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World Conservation Monitoring Centre

Working Toward High Seas Marine Protected Areas

An Assessment of Progress Made and Recommendations for Collaboration

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1. Executive Summary

The areas of the ocean that lie beyond national jurisdiction limits, also called the high seas, are vulnerable to human activities and currently underrepresented when compared to terrestrial and nearshore[1] marine environments under protection. Thus, there is a growing movement among the conservation community to increase measures, such as marine protected areas, that can ensure protection of the largely undiscovered but important biodiversity of the high seas.

The purpose of this report is threefold: (1) to summarise current efforts aimed at protecting marine biodiversity in areas beyond national jurisdiction; (2) identify the knowledge gaps that still exist; and (3) initiate a collaborative effort among stakeholders in the ocean community to implement high seas marine protected areas (HSMPAs) using globally adopted scientific criteria. The recommendations that resulted from this analysis are based on a review of projects, organisations and initiatives addressing the high seas as well as an assessment of the current content, scope, and focus of known and accessible databases related to high seas biodiversity. From this we determine gaps, outline current knowledge, and contribute further insights and approaches relevant for the identification and establishment of protected areas beyond national jurisdictions.

Since the 2002 World Summit on Sustainable Development set the goal for establishing representative networks of marine protected areas (MPAs) by 2012, there have been increasing efforts to ensure that the last remaining oceanic frontier—the high seas—is included in this protected area network. The World Database on Protected Areas describes approximately 4,600 globally recognised MPAs covering around 2.2 million square kilometres of the marine environment (WDPA 2008). However, these have mainly been implemented in states' territorial waters; thus, only 0.51% of the area outside these waters is actually under legal protection (UNEP-WCMC 2008a). Matters are further complicated since, by definition, high seas encompass an area of the open and deep ocean that sits beyond the legal jurisdiction of nations. Because this area covers nearly 50% of the earth's surface and accounts for 90% of the planet's biomass, it should be a priority for marine conservation efforts that aim to protect representative areas of the marine environment.

Protecting large areas of the ocean in such a vast, dynamic and fluid environment comes with numerous challenges for science and governance. New issues such as climate change impacts and emerging uses (i.e., bioprospecting, ocean fertilization, floating energy facilities) widen the gap in existing, dated policies that can significantly delay the creation of MPAs on the high seas. There is currently no international governance framework for regulating and coordinating high seas MPAs (HSMPAs) despite the scientific duty in the United Nations Law of the Sea Convention (UNCLOS) to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life (Hart 2008). In addition, knowledge about the biological features of high seas areas, including some habitats and species, is still relatively recent, patchy, and often localised especially when compared with scientific understanding of oceanographic physical features and nearshore marine environments. Implementing marine protected areas in the high seas will require addressing a suite of unprecedented marine management and enforcement challenges; thus, a coordinated effort among a number of institutions to find solutions is essential.

Despite the existing gaps in a high seas governance framework and the lack of geographically comprehensive biophysical data, there is increasing agreement among the diverse stakeholders engaged with high seas issues that enough collective knowledge exists to proactively begin identifying, proposing and developing pilot sites for marine protected areas in locations beyond national jurisdiction (Laffoley 2005, SCBD 2008). A set of scientific criteria[2] for identifying

[1] Defined in this report as within 12 nautical miles of the low water mark

[2] Seven scientific criteria exist for identifying ecologically or biologically significant marine areas or sites in need of protection in open ocean waters and deep sea habitats: *uniqueness or rarity; special importance for life history stages of species; importance for threatened, endangered or declining species and/or habitats; vulnerability, fragility, sensitivity or slow recovery; biological productivity; biological diversity; and naturalness.* Five scientific criteria exist for representative

ecologically and biologically significant areas and guidelines for developing networks of MPAs was adopted by the Convention on Biological Diversity's Ninth Conference of Parties in May 2008 (CBD 2008e). These criteria and guidelines include scientific rationale for identifying HSMPAs according to ecological and biological significance as well as areas that are representative of biodiversity in the marine realm. This development provides a landmark opportunity to begin the process of planning and implementing HSMPAs. In addition, ten principles for high seas governance were released at the 2008 World Conservation Congress, raising consensus on the importance of ecosystem and precautionary approaches as well as the need for international cooperation, transparent decision-making, and public availability of information.

Though challenges with managing existing coastal and nearshore MPAs are significant and indeed should be addressed, they should not prevent the advancement of protecting high seas biodiversity. In addition to advancing ways to identify significant and representative areas, it is important that pilot studies or demonstration areas are established in the high seas realm. This is key for two reasons: (1) to secure protection for priority high biodiversity areas as an initial contribution to the global marine protected areas network and (2) to start learning from practical experience how HSMPAs can be managed and compliance secured. At the same time, there exists an urgent need to increase political support of high seas protected areas, to continue widespread and coordinated research on the biophysical aspects of these important ocean areas, to reduce governance gaps, and to identify a legal mechanism supported by sustainable funding sources that will ensure protection will be implemented and enforced. This mechanism may be upheld in a number of ways, including strong participation and peer agreements by and among flag states, the fishing community, private sector, and international bodies that already oversee these processes.

This report provides a preliminary approach, using current knowledge, for identifying priority areas of the high seas that are in need of protection. In the end, moving toward HSMPAs will require a balance of two things: (1) increased scientific rigour when proposing and evaluating MPA proposals for the high seas and (2) precautionary action regarding human activities on the open ocean where their environmental impacts are yet unknown.

Key findings and recommendations of this report are summarised below.

Key Findings	Key Recommendations
Generally, existing knowledge of high seas biodiversity is uneven, patchy, and not well coordinated or easily accessible.	*Existing data, maps and coverage of bioregionalisations, biogeographic features, species, habitats, and geopolitical information related to high seas biodiversity should be consolidated into a centralised knowledge management system, building on existing agreements and tools such as the high seas interactive Map (IMap) (see CBD 2008b). We recommend one or more focused workshops for the following: (1) to review available high seas data (as outlined in Annexes 8 and 9) and agree on parameters for consolidation into an accessible and interoperable system and (2) to identify knowledge gaps and help prioritise funding and research direction.*

networks of marine protected areas that include open ocean waters and deep-sea habitats: *ecologically and biologically significant areas; representativity; connectivity; replicated ecological features; and adequate and viable sites.*

Main gaps in biodiversity knowledge relate to: geographic location; depth and associated biodiversity; complete representation; less charismatic species such as invertebrates; and complex physical and ecological processes. Knowledge is also unbalanced at various scales and largely dependent on the resolution of information available.	*Funding to support large-scale, long-term ecosystem based monitoring and targeted research efforts should be made available and prioritised.*
Equally important to the breadth and quality of the knowledge that the scientific community holds regarding high seas marine biodiversity is the ability to compile this information and make it accessible to the marine conservation community and those who need it for making decisions.	*Efforts to streamline and link existing knowledge systems [such as the Census of Marine Life (CoML), the Global Biodiversity Information Facility (GBIF), and the World Database on Protected Areas (WDPA)] and the generation of new knowledge should be increasingly supported and made interoperable with other relevant databases and initiatives where possible.* *Increase capacity for coordination and communication between smaller and broad-scale projects to ensure that data is standardised and more easily accessible to policy makers. In addition, provide summaries of technical reports in language meaningful to policy makers.* *Build broad political support through the development of a coherent and well-coordinated high seas campaign and the use of biodiversity information.*
In addition to a number of existing protective measures for high seas biodiversity (Table 2), at least 12 reports identify 1-41 areas each for potential and proposed HSMPAs. Nine geographic areas were identified where three or more HSMPA proposals have been suggested, a finding which can support a preliminary prioritisation of high seas protection. Adding biodiversity layers as well as reviewing numbers of supporting scientists, organisations, and political constituents increases the utility of this approach.	*Encourage the use of spatial planning tools and modelling processes using biodiversity data and physical proxies to create maps, such as those on pages 15 – 17, which can inform conservation decisions based on sound science.* *Information and lessons learned from past exercises in planning networks of marine protected areas (i.e. Greenpeace's Roadmap to Recovery) should be considered in the process of planning HSMPAs.*
Existing reports outlining proposals for HSMPAs are somewhat piecemeal with varying methodologies and desired outcomes. To increase the likelihood of a HSMPA proposal being implemented, it should include detailed scientific information (based on a consistent set of criteria) to support the proposal. Detailed management considerations may be developed in concert with or following the submission of an HSMPA proposal. Management implications and political feasibility are important future considerations.	*Future proposals for pilot HSMPAs should be streamlined to correspond to the CBD COP9 criteria and guidelines, and include adequate scientific information to help justify their designation.*

Significant gaps exist in the legal and governance framework that is needed for the implementation of a network of HSMPAs. No global instrument currently in place is competent to address the threats impacting the high seas in a cross-sectoral manner, nor is there a governance structure with the capabilities to facilitate cooperation and coordination of activities on the high seas (IUCN 2008).	*Encourage international agreements regarding the implementation of UNCLOS to protect biodiversity on the high seas based on ecosystem-based management and the precautionary approach. This would provide a mechanism to establish a network of MPAs including on the High Seas.* *Research programmes should aim to inform the implementation of international agreements.*
There are a number of management regimes involved in high seas conservation, such as the Regional Seas Fisheries Organisations; however, the biodiversity protection gaps that still exist both within and outside these regimes are substantial.	*Reform and expansion of RFMOs is needed to build increased protective measures for high seas biodiversity.* *Specific and clear practical guidance is recommended so that institutions and governments understand the next steps required for implementation of HSMPAs, and other sectors such as industry can then plan to avoid carrying out activities in certain areas. This guidance would be developed based on lessons learned through the designation of pilot HSMPA sites as well as experience gained in managing MPAs in remote, offshore areas.*
In light of the significant amount of research yet to be undertaken on the high seas, there exists a significant gap in funding available for high seas research and filling the knowledge gaps necessary for identifying key areas for HSMPAs.	*Identification and application of innovative funding mechanisms is needed to support implementation of HSMPAs, e.g. endowment funds and market-based costs.*
Given the dearth in information available, more specific guidance may be needed on the application of the precautionary approach in this context.	*Need to develop guidance on the use of proxies to assist with the identification of potential areas of ecological and biological significance, and to identify areas representative of a particular habitat or community type in a specific bioregion, in order to support the development of representative networks of MPAs.*

1.1 Objectives and Methodology

This report aims to compile existing and generate further recommendations regarding priority actions necessary to identify and establish a representative MPA network on the high seas. Special attention is given to the scientific criteria developed through the Convention on Biological Diversity's expert workshop in the Azores in October 2007 and adopted in May 2008 (see footnote, pg 4).

Key aims of this report are to:

1. Summarise current efforts focused on protecting high seas habitats and biodiversity
2. Identify the gaps that still exist in scientific knowledge and management capabilities
3. Initiate a collaborative effort among stakeholders in the ocean community to implement HSMPAs using globally adopted scientific criteria

A thorough literature review of policy documents, grey literature, and scientific publications related to marine biodiversity and protection in the high seas was conducted to understand the range of important concepts and debates regarding the establishment of HSMPAs. Existing recommendations

were gleaned from these sources and informed the content of this document and the generation of further recommendations. In addition, conversations with experts and exposure to meeting dialogue at the CBD's 13th Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) meeting in Rome, Feb 2008, and the Global Forum on Coasts, Oceans, and Islands in Hanoi, April 2008, provided additional context and insights not readily available in written format.

