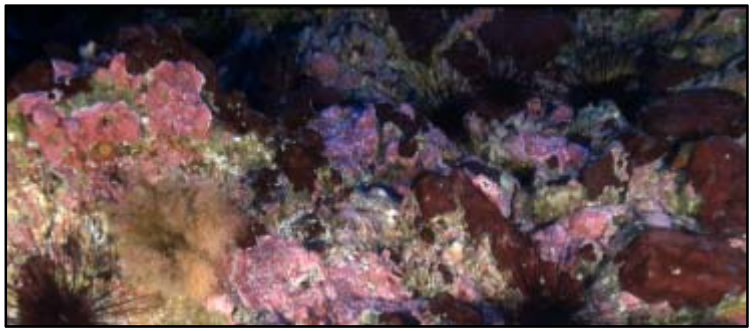
Kelp forests: these communities are commonly covered with algae such as *Saccorhiza polyschides* and *Laminaria ochroleuca*. The last one is more abundant and presents a wider range, whilst *Saccorhiza* is more abundant on top of the summits. An understory of brown and red algae grows under these two kelps, with species as *Zonaria tournefortii* accompanied by *Dyctiopteris membranacea* and suspension feeders as porifera, cnidarians, echinoderms and crustaceans.

***Zonaria* sp. forests:** in more exposed rocky bottoms, the presence of kelps decreases and *Zonaria tournefortii* takes place in higher densities, forming notably dense blankets of vegetation. It is frequently accompanied by *Dyctiopteris* spp., *Desmarestiua ligulata* and several red algae (*Polyneura bonnemaisonia*, *Plocamiun cartilagineum*, etc.) as well as suspensivorous invertebrates (porifera and nidaria), echinoderms and crustaceans.

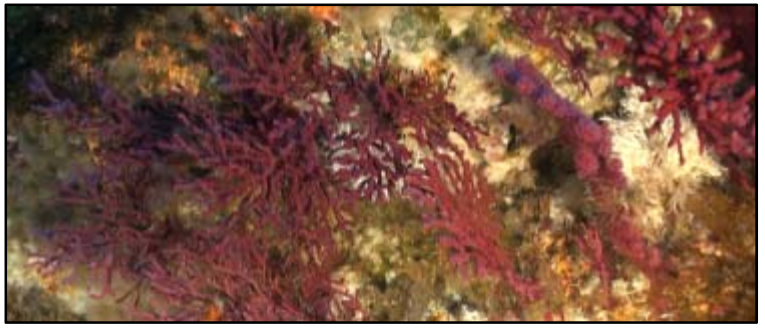
Maërl beds: *Lithothamnion corallioides* is situated in areas without steep slopes, mainly in sedimentary bottoms with small rocks. It covers wide extensions where transitional patches of other algae such as *Laminaria ochroleuca* and different epibionts are also common.



Rocky bottoms with calcareous algae: huge extensions of red calcareous algae (genus *Mesophyllum*, *Lithophyllum*, *Peyssonnelia*, etc.) are found, covering exposed rocky bottoms and, occasionally, kelps' haptera. Epibions as hydrozoans sporadically colonize these calcareous beds, and the presence of *Valoniaceae* green algae intercalated is common in this community.

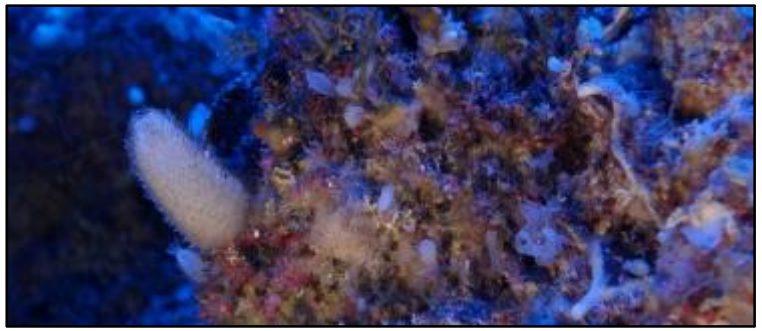


Rocky walls with Paramuricea clavata: these gorgonian habitats take place in rocky substrata and vertical walls where it forms dense aggregations. It can also be found forming patches among kelp and *Zonaria* forests, and in sheltered rock cracks with no sediment.