The results from the literature review were compiled into three comprehensive matrixes, which can be found in the annex. These include (1) relevant high seas biodiversity databases and information sources; (2) various approaches and mechanisms employed to protect and manage the high seas (such as conventions, agreements, and codes of conduct); and (3) relevant institutions at work in high seas biodiversity conservation and management. Data sources for all maps generated in this report can be found in **Annexes 1** and **2**.

2. Introduction: Ocean Protection and Marine Protected Areas

Oceans and seas cover more than two-thirds of the world's surface. About 64 percent of this marine environment is located beyond any national jurisdiction or territorial water, where it lacks rules or enforcement to implement integrated conservation efforts (UNEP 2006). This area, called the 'high seas' or the *area beyond national jurisdiction* (ABNJ) comprises the water column located beyond states' 200-nautical mile (nm) exclusive economic zone (EEZ). Similarly, the seabed outside the 200nm EEZ, or the outer edge of the continental margin where this lies beyond 200nm, is considered outside of the state's legal continental shelf and therefore is also beyond national jurisdiction. The collective seabed, ocean floor and subsoil that lie beyond the legal continental shelf are known as the 'Area' (see **Figure 1**).

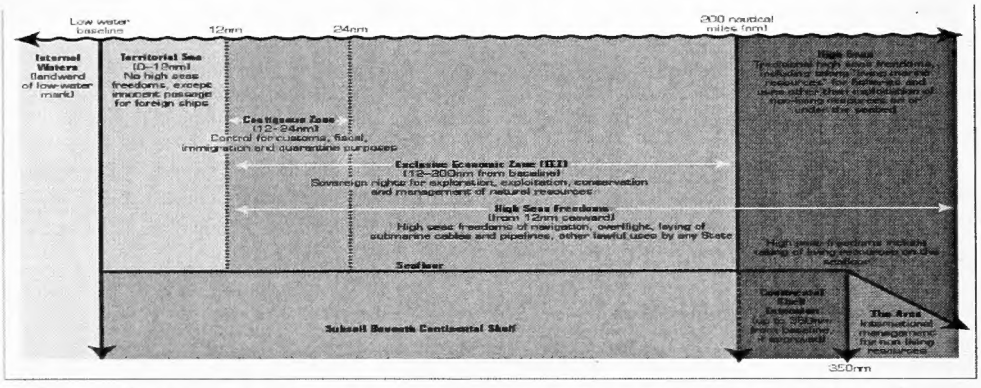

Figure 1: Marine zones as defined by the United Nations Convention on the Law of the Sea.[3]

Defining the exact boundaries of high seas areas can be complex. For example, the full declaration of EEZs is difficult to define in geographies where states are in close coastal proximity, such as the Mediterranean Sea. Here, the 12nm territorial sea generally delineates the high seas boundary but there are exceptions, i.e. Greece has sovereign rights over only 6nm. Unlike the high seas, which are defined by political boundaries, deep-sea areas are physically defined by the depth of the water column, typically below 200 meters where light and temperatures are significantly reduced. Deep-sea areas are found both within and beyond areas of national jurisdiction and are largely unexplored.

[3] Source: UNEP 2007, based on Gorina-Ysern, 2003.

The 1982 United Nations Convention on the Law of the Sea (UNCLOS) provides the legal framework for ocean conservation and management of human activities (Thiel and Koslow 2001) and defines a series of rights and duties for ABNJ. High seas *rights* include the freedom to fish, navigate and to conduct scientific research, and *duties* include the protection of the marine environment, conservation of living resources, and cooperation with other parties (UNGA 2005). Unlike the high seas, the seabed Area and its non-living resources are designated by UNCLOS as the "common heritage of mankind", meaning they are free from governance claims and subject to a different governance regime. The International Seabed Authority (ISA) established under UNCLOS, outlines rules to protect the marine environment before any mining can take place. Overall, laws in ABNJ are often basic and difficult to enforce thus relying on all states and their citizens to behave responsibly (UNEP 2007).

While conservation efforts for the world's marine environment have expanded in recent years, there is still a great deal of work that needs to be done in order to meet a variety of global targets, specifically in ocean areas beyond national jurisdiction. In 2002, the WSSD called for "*the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks by 2012.*" Recognising the importance of HSMPAs as a tool to reach this target, the 2003 World Parks Congress agreed on the establishment of five scientifically significant and globally representative HSMPAs by 2008, a process included in IUCN's Ten Year Plan HSMPA Strategy (2004). The Congress recommended that MPA networks be extensive and include strictly protected areas that amount to at least 20-30% of each habitat, and contribute to a global target for healthy and productive oceans.[4]

The 2004 CBD Conference of Parties (COP) agreed to a Programme of Work on Protected Areas (PoWPA) with the objective of supporting the establishment and maintenance by 2010 for terrestrial and by 2012 for marine areas of comprehensive, effectively managed, and ecologically representative national and regional protected areas.[5] Contracting Parties have agreed that at least 10% of the world's ecological regions should be effectively conserved.[6] With only 0.7% of the oceans currently under some form of protection (UNEP-WCMC 2008b), the effectiveness of this protection is unclear at best and it is certain that more integrated marine conservation efforts are urgently needed, including particularly the establishment of HSMPAs.

One of the most promising tools or actions proposed to address the conservation and sustainable use of the high seas is the development of "*spatial and temporal management tools such as MPAs, spawning closures and seasonal closures,* [which] *are particularly useful in data-poor situations such as encountered in the deep seas*" (FAO 2007a). However, there is no global legal framework that attributes international responsibilities and mechanisms for the identification, creation and protection of MPAs beyond national jurisdiction (Schwartze and Siegele 2008, Gjerde 2008). The Convention on Biological Diversity's 13th SBSTTA meeting in February 2008 stated that a clear legal mandate is required to assist with establishment of MPAs on the high seas (CBD 2008a). This mandate may require a multi-sectoral approach, encompassing fisheries, shipping and mining sectors etc., and could potentially provide a foundation for implementing mechanisms as well as give the opportunity for accessing critical funding.

Despite the development of criteria and commitments to meet national and global targets, the primary remaining challenges for establishing HSMPAs are: (1) developing a framework for high seas MPA identification, designation, management and enforcement; (2) improving and modernising high seas governance, including mechanisms for coordinated and integrated management; and (3) ensuring sustainable funding (K. Gjerde, pers comm. 2008).

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[4] see Recommendation 22 at http://www.iucn.org/themes/wcpa/wpc2003
[5] CBD COP VII, Decision 7.28: Goal 1.1
[6] CBD COP VII, Decision 7.30, Goal 1, Target 1.1

2.1 A Rationale for High Seas Marine Protected Areas

The current extent of global MPA[7] coverage affords some kind of protection to less than 1 per cent of the world's oceans, a disproportionately low figure when compared with terrestrial regions where approximately 12 percent of land is protected to some degree under different management regimes (UNEP-WCMC 2008b). The vast majority of MPAs are located along the coasts, leaving much of the offshore and open ocean areas virtually unprotected. Managing and protecting high seas areas, in addition to and in concert with coastal zones, is incredibly important given the intricate relationship that exists between shallow coastal waters and deeper areas of the open ocean. A complex array of biophysical processes, such as ocean currents and nutrient upwelling, connect the shallow waters of the ocean surface with the depths of the sea and provide critical services to marine life at all dimensions of the sea (i.e. water column and seabed) (UNEP 2007). MPAs in areas beyond national jurisdiction may protect against the irreversible loss of the biodiversity supported by these processes.

A number of mechanisms and international conventions support policies and recommendations that call for increasing protection of the oceans (see **Annex 4**). Many have existing capacities for protecting specific aspects or areas of the high seas. These include species-specific or area-specific closures under the Regional Fisheries Management Organisations (RFMOs), designation of Special Areas and Particularly Sensitive Sea Areas protected from pollution under the International Maritime Organisation (IMO), and whale sanctuaries as delineated under the International Whaling Commission (IWC). However, these existing mechanisms have limited competencies, with none applying to all potential human activities in the high seas. Thus, spatial and regulatory gaps still exist regarding coverage of important species, habitats, and ecological processes that are essential for a comprehensive network of HSMPAs (see **Figure 11).** Likewise, many existing regulations are not enforced or utilised; others are legally non-binding and thus questionable in their effectiveness.

In addition, according to Halpern et al. (2008), a recent review of global marine data indicates that no area of the oceans is untouched by human impact. Thus, there is an urgent need to ensure that protection is enabled not just at coastal, nearshore environments but in the offshore and deep-sea areas as well. While advances have been made in understanding high seas threats and deep-sea biology, there is a need to begin correlating conservation planning with policy. Equally important is to incorporate future modelling scenarios in current planning schemes as a way to look ahead to future threats such as climate change.

The vast expanse of the oceans, including the water column and seabed, is 300 times the volume of the terrestrial environment (Gage 1996). The ocean floor is a maze of canyons, seamounts, and plains. This complex topography creates a three-dimensional environment that contributes to a prodigious array of ecosystems and life forms and thus the high degree of biodiversity in the seas (UNEP 2007). Ninety percent of the planet's living biomass exists in this space, yet only a fraction of one percent of the seafloor has been investigated (Clark & Koslow 2007). Recent assessments of marine life, including deep-sea corals and migratory species, have revealed the range of high biodiversity that exists in waters more than 200 nautical miles from coastal environments. The Census of Marine Life estimates that 230,000 marine species are currently known (WoRMS 2008) though the total number is estimated between 500,000 and 100 million (Clark & Koslow 2007). Given the current gaps in effective high seas governance, these high biodiversity areas are still at risk.

High seas biodiversity provides valuable functions and services: these include seafood for consumption, regulating services like carbon sequestration and storage, and access for scientific research, exploration, and tourism (UNEP 2007). Marine reserves, one type of MPA that could confer strict and permanent protection to the high seas, can contribute to the maintenance of these values and

[7] *Any defined area within or adjacent to the marine environment, together with its overlying waters and associated flora, fauna and historical and cultural features, which has been reserved by legislation or other effective means, including custom, with the effect that its marine and/or coastal biodiversity enjoys a higher level of protection than its surroundings"* (CBD decision VII/5, paragraph 10*)*.

services. According to Sumaila et al. (2007), the benefits of implementing marine reserves on the high seas, if done so effectively, will far exceed the costs of closing these areas to a number of uses, including fisheries. For example, their recent study indicates that less than 2% of the globally reported marine catch would be lost as a result of protecting 20% of the high seas. In return, extinctions can be prevented and many values, including economic benefits and intrinsic values, will be protected.

Because of the fluid and dynamic nature of the ocean, HSMPAs are unique and could potentially be quite compatible with human activities when planned carefully. HSMPAs can be designed with a flexible sense of time and space to correspond with shifts in current patterns and other oceanographic features (Norse 2006, Norse et al. 2005). As a result, HSMPAs can be created to associate with seasonal fluctuations and species use patterns as well as providing protection to spatial features, such as static oceanographic currents. They can also protect temporal features, such as important primary production sites that serve as critical feeding grounds, and seasonally-important areas associated with life history patterns of highly migratory species, such as the spawning grounds of bluefin tuna (Block et al. 2005).

Despite the challenges associated with the establishment of HSMPAs, it is important to understand and begin planning how to implement marine protected areas and other area-based measures on the high seas as a means to conserving the valuable ecosystems and processes that contribute to critical ecological functions in the oceans and on land. In addition, the establishment of HSMPAs is an important tool for reaching global conservation targets, which can in turn raise awareness to the issues and motivate governments to provide the political support necessary to establish further HSMPAs.

2.2 Existing High Seas Marine Protected Areas

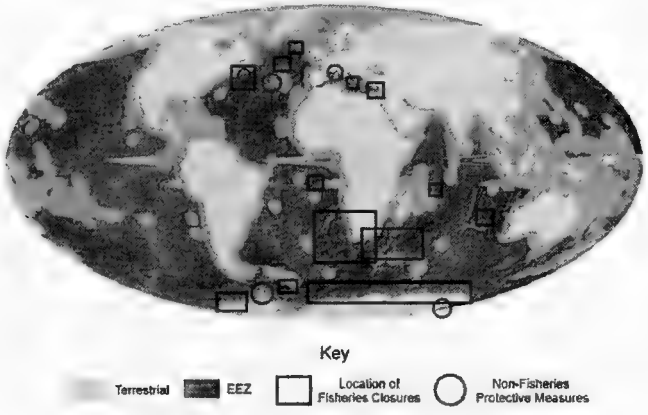
The concept of HSMPAs is complex, in part due to the lack of a common, adequate, spatial and legal encompassing definition, which makes agreement on the current extent of high seas protection and coverage problematic. In this report, we use the term "HSMPA" to describe closures of biologically diverse high seas areas to some or all human activities (not necessarily permanent in space and time). A number of protective measures and mechanisms contributing to biodiversity conservation are already in place on the open ocean (see **Table 1**). Examples include fisheries closures designated by Regional Fisheries Management Organisations (RFMOs) and the Pelagos Sanctuary designated by Regional Seas Programmes (RSPs). The scientific criteria agreed upon at 9th Conference of Parties (COP9) provide a means to build upon these existing mechanisms and focus the prioritization of critical areas. This process provides an objective way for identification of ecologically and biologically significant areas in need of protection, which can be utilised both on a sectoral basis as well as for the establishment of more comprehensive MPAs. **Figure 2** illustrates the geographic locations of the existing measures described in **Table 1**. Each type of existing protective arrangement is discussed in more detail below.

Table 1: Summary of arrangements under which geographically specific high seas protection measures have been adopted (adapted from Ardron, 2007).

Arrangements	*Current Measures*
Regional Fisheries Management Organisations (RFMOs)	**CCAMLR**: numerous defined species-specific closures (2007-2008), 2 full fisheries closures, 1 CEMP monitoring site, and an area-wide gillnet and trawl ban. **General Fisheries Commission for the Mediterranean (GFCM)**: trawl ban all areas >1000m in 2005, and 3 additional areas <1000m closed to bottom trawling in 2006. **North-east Atlantic Fisheries Commission (NEAFC)**: 5 bottom fishing closures on a 3 year interim basis; 3 bottom fishing closures until 2009.

RFMOs in development	**Northwest Atlantic Fisheries Organisation (NAFO)**: 4 bottom fishing closures from 2007-2010; coral protection zone closed to demersal gear in 2007. **South-east Atlantic Fisheries Organisation (SEAFO)**: 10 closures to all fishing activity from 2007-2010. **South Pacific RFMO**: precautionary trawl restrictions, and "frozen footprint".
Regional Seas Conventions	**Antarctic Treaty**: 17 Antarctic Specially Protected Areas (ASPAs) and 4 Antarctic Specially Managed Areas (ASMAs). **Barcelona Convention**: Pelagos Sanctuary SPAMI. **OSPAR Convention**: Portugal has 1 MPA on its claimed extended continental shelf.
Other International Conventions	**International Maritime Organisation (IMO)** (through MARPOL): 2 Special Areas – the Mediterranean Sea and the Antarctic area (south of 60°S). **International Whaling Commission (IWC)**: 2 ocean basin whale sanctuaries – Indian Ocean Whale Sanctuary and Southern Ocean Whale Sanctuary.
International Agreements	**Pelagos Sanctuary for Mediterranean Marine Mammals**; **Agreement Concerning the Shipwrecked Vessel RMS Titanic.**
Inter-governmental Organisations	**Pacific Islands Forum**: a ministerial call for precautionary trawl restrictions in the Western Tropical Pacific Islands Area.
Voluntary Measures	**Southern Indian Ocean Deepwater Fishers' Association (SIODFA)**: 11 voluntary Benthic Protected Areas closed to trawling in 2006.

Figure 2: The geographic location of existing high seas protective spatial measures[8]



Regional Fisheries Management Organisations

Regional Fisheries Management Organisations (RFMOs) have been developed to manage and conserve high seas fish stocks as well as straddling and highly migratory fish stocks in some but not all regions. Under the UN Fish Stocks Agreement (UNFSA), RFMOs are to ensure the conservation and sustainable use of fish stocks within their geographic remit based on the principles of the UNFSA, including Articles 5 and 6 relating to an ecosystem and precautionary approach. A number of RFMOs have established defined areas on the high seas that are closed to some or all types of fisheries, thus affording protection to other species and ecosystems within the area.

[8] Map does not include the IMO and IWC conservation measures or the precautionary South Pacific RFMO closures.

Not all RFMOs have the capacity or mandate to adopt fisheries closures to conserve biodiversity (as opposed to protecting areas to enhance fish stocks) (see **Figure 2**). Most closures are presently being concentrated in the North Atlantic, Mediterranean Sea, and the Southern Ocean. Processes to expand the competence of existing RFMOs (e.g. NAFO, NEAFC) and to create new RFMOs with a wider environmental protection mandate are underway, such as the proposed South Pacific RFMO. However, fisheries closures can offer fairly limited protection to high seas areas as most lack permanence and often only control specific fishing gear types. In particular, protection is most often afforded to the habitat and species of the seabed by controls on bottom trawling (e.g. NAFO, NEAFC, SEAFO, and GFCM); however, some single species RFMOs such as the Inter-American Tropical Tuna Commission (IATTC) temporarily close areas to activities such as long-line fishing by purse seine vessels in order to conserve their stocks, and CCAMLR has implemented a range of Conservation Measures providing year-round and seasonal fisheries closures. It has also designated two CCAMLR Ecosystem Monitoring Program (CEMP) protected sites, though one has been de-listed since research is no longer occurring there (S. Grant, pers. comm. 2008). In all, few of the measures available to establish area protections from fisheries impacts have been widely employed, and effective global oversight of high-seas fishery conservation and management is lacking (Kimball 2005). Chapter 4 provides a more detailed discussion of governance and management issues concerning RFMOs.

Regional Seas Conventions

Regional Seas Conventions (RSCs) are agreements, generally with accompanying action plans, established by groups of countries sharing common seas. Many were formulated under the auspices of the United Nations Environment Programme's Regional Seas Programme, which covers 18 regions of the world. Although the Regional Seas Programme plays an important role in regional cooperation (Kelleher 1999), these agreements are limited in their coverage of areas beyond national jurisdiction (Kimball 2005) with only four out of thirteen RSCs covering areas beyond national jurisdiction (OSPAR, North-East Atlantic; Barcelona Convention, Mediterranean; Lima Convention, South-East Pacific; and the Antarctic Treaty, Antarctica) (Kimball 2005, annex VI). The SPREP agreement also applies to the three high seas "donut holes" surrounded by the EEZs of the relevant parties, which Greenpeace are currently campaigning to protect as Pacific Commons (see Section 2.3).

Three of the Regional Seas Conventions covering areas beyond national jurisdiction have been involved in the creation or progression of HSMPAs. Agreement to promote an OSPAR network of Marine Protected Areas has been responsible for the protection of the Rainbow Vent Field, of which the water column can be classed as high seas, and is currently pioneering the Charlie Gibbs Fracture Zone HSMPA proposal. The Pelagos Sanctuary for Mediterranean Marine Mammals in the Ligurian Sea was accepted in 2001 by the Barcelona Convention as a Specially Protected Area of Mediterranean Importance (SPAMI) and now represents the largest area of the high seas currently under protection. The Antarctic Treaty has also been active in MPA planning and has designated six fully marine Antarctic Specially Protected Areas (ASPAs) as well as 11 ASPAs with both marine and terrestrial components, which have been designated primarily as sites of ecological and scientific importance. Most of these sites are very small, coastal areas, ranging from less than 0.5 to 30km², with the largest covering 900km². Four Antarctic Specially Managed Areas (ASMAs) have been designated to manage multiple activities and to reduce cumulative environmental impacts. The largest of these ASMAs was established in 2008, and covers an area of more than 3000km². ASPAs and ASMAs currently cover 0.02% of the area south of 60 degrees South (S. Grant, pers. comm. 2008). As the Antarctic Treaty was signed prior to UNCLOS in 1959, these protected areas are not technically 'High Seas' as defined under UNCLOS but they are MPAs in areas beyond national jurisdiction.

Other International Conventions

To date, the International Whaling Commission (IWC) has been responsible for the designation of three Whale Sanctuaries in order to protect some species of whales from commercial whaling activities. Two sanctuaries are currently in effect on the high seas: the Indian Ocean Whale Sanctuary established in 1979, which has been further extended on two occasions since its designation, and the Southern Ocean Whale Sanctuary established in 1994. Although IWC Whale Sanctuaries cover large areas of the high seas, it is important to realise that their mandates are limited to the protection of whale stocks from targeted hunting only and do not extend to the protection of the ecosystem.

The International Maritime Organisation (IMO) is considered *the* competent international body to establish special protective measures in defined areas at risk from shipping. IMO has negotiated more than forty conventions and other legal measures, including the 1973 International Convention for the Protection of Pollution from Ships, as modified by the protocol of 1978 (MARPOL). MARPOL provides for the designation of 'Special Areas', based upon oceanographic and ecological conditions, as well as levels of sea traffic, where mandatory rules apply to ships in terms of oil and noxious liquid substance discharges, and marine debris (Schwarte and Siegele 2008). On the high seas, Special Areas have been designated in the Mediterranean Sea and the Southern Ocean (IMO 2008).

International Agreements

A number of other processes have been employed in order to establish protective measures on the high seas. A protected area designated for the conservation of the cultural heritage of the famous ship *Titanic* was created in 2004 through a multi-national agreement between Canada, France, the United States, and the United Kingdom (Hislop 2007). This is one example of a site-specific protective measure where parties agree to regulate the activities of their nationals and flag vessels that may affect the area. The agreement is binding only on the Parties directly involved. Though this action does not directly target the conservation of biodiversity, it may serve as a model for how legal agreements for pilot MPAs might be implemented. A successful HSMPA prototype could then be used as a model to reduce political opposition (Brunner and Clark 1997) and to develop a series of HSMPA pilots at prioritised locations, both of which would instigate additional actions to implement global targets.

In a similar process, prior to its designation as a Specially Protected Area of Mediterranean Importance (SPAMI), the Pelagos Sanctuary for Mediterranean Marine Mammals was first established through an international agreement. First proposed by the Tethys Research Institute in 1990 as "Project Pelagos", a trilateral agreement between France, Italy and Monaco was signed in Rome 1999 for its establishment, following vigorous lobbying by the NGO community and members of the Italian Parliament. In 2001, the Sanctuary was designated a SPAMI under the Barcelona Convention and, following a period of ratification by the three countries, the Sanctuary Agreement came into force during February 2002 (Notarbartolo di Sciari 2008).