Rocky beds with *Corynactis viridis*: this jewel anemone covers wide surfaces, mainly vertical walls but also horizontal rocky substrates. Different brown and calcareous algae, corals, sponges and polichaetes as *Filograna implexa* can co-occur in this habitat.

Rocky bottoms with calcareous sponges (Turf): these communities are characterized by a vast mixture of different organisms as bryozoans, hydrozoans, polychaete, ascidians and sponges. The last ones normally dominate over the others, being those calcareous or demospongiae, according to the depth. Coral species can occasionally appear in these turf aggregations.



Deep circalittoral zone: This deeper zone is characterized by the gradual reduction of photosynthetic algae (directly related to light attenuation) and the progressive occurrence of black and scleractinian corals. It descends down to 140 m approximately and, apart from the rockybeds, other substrate types appear as soft detritic bottoms and oyster beds.

Black coral beds (*Antipathella* sp. and *Tanacetiphates* sp.): black corals forming mixed forests are developed on boulders and abrupt rocky areas with little sediment. The main species that constitute these aggregations are *Antipathella wollastoni*, *Antipathella subpinnata* and *Tanacetipathes sp*. Other black corals can be associated as *Antipathes furcata* and the gorgonian *Ellisella paraplexauroides* appears occasionally. This seamount is located on the border of distribution of these two *Antipatharians*, therefore constituting one of the few places where these mixed forests exist.

Circalittoral caves: these caves create habitats that are frequented by several fishes as *Phycis phycis*, *Conger conger*, *Muraena helena*, etc. The cave walls are commonly covered with turf aggregations, presenting ground-covering sponges, bryozoans, hydrozoans, etc.

Oyster beds: *Neopycnodonte cochlear* is able to create thick mantles, serving as hard substrate for multitude species of foraminifera, bryozoan, ascidians, coral, sponges, etc. Few algae can also be spotted here and the lobster *Palinurus elephas* is commonly found feeding on the oysters.

Sandy-detritic soft bottoms: this habitat is formed by flat sediments composed by biogenic detritus with some boulders intercalated. It hosts several species as echinoderms (*Diadema antillarun*), fishes (Macroramphosus *scolophax* and *Capros aper*) and hydrozoans (*Nemertesia* sp.). These associated species may vary along the wide depth range that this habitat presents (from 80 to 170 m, approximately).

Rocky bottoms with *Dendrophyllia cornigera*: this coral has a wide bathymetric range, being present in circalittoral and bathial zones, but is at this depth were it is more abundant. It forms gardens in hard substrates, usually poorly sedimented.

Rocky beds with *Villogorgia bebrycoides*: *Villogorgia bebrycoides* is a small gorgonian that dominates in certain hard substrata. Other associated organisms that can be found here are lollipop sponges, mainly *Podospongia* genus, and the echinoderm *Hacelia superba*. These habitats are typically situated in transition areas –between deep circalittoral and upper bathial zones– being complemented by calcareous algae or sponges and corals, respectively.

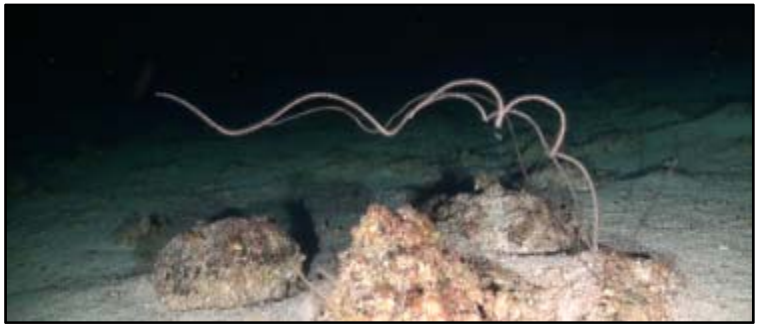
Upper Bathial zone: This zone lacks from any algae, and sponges and corals –both gorgonians and black ones– are the main elements providing structure and habitat complexity. These habitats are present until approximately 250 m depth.