Voluntary Measures

Cooperation among sectors also has the potential to establish peer agreements and self-policing components to keep anthropogenic pressures off protected areas in the high seas. This is exemplified by the 2008 agreement between the four members of the Southern Indian Ocean Deepwater Fishers Association (SIODFA) to voluntarily close 11 areas to deepwater trawling in the Southern Ocean. Although a voluntary closure is only applicable to the members of SIODFA and with no legal enforcement, this agreement represents an important step forward in terms of collaboration, and may provide a model for future agreements between the fishing and other industries.

Many current mechanisms do not provide protective measures to all species and habitats where applied, nor do they offer permanent protection which is critical for the establishment of MPA

networks (UNEP-WCMC 2008a). Overall, many of the high seas areas currently under some form of protection are very limited geographically and are generally located close to EEZs. The majority of the Antarctic Treaty and CCAMLR sites are very small and all are located near the Antarctic continent and its surrounding islands. The HSMPA designated for the conservation of the famous ship *Titanic* offers protection to only 1km² of the water column. Finally, even where large HSMPAs exist, they offer limited protection usually concerning only certain species. For example, the IWC Whale Sanctuaries and the Pelagos Sanctuary for Mediterranean Marine Mammals, spanning both territorial waters and 46, 371km² of the high seas, are managed for the conservation of cetaceans. However, it is hoped that the conservation measures in place for marine mammals will act as an 'umbrella' and contribute to the protection of the wider ecosystem (Notarbartolo Di Sciara et al. 2008).

2.3 Proposed High Seas Marine Protected Areas

Although there are conflicting ideas about what defines an HSMPA or the exact area of high seas that is under some protection, it is certain that marine areas protected beyond national jurisdiction are not well represented within the existing global system of protected areas. Some organisations and initiatives are already under way to identify and develop additional HSMPAs; however, the more collaboration that can be employed among these groups, the more efficient and streamlined will be the results. Annex 1 of the COP9 Decision IX/20 lists some examples of marine species, habitats, and ecosystems, which relate to each of the criteria and guidelines for the establishment of HSMPA sites and networks. An analysis of these examples could form the basis of the next steps needed to commence a harmonised approach to HSMPA planning.

The development of high seas MPA pilot sites is one way to begin gaining practical experience in understanding what mechanisms are needed to effectively designate, implement and enforce HSMPAs.[9] Current proposals for HSMPAs include a variety of approaches ranging from scientific collaboration and NGO campaigns to multinational agreements. Most recently at the World Conservation Congress in October 2008, ten "High Seas Gems", examples of important high seas areas that merit protection, were released by the IUCN-WCPA in collaboration with the Marine Conservation Biology Institute (MCBI).[10]

For our report, twelve separate publications that include potential or proposed HSMPAs, ranging from 1-41 areas each, were identified and areas reviewed for cross-reference (**Table 2**). Where spatial information of existing and proposed HSMPAs is available (at minimum a description of the geographic area), valuable maps can be produced to inform planning and prioritisation of HSMPAs. Geographic information was gathered and mapped for all the existing and proposed HSMPAs and is described in **Table 1** and **Annexes 1** and **2**. As shown in **Figure 3**, these layers were then combined in order to illustrate the geographic location of existing (see **Table 1**) and potential/proposed HSMPAs, and associated density (i.e. where they overlap). Because these areas have been identified either through expert review of science-based knowledge, expert opinion, spatial-based decision tools such as MARXAN, or a combination of these, a density approach can be useful to indicate which areas of the high seas are currently seen as the highest priority areas for HSMPA designation. In the future, by building more rigor into the scientific underpinnings of each of these areas, in conjunction with outreach and political support, this process can be useful for identifying not only the ecologically and biologically significant areas of the high seas but also those that may have a good opportunity for success based on the number of supporting scientists, organisations, and political constituents.

Figure 3 demonstrates that large areas of the high seas have been subject to MPA proposals, yet this has no bearing on the feasibility of such proposals becoming realised. For example, Greenpeace's

[9] See http://groups.google.com/group/wcpamarine-summit/web/iucn-wcpa---marine-high-seas-work for backing paper

[10] The ten sites are as follows: Emperor Seamount Chain; Gakkel Ridge; Sargasso Sea; Southeast Shoal of the Grand Banks; Charlie Gibbs Fracture Zone; East Pacific Rise; Ross Sea; Pelagos Sanctuary; Saya de Malha Banks; and Lord Howe Rise.

'Roadmap to Recovery' proposes 26 large areas that, if designated, would afford extensive protection through a network based upon 40% representivity of high seas ecosystems. Proposals such as this can be challenging since, although they offer protection to large areas of the high seas, their size is unlikely to be politically acceptable at present and so their feasibility of short-term establishment is low. To balance these effects, we produced a second map illustrating areas where the density of potential or proposed areas was three or higher, thus identifying nine high seas areas where proposals had the highest agreement on the need for protection (See **Figure 4**). While it is clear that the 10% target for protection of representative ecoregions of the ocean will take time, this approach provides a useful tool by pinpointing those areas currently deemed most worthy of protection using current knowledge and thus may be used to focus efforts for the designation of HSMPA pilot sites. We can also gain a better understanding of where the most significant gaps exist for areas of high biodiversity. A description of the high seas protection proposals that have been identified and their sources can be found in **Table 2**. In addition, a number of which are discussed below.

Figure 3: The geographic location and density of HSMPA proposals in relation to existing high seas protective measures.

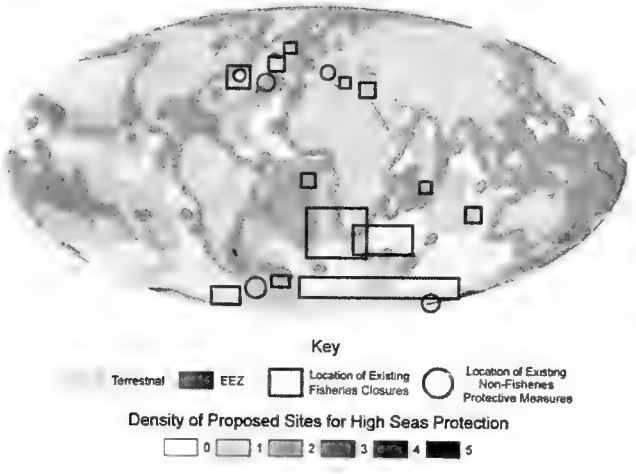


Figure 4: The nine areas with the highest agreement for protection amongst high seas protection proposals.

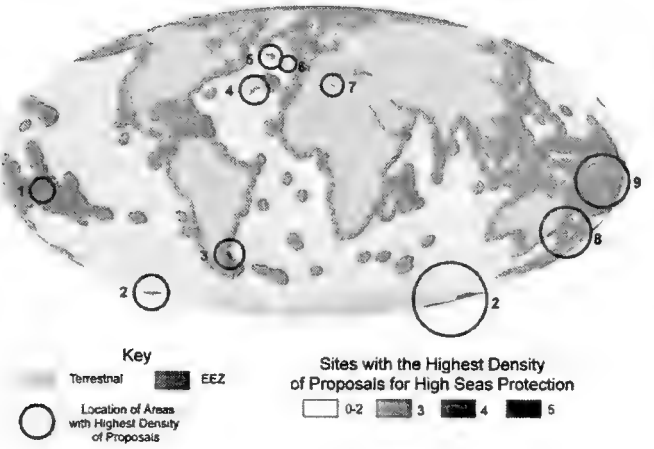


Table 2: Description of the nine areas with the highest agreement for protection amongst high seas protection proposals.

Site No.	Geographical Region	Proposal	Basis for Proposal
1	**Western-central Pacific** – area enclosed by the EEZs of French Polynesia, the Line Islands, and the Cook Islands.	Greenpeace (2008): - Pacific Commons Site 2	Expert consultation; Marxan (40% representivity).
		Greenpeace/Roberts et al. (2005): - Representative Site	Expert consultation; Marxan (40% representivity).
		IWC (1999): - South Pacific Whale Sanctuary	Scientific proposal by Australia and New Zealand to the IWC scientific committee.
2	**Ross Sea/ Pacific Antarctic Ridge**	IUCN/WCPA/WWF (2003): - Antarctic seamounts	Expert workshop.
		IUCN (2003): - Ross Sea	Expert consultation (Vth World Parks Congress side event).
		FVSA/WWF (2008): - Ross Sea	Expert workshop; Scientific committee consultation; Government public consultation.
		Greenpeace/Roberts et al. (2005): - Site 12: Southern Australia/New Zealand	Expert consultation; Marxan (40% representivity).
3	**Patagonian Shelf/Argentine Sea**	Claudio Campagna (2003): - Agujero Azul	Scientific conservation of biodiversity and the *Illex* squid fishery.
		FVSA/WWF (2008): - South-west Atlantic Squid HSMPA	Scientific conservation of the *Illex* squid fishery.
		Greenpeace/Roberts et al. (2005): - Site 8: Antarctic/Patagonia	Expert consultation; Marxan (40% representivity).
		IWC (2000): - South Atlantic Whale Sanctuary	Scientific proposal by Brazil and Argentina to the IWC scientific committee.
4	**Atlantis and Oceanographer Fracture Zones**	IUCN/WCPA/WWF (2003): - Rainbow Vent Field of the Mid-Atlantic Ridge	Expert workshop.
		IUCN/WCPA/WWF (2003): - Mid-Atlantic Ridge vent fields	Expert workshop.
		Greenpeace/Roberts et al. (2005): - Site 3: Azores/Mid-Atlantic Ridge	Expert consultation; Marxan (40% representivity).

5	**Charlie Gibbs Fracture Zone**	IUCN/WCPA/WWF (2003): - Mid Atlantic Ridge vent fields	Expert workshop.
		OSPAR (2008): - Charlie Gibbs Fracture Zone	Scientific analysis and collaboration (representation of biological and ecological diversity).
		Greenpeace/Roberts et al. (2005): - Site 2: North Atlantic	Expert consultation; Marxan (40% representivity).
6	**West European Basin**	IUCN/WCPA/WWF (2003): - European deep Seas Transect	Expert workshop.
		Greenpeace/Roberts et al. (2005): - Site 2: North Atlantic	Expert consultation; Marxan (40% representivity).
		Hjalmar Thiel (2003): - Unique Scientific Priority Areas	Expert opinion: long-term protection of existing scientific study sites within the European Deep-Sea Transect.
7	**Central Mediterranean Sea** – off the Tunisian and Maltese coasts.	ACCOBAMS (2004; 2006): - Area of special importance for the common dolphin and other cetaceans: waters surrounding the island of Malta and South-eastern Sicily. - Area of special importance and diversity for various cetacean species: the Strait of Sicily.	Spatial modelling of cetacean critical habitats, and interaction between cetacean and human activities.
		Greenpeace Marine Reserves for the Mediterranean Sea (2006): - Sicilian Channel - Maltese Slope	Expert consultation; GIS overlays of biodiversity and oceanographic data (40% representivity).
		Greenpeace/Roberts et al. (2005): - Site 5: Central Mediterranean	Expert consultation; Marxan (40% representivity).
8	**North Tasman Sea**	IUCN/WCPA/WWF (2003): - Lord Howe seamount chain	Expert workshop.
		Greenpeace/Roberts et al. (2005): - Site 17: Lord Howe Rise and Norfolk Ridge	Expert consultation; Marxan (40% representivity).
		IWC (1999): - South Pacific Whale Sanctuary	Scientific proposal by Australia and New Zealand to the IWC scientific committee.
9	**Western Pacific** – area enclosed by the Federated States of Micronesia, Papua New Guinea, the Solomon Islands, Turalu, Kiribati, Nauru, the Marshal Islands, and Fiji.	Greenpeace (2008): - Pacific Commons Site 3	Expert consultation; Marxan (40% representivity).
		Greenpeace/Roberts et al. (2005): - Site 20: Western Pacific	Expert consultation; Marxan (40% representivity).
		IWC (1999): - South Pacific Whale Sanctuary	Scientific proposal by Australia and New Zealand to the IWC scientific committee.

Recommendations by IUCN-WCPA, WWF, World Parks Congress

As a first step towards implementing the 2002 WSSD high seas MPA targets, thirty-eight world experts met in Malaga, Spain, in January 2003 to agree on a set of actions to enable the establishment of a Marine Protected Areas Network in the high seas (Gjerde and Briede 2003). As part of this workshop, potential high seas areas were identified for the establishment of "test" sites in order to gain scientific knowledge and management experience in developing HSMPA networks. Seven broad areas were presented in a scientific background paper, from which the experts then identified six more specific areas based on potentially favorable political opportunities for designation. A series of steps necessary for the designation of sites was also outlined. This workshop provided a necessary starting point for subsequent work on the establishment of HSMPAs and the consideration of political feasibility. However, the descriptions of the identified sites are limited to one or two sentences each and much more scientific and political data would need to be compiled if these sites were to be seriously considered for establishment. Also in 2003, participants at a side event at the World Parks Congress urged that the largely intact area of the Ross Sea warranted priority for protection.

Recommendations by Greenpeace

In 2005, Greenpeace published the 'Roadmap to Recovery' which presented a design for a global network of high seas marine reserves (Roberts et al. 2005). The proposed network covers 40.8% of

the global oceans and includes twenty-nine separate candidate reserves that are representative of all twelve biogeographic zones. The approach adopted combined the results of a consultation of sixty five experts, who recommended forty-one high seas areas for protection. [11] The results of this expert consultation were combined with a computer-based *Marxan* analysis of biological, oceanographic, and physical ocean features. This approach does not take into account political aspects and thus may have limited application due to its potentially unfeasible goal. In addition, the rationale for each area recommended by an expert is limited to a short description no longer than a paragraph in length. However, this proposal has provided a useful basis for further analysis and has significantly contributed to furthering the field of HSMPA planning. Also, the individual areas identified provide a useful starting point for further scientific information gathering.

Greenpeace has also proposed a network of marine reserves for the Mediterranean Sea (Greenpeace 2005), and more recently recommended that three marine reserves be established in high seas areas enclosed by Pacific Island EEZs, in the Western and Central Pacific Ocean (Greenpeace 2008). These "donut-holes" have been proposed primarily to protect Pacific Island Countries from Illegal, Unreported and Unregulated (IUU) fishing in the area. While the scientific merit of these sites is still being based on their inclusion in the 'Roadmap to Recovery' report (S. Nabou, pers. comm. 2008), the compilation of more localised data on these specific sites will be needed in order to produce a more scientifically rigorous proposal. It is encouraging, however, that these three sites have political support from a number of Pacific Forum Island Countries including Papua New Guinea, the Solomon Islands, and the Cook Islands (Greenpeace 2008).

Recommendations by FVSA, WWF

In April 2008, WWF and the Fundación Vida Silvestre Argentina (FVSA) produced a publication describing four geographically representative high seas areas where research is being carried out (FVSA 2008). These actual or potential HSMPAs include the Pelagos Sanctuary for Mediterranean Marine Mammals (existing), the establishment of an entire HSMPA network in the Ross Sea, the proposed South-west Atlantic Squid HSMPA, and the Mid-Atlantic Ridge/Charlie Gibbs Fracture Zone, a biologically and ecologically significant site also proposed for inclusion in the OSPAR network of MPAs (see below). Each of these is assessed with regards to the CBD scientific criteria and guidelines, and so provides an important first step toward the streamlining of proposals in line with these measures. However, the scientific basis for each of the proposed areas needs to be further developed and expanded.

Recommendations by OSPAR Convention

The OSPAR Convention is the current legal instrument guiding international cooperation on the protection of the marine environment of the North-East Atlantic. Work under the Convention is managed by the OSPAR Commission, made up of representatives of the Governments of 15 Contracting Parties and the European Commission, representing the European Community. Annex V under the Convention provides a legal basis for the establishment of an OSPAR Network of Marine Protected Areas aiming, by 2010, to be an ecologically coherent network of well-managed MPAs including in areas beyond national jurisdiction.

The process of proposing MPAs for inclusion in the network, and their subsequent designation, is one of scientific rigour and involves cooperation between both the OSPAR Commission and the Contracting Parties. The OSPAR Commission annually evaluates all proposals from the previous year and designates any suitable sites. Until 2010, the network will be continually reviewed for its ecological coherence and further designations will be made to fill any gaps identified.

Major accomplishments have been made by OSPAR regarding HSMPAs in the North-East Atlantic. The proposed 'Charlie Gibbs Fracture Zone' (CGFZ) located on the Mid-Atlantic ridge, was approved as a potential Marine Protected Area in a 2008 meeting of the OSPAR Commission. It was agreed that

[11] For full list and description of sites please see the "Roadmap to Recovery" report, Roberts et al. 2005.

a comprehensive scientific case had been established for the CGFZ and that collectively the OSPAR Contracting Parties had expressed substantial political support for the proposal. A 'road-map' for 2008-09 was also agreed upon, which sets out a critical path of considerations and steps to be undertaken, with the view to adopting HSMPAs at the OSPAR Ministerial Meeting in 2010. The CGFZ is being considered as part of a network, with a further seven sites being recommended for peer review by ICES (OSPAR 2008a). In July 2008, OSPAR adopted a Memorandum of Understanding with the North-East Atlantic Fisheries Commission (NEAFC) in the first example of a Regional Seas Organisation with an environmental protection remit and a Regional Fisheries Management Organisation (RFMO) creating a firm basis for cooperation regarding the management of ABNJ (NEAFC 2008).

OSPAR has now begun dialogue with other internationally competent authorities and has received responses from NEAFC, IWC, UNEP, IMO and the International Seabed Authority. The formation of an adhoc taskforce/correspondence group has been proposed in order to address further steps and possible measures regarding the CGFZ, and to develop possible management measures that these bodies could contribute towards meeting the OSPAR conservation objectives (OSPAR 2008b).

Other proposals

Additional high seas areas in need of protection (outlined in **Table 2**) have been proposed by the International Whaling Commission (IWC), the Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS), Hjalmar Thiel (a retired scientist), and Claudio Campagna (Sea and Sky Project, Patagonia). Notably, a proposal for an IWC whale sanctuary must be based on scientific information and be concerned with the preservation of whale stocks directly, not the protection of the wider ecosystem. The two proposed sanctuaries have failed to reach the 75% majority vote required for designation due to disagreement over their scientific basis. ACCOBAMS sites must meet a variety of scientific criteria that consider both the distribution of critical habitat for cetaceans and the interaction of cetaceans with anthropogenic activities. Hjalmar Thiel has proposed three Unique Scientific Priority Areas (USPAs) in order to establish permanent areas for scientific research in the European Deep-Sea Transect where scientific study has been carried out for a number of years. Finally, Claudio Campagna has proposed a HSMPA for the Agujero Azul ("blue hole") on the Patagonian Shelf[12] based upon its importance for biodiversity and due to it lying adjacent to the commercially important *Illex* squid fishing grounds, an area also proposed by the FVSA and WWF.

Table 2 and this discussion demonstrate the range of processes that are being used to identify and propose further protection for the high seas. However, the variation of rigor and scientific justification for these areas is extreme as many are geared towards awareness raising and not specific proposals to intergovernmental bodies. The scientifically rigorous proposal process adopted by OSPAR provides a useful example of the importance of the use of scientific criteria and information in HSMPA planning. While this level of detail is most likely not possible for all future HSMPAs, it is important that a concerted effort be made to ensure that, to the extent feasible, a baseline level of scientific information should be incorporated into the proposal process so that ecologically and biologically significant areas of the high seas can be identified and thus justly protected.

2.4 Spatial Mapping of HSMPAs and Scientific Data

When combined with other data layers regarding high seas biodiversity and proxies, such as species richness and primary productivity, an evaluation of HSMPA proposals can take place in relation to their biological and ecological values (see Annex 1 of CBD COP9 Decision IX/20 for further detail). This technique can be coupled with other approaches, such as gap analyses, to ensure that site and

[12] See 'Forum for the Conservation of the Patagonian Sea and Areas of Influence' (http://www.patagoniansea.org/index.shtml) and the Sea and Sky project (http://www.sea-sky.org/) webpages for more information.

network level considerations are made and include habitat niches for endangered, threatened, and highly migratory species.

We use the nine high seas areas outlined in Section 2.3 as a preliminary model of this approach because they have already been identified by at least three or more separate entities or actions. Overlays of additional information, such as biogeographic classification, can provide insights on additional but critical factors such as habitat representation in a number or ecoregions. We combined these areas with additional data layers representing different aspects of high seas biodiversity and proxies. This type of analysis provides an opportunity to begin identifying important high seas areas in terms of their high biodiversity values, in response to the CBD criteria and associated steps for identifying ecologically and biologically significant areas in need of protection.

Physical Oceanographic Data Layers

Physical oceanographic measures, such as bathymetry and sea surface temperature, indicate areas where increased mixing and upwelling of nutrient rich waters result in areas of high primary productivity. These areas form the base of localised food webs and therefore can indicate areas of high biodiversity and species density in an otherwise sparse seascape. Physical oceanographic data can be measured by satellites and is therefore more readily available at a number of spatial and temporal scales than information on specific species and habitats. **Figures 4, 5 and 6** illustrate how sea surface temperature and ocean productivity data can be mapped and overlaid to evaluate HSMPA proposals and to highlight areas of the high seas that warrant protection.

Figure 4: Global Sea Surface Temperature (SST)[13] for 2002-2007 overlaid with nine high seas areas recommended for protection.