Rocky beds with *Callogorgia verticilata* and *Viminella flagellum:* the habitat occurs in the shallowest part of the bathymetric range of *Callogorgia verticilata*, which forms mixed gardens vith *Viminella flagellum*. They settle in rocky substrate, on a sandy-rocky mixed bottom, together with other species as the gorgonian *Narella* cf. *bellisima* and sponges such as *Tedania* sp. and more demospongies not identified.

Bathial caves: these caves create habitats that are frequented by several fishes as *Hoplosthetus* sp., *Gephyroberyx* sp.**,** *Conger conger*, *Laemonema* sp., *Epigonus* sp., etc., and decapods as *Plesionika edwarsi*. Equally to the circalittoral caves, their walls are covered with turf, although main species forming these aggregations might change with the depth.

Rocky bottoms with arborescent *desmospongiae:* in these communities, *Haliclona* sp. is the predominant dermosponge. It is normally assembled in rocky substrata. Other species as gorgonians *Viminella flagellum* and *Callogorgia verticilata* can be present, taking place in this habitat.

***Stichopathes* sp. beds:** the spiral black coral forms aggregations in horizontal, sandy-rocky mixed bottoms, where it can be attached to both substrates. Other associated species in this habitat are the black coral *Antipathes furcata* and the hydrozoan *Nemertesia antenina.*



***Phakellia, Poecillastra* and *Pachastrella* bottoms:** these sponges are also present in deeper bathial zones (down to 500 m depth), associated with deep corals. At these depths, they form mixed communities in soft-sediment bottoms, in presence of associated species as bryozoans and brachiopods like *Gryphus vitreus*.

Deep bathial zone: At these depths (from 250 m to more than 500 m), there are hard substrates presenting a high level of sedimentation. Soft-detritic bottoms occupy also large extensions. The existing communities are dominated by different sponges (hexactinellid and demosponges) and also by solitary corals, ophiures and bivalves.

***Asconema setubalense* bottoms:** this hexactinellid sponge is very common in Gorringe Bank and dominates rocky bottoms and boulders surrounded by soft sediments at the deepest layers, usually below 200 m. In these communities, the presence of other sponges as *Geodia* sp. and *Hymedesmia* sp., and corals like *Callogorgia verticilata* and *Viminella flagellum* are very common.

Lithistid sponges beds: the stone sponges form dense aggregations of several species, mixed with other type of sponges as *Geodia* sp. They develop on soft bottoms at the deepest layers (from 300 to 500 m approximately), although they can be present in a wider bathymetric range and different substrata. These sponges frequently serve as substrate for other organisms, and can be found covered by hydrozoans, bryozoans, corals, etc. These communities are also composed by gorgonian corals associated as *Viminella flagellum* and *Callogorgia verticilata*.

Lollipop sponges beds: these habitats are composed by *Podospongia* genus and various unidentified species of lollipop sponges. They dominate in highly sedimented bottoms at the deepest layers. This community is also composed by other hexactinellid and demosponges, and dispersed corals as *Viminella flagellum*.

Rocky bottoms with hydrocorals: At least three genera of hydrocoral (*Stylaster, Errina and Crypthelia*) are placed on rocky bottoms, boulders surrounded by soft sediments and detritic bottoms. Although they are the predominant organisms, other organisms as sponges and ophiures are also forming this community. Further, hydrocorals' exoskeletons serve as hard substrate to a great variety of invertebrates.

***Pheronema carpentieri* bottoms:** nest sponges are abundantly found at deeps around 500 m, forming habitats on detritic sedimentary bottoms. These detritus are mainly formed by dead hydrocorals, although it is possible to find alive ones forming part of this community. Branchiopods as *Gryphus vitreus* are also common here.

Bottoms dominated by mixed sponges: a mixture of all aforementioned sponges takes place here, forming a community where most of them occur at different proportions, but without any predominating one. Similarly to the rest of sponge communities, the presence gorgonians as *Nicella granifera* of corals as crinoids, hydrozoans, bryozoan, fish, etc.