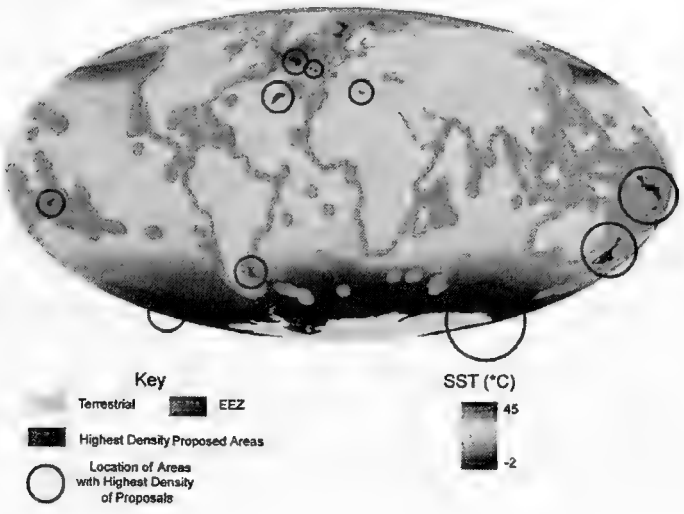
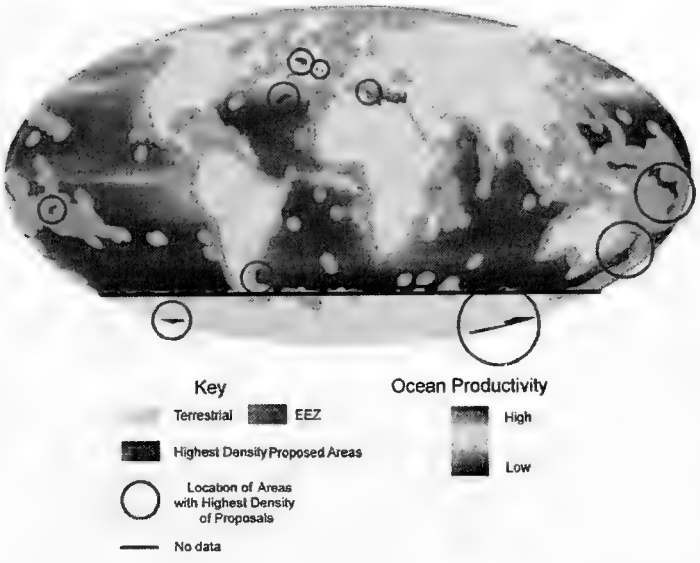


Figure 4 illustrates global satellite sea surface temperature (SST) for the period of 2002 to 2007. From this five-year composite, the transition zones from cool to warm surface temperatures can be clearly seen in the northern and southern mid-latitudes. It is within these transition zones that

[13] SST data source: NASA OceanColor database

increased water body mixing and upwelling occurs leading to increased primary productivity. **Figures 5** and **6** illustrate the net primary productivity for the same time period for summer (**Figure 5**) and winter months (**Figure 6**). The differences in the location of high primary productivity depending upon the time of year (i.e. primary production is concentrated in northern mid-latitudes in the summer and switches to southern mid-latitudes in winter) provides further support towards the need for MPA networks that can effectively manage the dynamic nature of the high seas, for example by including seasonal closures.

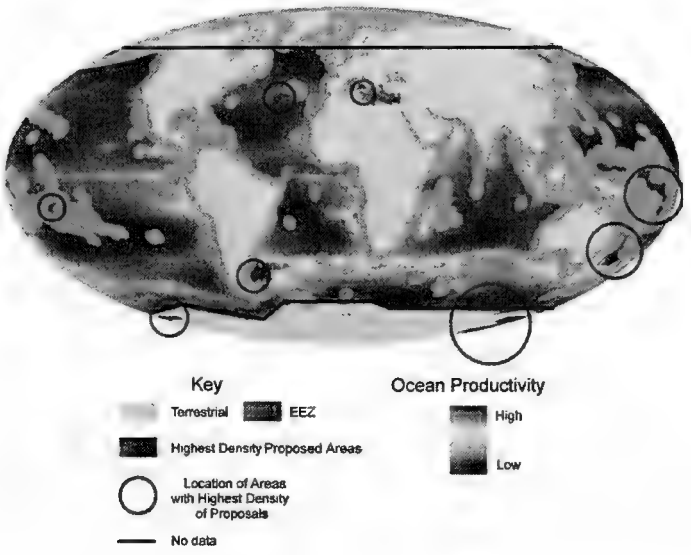
Figure 5: Ocean productivity[14] for the *summer* months of 2002-2007 overlaid with nine high seas areas recommended for protection. [15]



A number of the nine priority areas for HSMPAs identified in this study are located within these highly productive zones, with only the two located in the Western and Central Pacific Ocean (site 1 and 9) falling in warmer, less productive waters. In summer, the Charlie Gibbs Fracture Zone and the West European Basin (sites 5 and 6) fall within a high productivity area in the North Atlantic, whereas in winter, the two sites located within or closest to a high productivity site are the Patagonian Shelf/Argentine Sea and the North Tasman Sea (sites 3 and 8). Again the two sites in the Western and Central Pacific (sites 1 and 9) lie in warmer waters and so are furthest from highly productive zones. Due to data gaps at the poles, the Ross Sea (site 2) cannot be analysed in this way, however as cooler waters have higher baseline productivity than warmer waters, the Ross Sea and Pacific/Antarctic Ridge (site 2) may also represent a relatively high productivity site irrespective of the fact it lies outside an obvious SST transition zone.

[14] Ocean productivity data source: Oregon State University 'Ocean Productivity' database.
[15] For Figure 5, no data is available below the 'no data' line marked on the map.

Figure 6: Ocean productivity for the *winter* months of 2002-2007 overlaid with nine high seas areas recommended for protection. [16]



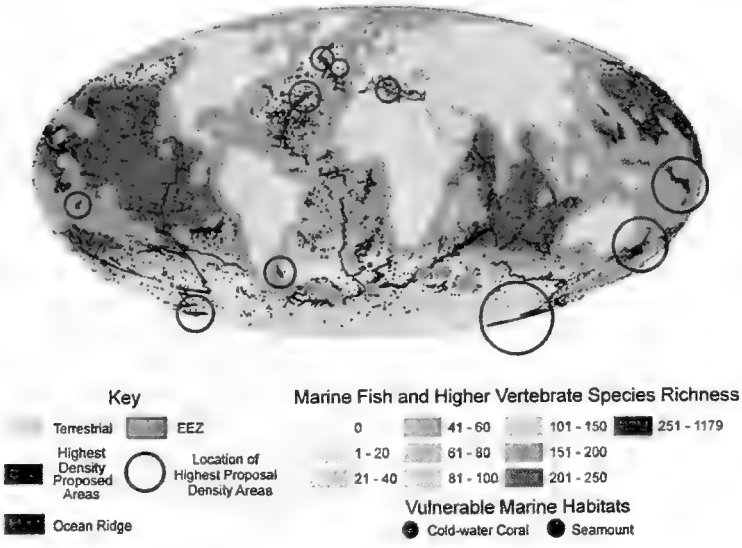
Biological Diversity Data Layers

Where available biological data exists, this can also be mapped to assess the biological and ecological significance of high seas areas. In **Figures 7** and **8**, we have mapped the presence of these highest priority proposals with species richness values[17] and the locations of seamounts and cold-water corals that are described by the FAO as Vulnerable Marine Ecosystems (VMEs), all relevant with regard to the scientific criteria according to the COP9 CBD decisions. From these maps it can be seen that many of the highest priority areas fall outside of the highest fish and marine vertebrate species richness areas. Only those sites proposed in the vicinity of the West and Central Pacific islands (sites 1 and 9) represent areas of high species richness. Similarly, few sites correspond to the location of seamounts and cold-water corals known to be important for biodiversity, the exception being those located along the mid-Atlantic Ridge. Where species distribution is known, particularly with regard to life history stages, this type of data layer would also provide valuable insights to the validity of potential HSMPAs.

[16] For Figure 6, no data is available above the northern 'no data' line, or for below the southern 'no data' line.

[17] Species richness maps are used via permission from Cheung et al. 2005 and downloaded from the Sea Around Us Project website, http://www.saup.org.

Figure 7: Marine fish and higher vertebrate[18] species richness and vulnerable marine habitats overlaid with nine high seas areas recommended for protection.



Highly migratory species, such as cetaceans and seaturtles, have been suggested as an important consideration in HSMPA planning and are included as a consideration in the CBD criteria and guidelines. Migration routes of these species can cover thousands of miles, spanning ocean basins and, if protected, have the potential to provide functional links between MPAs and other critical habitats (King and Beasley 2005). They may also be used as indicator species for the presence of productive oceanic biodiversity 'hotspots', thus acting as 'umbrella' species due to the fact that many other species are protected indirectly in the same area (Hooker & Gerber 2004, King and Beasley 2005). Satellite tracking of highly migratory species is increasing with a number of projects now established around the world (e.g. the Tagging of Pacific Predators (TOPP) project based at Stanford University). The data gained from these studies provides a direct, fisheries independent measure of species movements and can provide important insights on the connectivity processes occurring in the high seas. This data can also be mapped and used as an overlay when evaluating potential HSMPAs (see **Figure 9**).

[18] Higher vertebrate species are marine mammals, seabirds, and seaturtles.

Figure 8: Higher vertebrate species richness and vulnerable marine habitats overlaid with nine high seas areas recommended for protection.

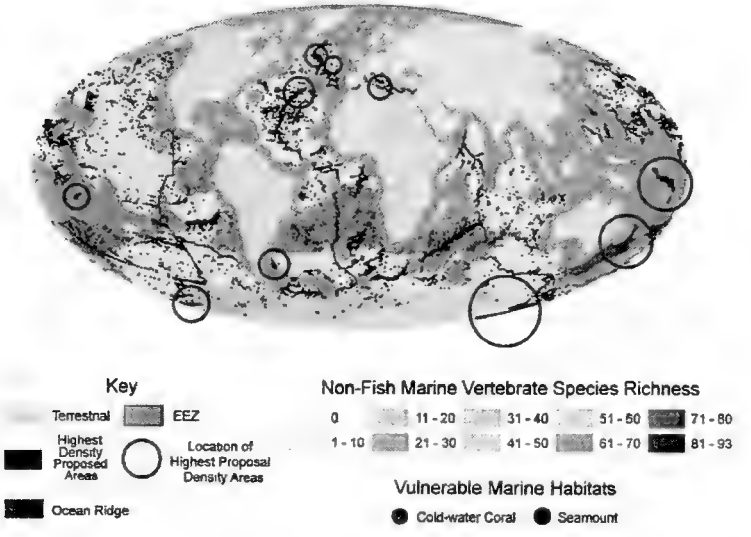
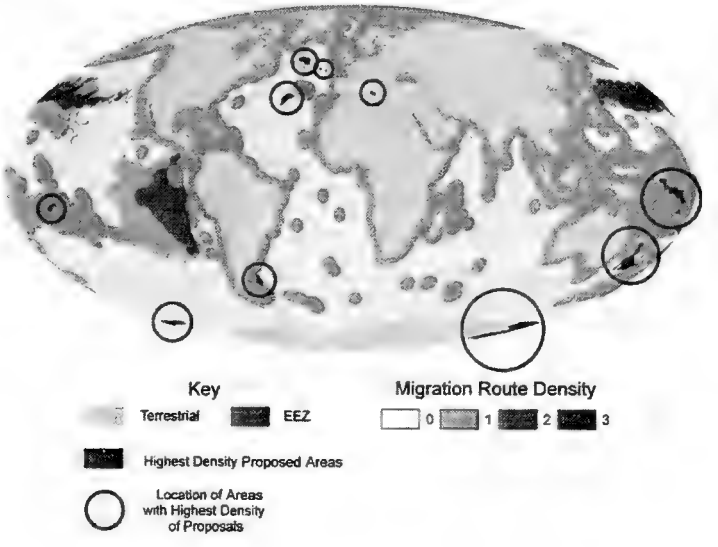


Figure 9: An example of how species migration data may be mapped and used to evaluate HSMPAs.[19]



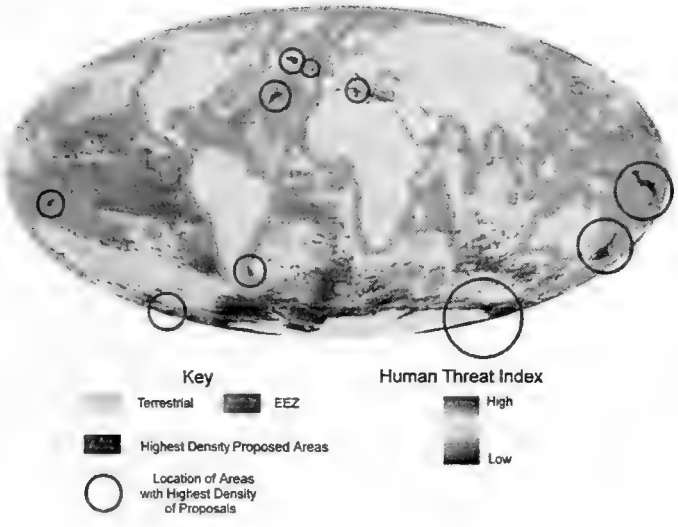
[19] Migration route density refers to the number of overlapping migration routes, indicating the importance of certain areas of the high seas as migration routes.