***Flabellum chunii, ophiures and Gryphus vitreus* mixed beds:** these species are abundant in gravel-detritic soft bottoms with sediments mainly composed by biogenic rests, at 400-500 m depth. Sometimes one of the species proliferates and dominates over the rest, generating a micro-habitat. These habitats are connected and frequently overlapped, being thus difficult to separate them. *Gryphus vitreus* can be also found in hard substrata. These communities are highly associated with the presence of crinoids, commonly growing around small sedimentary rocks. Other species as fishes (*Nezumia sclerorhynchus, Capros aper and Lophius piscatorius*), sponges (*Pheronema carpentieri*), cephalopods (*Sepia cf. Orbignyana*) and bryozoans can be found.

III. Press Releases

Oceana documents 350 species on the Gorringe Bank

December 12, 2013
Madrid
Contact: Marta Madina (mmadina@oceana.org)

This data will be crucial for the Portuguese government to take protective measures for the Gorringe Bank.

The comprehensive collection of information is the result of over 60 hours of recording, filmed during 3 campaigns.

Oceana scientists have identified more than 350 species on the Gorringe seamount, located in Portuguese waters, 160 nautical miles south-west of Cape St Vincent. The documentation of this great biodiversity, undertaken with the support of the Foundation for the Third Millennium, will be extremely useful in the process of protecting these seamounts, initiated by the Portuguese Government.

"Oceana's expeditions represent one of the most exhaustive contributions to the knowledge base regarding these seamounts, which are of high ecological value, and justify the need to initiate a process of protection for the Gorringe Bank. Therefore, all the documentation has been made available to the Portuguese institutions, with which Oceana is currently collaborating, in order to start the procedures for the conservation process," says Ricardo Aguilar, research director of Oceana in Europe.

The information was obtained during three campaigns which the international marine conservation organisation carried out during 2005, 2011 and 2012. During these expeditions, 21 dives were made with a submarine robot (ROV), resulting in over 50 hours of recording. The study was complemented with more than 10 hours filmed by a team of divers along with more than 2,200 photographs. With the information gathered, Oceana has documented numerous habitats and species listed as threatened or vulnerable by various international organisations (OSPAR, ICES).

During the expeditions, vulnerable species such as deep sea corals and sponges have been documented, for example the red gorgonian and the glass sponge, which are crucial for the shelter and protection of many other organisms. It has also been possible to observe numerous species of commercial interest, such as swordfish and lobster, as well as highly migratory pelagic species such as basking sharks, loggerhead turtles and cetaceans such as fin whales and pilot whales.

"This large number of species identified – approximately 125 per hectare sampled – is only the beginning, as there are hundreds of sponges, bryozoans, hydrozoans etc. whose characterisation by naked eye is very difficult and requires more sophisticated sampling techniques," explains Helena Álvarez, marine scientist at Oceana.

Despite the extensive work of Oceana and the technological resources that have been employed for this purpose, further research is needed to gather more information that will help to protect both these mountains and the numerous other seamounts in the north-east Atlantic that are still unprotected.

Portugal to nominate Gorringe Bank as new marine protected area

January 31, 2013
Madrid
Contact: Marta Madina (mmadina@oceana.org)

The impressive Atlantic seamounts will be included in the Natura 2000 network.

At 5000 m high, the Gorringe seamounts, located in the Atlantic, 300 km off the Portuguese shore, are on their way to becoming a new Marine Protected Area, following their nomination by the Portuguese government[i]. Oceana, which has documented this area on several occasions, is thrilled with this announcement.

Since 2005, Oceana has worked to include this bank, one of the most spectacular seamount ranges in the world, into the Atlantic protected space network. These huge peaks are home to a greatly diverse sea life, and they reflect the history of the Atlantic ocean from its beginnings to present day.

The Gorringe seamounts began to form at the end of the Jurassic period, with the movement of the North American, African, and Eurasian tectonic plates. Located on the Azores-Gibraltar fault, they have always had a history of upheavals, including the great 1775 earthquake, which generated a tsunami that destroyed the city of Lisbon, as well as other Portuguese, Spanish, and Moroccan towns.

From the biological point of view, the Gorringe seamounts are home to a wide range of fauna and flora due to their broad bathymetric distribution. The Gettysburg and Ormonde peaks almost reach the surface, allowing the establishment of large algae communities, including kelp forests. On their slopes, sponge aggregations, coral gardens, and detrital seabeds give rise to highly complex ecosystems, while great pelagic species, such as whales, sharks, swordfish, and seabirds, live in their waters.

In October 2012, Oceana, which has been collaborating for the past few years with the University of Algarve, launched its latest expedition to the Gorringe area, which revealed species never seen before in these seamounts, such as roughskin dogfish, nest sponges, and various black corals. But it also found signs of deterioration in an almost pristine area, such as waste and the remains of fishing gear, particularly in rocky seabeds where the long-lived deep-sea perch, which can live for more than 125 years, is found.

"The nomination of the Gorringe as a protected area in the Atlantic brings hope to ocean recovery", says Ricardo Aguilar, Head of Research at Oceana in Europe. ***"Portugal is the country with the least protected surface in Europe, and it must make great efforts to meet European and UN goals to conserve at least 10% of its marine surface".***

The Portuguese Government has launched an ambitious project to expand marine protected areas in its waters which, will propel it to the top as the EU member with the largest marine surface, and raise its profile in the international community. With more than 1.7 km2 of waters in its Exclusive Economic Zone, and almost 4 million km2 claimed as an expansion of its continental shelf, Portugal is assuming international responsibility in the conservation of oceans.

Oceana obtained the first images of the Gorringe bank in 2005. Thanks to the support of the Foundation for the Third Millennium, in 2011 and 2012, Oceana further documented different areas in the Gorringe to collect data to support its protection.

Oceana finds never before seen species and litter in the Gorringe Seamounts

October 19, 2012
Madrid
Contact: Marta Madina (mmadina@oceana.org)

Regarded as an untouched enclave in the Atlantic, the Gorringe now displays signs of pollution due to human activity.

Deep-sea sharks, hydrocoral, glass sponges, and black coral, among the new findings in these seamounts.

Oceana has documented the presence of litter and fishing gear in one of Europe's major seamounts, the Gorringe bank. The images were taken during an expedition with researchers from the University of Algarve, in which stunning algae forests and a wide range of habitats with hundreds of species were filmed. Due to this great biodiversity, Oceana requests that protection of this enclave be promoted.

Gorringe is one of the marine mountainous areas with the widest range of environments. This spectacular underwater mountain range, more than 250 km off the Portuguese coast, rises from a depth of 5,000 m to 30 m below the surface.

Though some areas are completely untouched, some rocky bottoms are already strongly affected by human activity, with abandoned fishing gear, such as creels, fishing lines, nets, and ropes.

"During last year's expedition we found some new species whose existence in the Gorringe was unknown, such as branching black coral, hydrocoral, dogfish, bird's nest sponge, and various gorgonia", says Ricardo Aguilar, Director of Research at Oceana in Europe. ***"There are dozens of species which have not been identified yet. We hope that they will provide new data on these ecosystems, and facilitate the protection and conservation of this unique enclave."***

The seamounts are visited by great pelagic species, such as whales, dolphins, and swordfish, and birds such as small petrels or shearwaters abound.

The peaks are covered by algae forests, particularly kelp. Large schools of amberjack, horse mackerel, and barracuda concentrate above the highest peaks, and detritic bottoms, covered in the remains of coral, bryozoans, and molluscs, abound in deeper areas, are inhabited by dragon fish, fan corals, pink frogmouths, and bird's nest sponges.

"This year we have carried out dives to observe species in deeper areas that swim up the seamount sides seeking prey. We found various deep-sea sharks and other fish that are generally harder to observe", states Aguilar.

The images and samples collected will be analysed by Oceana and the University of Algarve, which collaborates in these expeditions.

Oceana obtained the first images of the Gorringe bank during an expedition in 2005. Thanks to the support of the Drittes Millenium foundation, the international organisation for marine conservation documented various areas of the Gorringe in 2011 and 2012 in order to obtain data supporting its protection.

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