One challenge with migratory data is that much of it is only being collected from a few individuals at any one time and therefore the recorded movements may not be representative of the population as a whole. Nevertheless, this approach has yielded some significant results to date (e.g. see Block et al. 2005 for implications on the management of Atlantic bluefin tuna) and should be synthesised with other approaches to further build our knowledge of high seas processes.

Human Threats Layer

When assessing the value of future HSMPA sites, it is important to consider their vulnerability or sensitivity to threats and the probability of occurrence of current and future threats in that area. Halpern et al. (2008) have produced a map of cumulative human threats to the global ocean via the synthesis of seventeen ecological drivers of anthropogenic change in twenty marine ecosystems. **Figure 10** illustrates how almost all of the nine high seas areas identified for protection fall within areas of high cumulative threat. Only the Ross Sea and Pacific/Antarctic Ridge lies in a low impact area, and this fact constitutes one of the main reasons this area has been proposed for the development of an HSMPA network (see **Section 2.3**). The remaining eight sites are shown to be vulnerable to anthropogenic threat and as such warrant further research into their protection.

Figure 10: Cumulative Human Threat of the global ocean overlaid with nine high seas areas recommended for protection.



Overall, this section demonstrates how both physical and biological high seas data can be used synergistically to map and evaluate high seas areas for their biological and ecological significance in line with the CBD criteria and guidelines. This methodology is equally applicable at finer regional and local scales, thus making it a potentially important tool in the HSMPA planning process, and one that can be continually updated as our knowledge on the high seas expands.

3. High Seas Marine Biodiversity and Data

In order to progress with the selection and creation of a truly representative network of MPAs, critical knowledge gaps regarding the ecology and biology of high seas marine biodiversity should be identified and addressed. While filling all gaps is not realistic, establishing a process for identifying and filling key gaps will be important. The 2007 UNEP Global Marine Assessment raised attention to the disproportionately low understanding of the high seas and deeps oceans compared to other biological realms and the fact that the Southern Hemisphere falls behind the North in terms of biodiversity knowledge (UNEP 2007). Several geographic gaps in data exist for specific habitats and species, due in part to the high cost of gathering information over wide-ranging sea areas that require extensive resources such as qualified researchers, boat facilities, and advanced equipment. Long-term and large-scale marine ecological processes, which are particularly relevant to the high seas, lack substantial understanding (MEA 2008). Finally, a better analysis of threats to the high seas and ways to address them is needed.

Generally, existing knowledge of biodiversity is uneven (Millennium Ecosystem Assessment, Current Conditions and Trends- MEA 2008). Main gaps in biodiversity knowledge relate to:

- Geographic location
- Depth and associated biodiversity
- Complete representation, i.e. understanding of marine habitats and species is patchy and usually confined to areas that are more accessible
- Less charismatic species such as invertebrates
- Complex physical and biological oceanographic and ecological processes

Likewise, our knowledge is unbalanced at various scales and dependent on the resolution of information available. Technology can have a significant impact on the scale, resolution, quality, quantity, and range of data collected. For example, broad-scale data tends to be, by necessity, rather coarse because of the extent from which is it collected (i.e. 5 km^2 resolution for some data, 1 km^2 resolution for others). For example, NASA offers a range of sea surface temperature and other data products that have varying properties depending on the satellite used (e.g. the TerraMODIS vs. the AquaMODIS sensor). In addition, there is a disjunct between what is known or stated at higher taxonomic levels and what has been studied at the individual species level. To illustrate, in most cases of megafauna such as cetaceans and seaturtles, there is a generalised understanding of critical habitats for populations; however, species-level critical habitat requirements are not as well understood in high seas areas or knowledge is confined to coastal areas. For example, many nesting beaches of Leatherback seaturtles are well documented whereas their critical foraging grounds have only recently begun to be understood through satellite tracking programmes such as the Tagging of Pacific Predators (TOPP) project.

Equally important to the breadth and quality of the knowledge that the scientific community holds regarding high seas marine biodiversity is the ability to compile this information and make it accessible. The audience for this would include the marine conservation community, other relevant sectors, and those who make decisions that directly impact the marine environment, marine policies, governance, or the activities that threaten the ocean realm.

3.1 Threats to Marine Biodiversity

Human impacts to the biodiversity of the high seas, if left unchecked, can affect the resilience of the ocean system to deal with increasing threats and lead to biodiversity loss, including goods and services. In recent decades there has been an increase in the number of human activities targeting the resources of the deep sea and open ocean. These include exploration and exploitation of the seabed floor for minerals and genetic resources, the laying of undersea cables and pipelines, increased

military action and a proliferation of unsustainable fishing practices. Subsequent impacts of these activities include destruction of deep-sea habitats, pollution from both land- and sea-based sources, increased noise and the collapse of marine food webs. Atmospheric transport of airborne pollutants and increasing acidification from increasing levels of anthropogenic carbon dioxide also contribute to the growing demands.

The slow growth and low productivity of deep-sea species, communities and habitats make them inherently vulnerable to invasive industrial exploitation, such as bottom trawling (UNEP 2007). This fishing method rapidly depletes the species, communities and habitats associated with the seafloor and reduces the recovery rate of the ecosystem (Beaumont and Tinch 2003, Roberts 2002).

Global climate change is forecast to have profound effects on the oceans and thus marine species at all trophic levels. Sea surface warming inhibits the upwelling of cooler, denser, nutrient rich waters, thus suppressing primary productivity (including fisheries production). This situation may already be occurring in the North Pacific (Jackson 2008). Oceanic uptake of anthropogenic carbon dioxide has resulted in a 30% increase of ocean acidity from pre-industrial levels and is increasingly threatening to dissolve marine organisms with a calcium carbonate component in their bodily structure. These organisms include carbonate plankton and krill, both of which are important components at the base of many marine food webs.

The distribution of fish stocks are strongly influenced by climate variation (Stenevik and Sundy 2007) and the temperature increases resulting from global warming are likely to have profound impacts on commercial fisheries through shifts in distributions and changes in community interactions (Perry et al. 2005). Over the past 25 years, distributions of exploited and non-exploited North Sea fish species have responded markedly to increases in sea temperature, with two thirds displaying a shift in mean latitude, depth or both. Additionally, half of the species with north or south range margins in the North Sea have experienced northward (and one southward) boundary shifts with warming (Perry et al. 2005). Aquaculture will also be significantly affected; for example, the optimum temperature for fish farming along the Norwegian coast will be displaced northwards (Stenevik and Sundy 2007).

The combined impact of these activities is not fully understood. However, it is important that they are considered when planning protection of the high seas so that not only current but also future threats are taken into account.

3.2 Marine Biodiversity Data, Information, and Analysis

To date, at least two publications[20] have looked in depth at spatial data sources related to high seas conservation and HSMPAs. Both suggest that information is incomplete and lacking coordination, and that a streamlined, comprehensive conservation planning and data assimilation approach is needed for the high seas. Furthermore, one of these documents specifically indicates that a consultation or workshop is needed to define the type and scope of information that should be compiled in a centralised database to help inform the development of HSMPAs while also informing those entities who are undertaking activities that might have an impact on marine biodiversity in ABNJ (see CBD 2008c). This CBD document also proposes a data management scheme and a table of potential key data partners for a high-seas knowledge database. One of our aims within this report is to assess the current content, scope, and focus of known and accessible databases to determine gaps and contribute further insights.

[20] These are the (1) *Development of an Interactive Map (IMap) and review of spatial databases containing information on marine areas beyond the limits of national jurisdiction* (CBD 2008c) and (2) *Overview of existing high seas spatial measures and proposals with relevance to high seas conservation* (BfN 2007).

3.2.1 Data Overview and Analysis

In order for an ecologically representative network of HSMPAs to be achieved it is necessary to have knowledge on how species and habitats are distributed geographically, a difficult task when dealing with such a vast system about which little is currently known. We performed an analysis of 71 existing scientific datasets related to the high seas, with particular attention to biodiversity information, which could be used to inform HSMPA planning (see **Annex 8** for more detail on databases and contents). We reviewed databases regarding their relevance to atmospheric (above sea level), pelagic (water column) and benthic (seafloor) systems as well as their area of focus: chemistry, fisheries, habitats, marine species (outside of commercial fisheries), meteorology, oceanography, and physiography (the study of the natural features of the earth's surface, especially in its current aspects, including land formation, climate, currents, and distribution of flora and fauna).

Approximately two thirds of the databases were found to hold chemical and physical data (chemistry, meteorology, oceanography and physiography) whereas the remainder hold biological data (fisheries, habitats and marine species). Generally, the majority of the databases are focused on oceanographic (31 databases) and physiographical (37 databases) parameters or features of the ocean. Regarding biological information, databases that are international or regional in scope are focused on fisheries (18 databases), indicating that data for all other marine species is localised to specific regions or areas. The greatest deficit is found in the number of databases holding information on high seas marine habitats, which is a critical component for ensuring adequate representation across an ecologically coherent network of HSMPAs.

3.2.2 Species Data

The information now available regarding distribution and density of marine species is increasing rapidly, especially in response to the strategic and comprehensive Census of Marine Life (CoML),[21] an unprecedented 10-year initiative by global researchers to understand the diversity, distribution, and abundance of ocean life. CoML is carrying out extensive field studies into poorly known habitats and those assumed to be well known, with the aim of assessing the diversity, distribution and abundance of life in the oceans. The Oceanographic Biodiversity Information System (OBIS), established by CoML, is developing a strategic alliance of people and organisations with the view to creating an 'open access', interoperable, online database of marine biogeographic data which includes software tools for data exploration and analysis. If the data held by OBIS on the abundance and distribution of marine species can be linked with specific marine habitat types, then the result could potentially play a key role in HSMPA planning by advising which habitat types are most valuable to marine species, and therefore should be protected. The University of British Columbia's Sea Around Us Project, Fishbase and Sealifebase hold similar datasets, providing information on a vast number of marine species.

Some recent reports indicate a growing body of data regarding hotspots of species. For example, Lisa Ballance and colleagues from NOAA Fisheries' Southwest Science Center in the United States have found three distinct hotspots in the Eastern Tropical Pacific where densities of whale and dolphin species correlate with areas on the edge of highly productive oceanic gradients (Young 2008, Ballance et al 2006). In general, such physical features are known to concentrate plankton and fish populations, thus making them particularly significant habitat for foraging apex predators. However, analysis of Ballance et al. showed that these hotspots did not describe or even include the most important areas for many oceanic cetaceans. Instead, these hotspots encompassed edge habitat and they suggested that conservation efforts focused here would be of little conservation value to these species. This research indicates that the principles of hotspots based on terrestrial work may not apply to open ocean systems.

[21] http:// www.coml.org

According to the datasets in **Annexes 8** and **9**, there is fairly widespread research taking place on species, including information compiled on abundance, biology, census, distribution, ecology, and threat status. For example, high seas salmon are studied in the North Pacific Ocean and Bering Sea, and zooplankton and micronekton are being inventoried in the Sargasso Sea. CephBase aims to provide data on all living species of cephalopods and the International Maritime Organization is investigating the impact of invasive alien species. Specific invertebrate species that have greater data emphasis in **Annex 8** are deep-water invertebrates of hydrothermal vents and ridges, cephalopods, crustaceans, and molluscs. Generally, seamount and seabed species are also a focus for data collection.

Analysis of the representation of species groups (fish, invertebrates, marine mammals, plants, sea-birds, sea-turtles or vertebrates) across the databases (**Annexes 8** and **9**) with a focus on marine species indicates a predominance of invertebrates: 24 of the 37 species datasets include a focus on invertebrates (ranging from microscopic zooplankton to giant cephalopods). However, this group is still clearly underrepresented across our suite of biodiversity knowledge because many of these species are still undiscovered. In contrast, few datasets that are publicly available focus on keystone species: only 8 species datasets include marine mammals and seaturtles, 3 include fish, and 4 include seabirds. While information about the distribution and richness of these species groups is available (Cheung et al 2005), there is a gap in a comprehensive assessment of their life histories, for example, how migration routes and critical habitats might affect the siting of HSMPAs.

Organised and targeted research at the global scale is demanding, costly, and time-consuming but essential to building our knowledge of the high seas. A patchy approach at compiling data means that gaps and biases are prevalent in some high seas biodiversity datasets. For example, information on the migration routes of species that traverse large expanses of the ocean during their life cycle, such as the Wandering albatross and Leatherback seaturtles, is severely limited and spatially restricted to where organisations have concentrated research efforts. However, many highly migratory species research groups are emerging and databases concerned with the behaviour of a limited number of these species are included in **Annex 9**.

While much of the data on high seas species biodiversity is accumulated through opportunistic approaches such as records of historic fish landings and missing catches, as well as from observers that are placed on various vessels, there are some excellent examples of ecosystem-based monitoring practices that should be a model for how to accumulate information for making decisions and better understanding complex oceanic processes. For example, NOAA is mandated to conduct regular monitoring cruises that examine physical and biological habitats, mid trophic-level fishes and invertebrates, and apex predators in specific large-scale geographic regions (such as a 21 million km^2 portion of the eastern tropical Pacific) (L. Ballance, pers. comm. 2008). This kind of consistent, scientifically rigorous approach to monitoring and reporting is critical for protecting the most vulnerable and valuable areas of the high seas.

Data from localised species research is rarely communicated between data holders on any scale (local, regional or international), and so is often not amalgamated into more accessible and interoperable regional and global databases. There are, however, some excellent exceptions, such as the International Cooperative for High Seas Salmon Research.[22] An increase in capacity for coordination and communication between smaller and broad-scale projects could ensure the data is standardised and accessible to policy makers. This process will be particularly important for addressing emerging threats which impact the high seas on a global scale (such as the effects of a changing climate on species, communities and ecosystem function) and therefore co-ordinated research initiatives to address these issues should be strengthened.

[22] see www.fish.washington.edu/research/highseas

The World Register of Marine Species (WoRMS)[23] provides a consolidated database of species registers with consistent taxonomy and aims to provide an authoritative and comprehensive list of names of marine organisms. Lessons learned from WoRMS can provide valuable insights and direction for how to work with and manage knowledge regarding the biodiversity of marine life. For example, scientists affiliated with the Census of Marine Life consolidated 34 regional and highly specialised inventories (WoRMS 2008). In this process, the total number of species was reduced by one-third as redundant names and aliases were removed during the streamlining of databases. By adopting a similar validation process, the knowledge on high seas marine biodiversity can perhaps be better merged and synchronised.

3.2.3 Habitat Data

Of all the databases reviewed for this report, more than one specifically focuses on seamounts, cold water corals and chemosynthetic/hydrothermal vent systems, while none exclusively deal with other high seas habitats, such as the mid water column (below 200m) and sponge reefs and fields. These gaps should be addressed in order to create an ecologically representative network of HSMPAs, and not one that simply focuses on 'hotspots' of data collection. What is also needed is better understanding of correlation with threats. Halpern et al. (2008), who developed a global map of human impacts on the marine environment, recommend that distribution of habitat types be better studied. It is of vital importance to establish baseline information on high seas habitats, which subsequent anthropogenic impacts can be measured against, so as not to suffer from a 'shifting baseline syndrome' (Pauley et al. 1998), where a degraded habitat becomes established as the norm.

Much has been learned about cold-water corals and seamounts, as evidenced by database content and research endeavours. For example, CenSeam, [24] a programme associated with the Census for Marine Life, is compiling information about marine biodiversity on seamounts. These focused, coordinated research efforts provide a useful model for how to build knowledge on other high seas marine habitats. The vulnerability of seamount ecosystems is becoming an increasing concern. The slow growth and restricted distribution of many of the species associated with seamounts make them particularly vulnerable to industrial activities. At least 50,000 seamounts over 1000 meters high are estimated to exist in the world's oceans. Over half (53%) of known seamounts are located in the high seas area (Harris 2007).

Cold-water coral species known to inhabit the deep sea are now greater than the number found in shallow and tropical seas and, like seamount communities and habitats, are particularly vulnerable (Gianni 2004). Cold-water corals add complexity to seamounts and other deep-sea environments, offering refugia for a diverse array of invertebrates and fish (including commercially important species), and provide a hard substrate for colonisation by other encrusting organisms accessing the increased food supply provided by prevailing currents. Video observations have documented the rich biodiversity of cold-water coral reefs and have also recorded the impacts of destructive human impacts such as bottom trawling on reef communities (Clark et al. 2006). Thus, this habitat should maintain high research interest.

Hydrothermal vents represent isolated islands of biodiversity and productivity in an inhospitable abyssal environment. They host one of the highest levels of animal abundance on earth and approximately 90% of described species are endemic and rare, as they are highly specialised to extreme physio-chemical conditions (SCBD 2008, WWF/IUCN 2001). The only current threat to hydrothermal vents is from marine scientific research where bioprospectors require large quantities of a particular organism to obtain useful quantities of a natural product. A substantial future threat may arise from the mining of polymetallic sulphide deposits incurring severe physical damage and disturbance to vent communities (WWF/IUCN 2001).

[23] see www.marinespecies.org/
[24] see www.censeam.niwa.co.nz

The three habitats described above represent important areas for biodiversity and should be protected in an ecologically representative network of HSMPAs. However, they are not distributed evenly across the oceans; for example, the Atlantic Ocean may have only 40 hydrothermal vents, whereas the Indian, Pacific and Southern oceans collectively may contain around 12,000 vents. Since the Atlantic Ocean vents are rarer more isolated (Harris 2007), this will have implications for which high seas areas are prioritised for protection. New seamounts, corals and vents are constantly being discovered and the scientific knowledge on the biodiversity and human impacts on these habitats continues to increase. It is important that this new knowledge is made rapidly available to HSMPA planners to ensure adequate protection of these vulnerable ecosystems before they are damaged or destroyed.

3.3 Proxies for biodiversity

There are a number of parameters that could potentially be used as a proxies for biodiversity in the high seas and therefore inform us about priority areas for HSMPA planning. In the vast landscape of the high seas, species often aggregate in areas where mixing of the water column has promoted the upwelling of cooler, nutrient rich waters and increased local primary productivity. These conditions are conducive to food web development where primary producer presence results in aggregations of planktivores and low-level predator species; in turn, this determines the distributions of predatory pelagic mega-fauna (Palacios et al. 2006, Hyrenbach et al. 2000). Thus, areas of high primary productivity generally correlate with high biodiversity.

This mixing of the water column can be brought about in a number of ways: static bathymetric features, for example mid-ocean ridges, seamounts and submarine canyons, alter the water flow above them, increasing turbulence and enhancing mixing of water bodies (Opdal et al. 2008, Hyrenbach et al. 2000, Wolanski and Hamner 1988). Distributions of a number of cetacean species have been found to correlate with bathymetric variables, particularly the aspect of the sea floor and the depth of the water column (e.g. Skov et al. 2008, Macleod and Zuur 2005).

Persistent hydrographic features such as ocean fronts and currents represent some of the best known oceanographic patterns (Hyrenbach et al. 2000). Fronts occur where waters of different temperature and salinity meet leading to enhanced surface convergence and vertical mixing at all levels of the water column. This results in the upwelling of nutrients to the surface and the creation of predictable sites of concentrated primary production and prey aggregation (Bograd et al. 2004, Hyrenbach et al. 2000, Sournia 1994). This high predictability and persistence makes oceanic fronts ideal "signposts" and "highways" for species in an otherwise featureless landscape (Hyrenbach et al. 2000). Similarly, physical forcing mechanisms such as localised upwelling, eddies, and buoyancy fluxes can create small-scale ephemeral hydrographic features such as localised fronts and convergence zones. The promotion of primary productivity by these features creates a dynamic, patchy landscape of foraging grounds, which are of critical importance to pelagic species in the food stressed environment of the open ocean (Hyrenbach et al. 2000).

It is possible to detect these oceanographic features through the use of remote sensing and satellite technologies, which have the capability of detecting the sea surface temperature gradients indicative of fronts, and levels of chlorophyll that are related to ocean primary productivity levels. These datasets are generally readily accessible at global and regional scales and could be used to identify priority areas of high biodiversity to be incorporated into the HSMPA network.

It has also been suggested that species presence could potentially be utilised as a proxy for these highly productive areas. Globally, seabird species richness has been found to be strongly associated with basin-wide oceanographic fronts, particularly the sub-tropical, sub-Antarctic and sub-polar fronts of the Southern Ocean (Cheung et al. 2005). This has led to the suggestion of seabird presence being used as a proxy for high productivity frontal regions and therefore a tool for siting MPAs in the Southern Ocean (Harris et al. 2007). This would provide an inexpensive approach to HSMPA

planning, an important consideration for developing countries which often do not have the capacity to fund conservation measures.

3.4 Discussion: Gaps in Science Knowledge

Although an increasing amount of information is available regarding high seas biodiversity, there is still a great need to continue exploring the oceans and building our scientific knowledge, especially when considering the vast expanse of the deep seas. Improved scientific understanding of the complexities of marine biodiversity found in cold-water corals, continental slopes, hydrothermal vents, seamounts, and ridges of the deep-sea bed is required (UNGA 2006, UNEP 2007), with particular emphasis being placed upon the biogeography, reproductive strategies and vulnerabilities of these ecosystems (CBD 2008c).

For improved scientific understanding of the deep sea floor and its associated biological communities, the maintenance of long-term observation systems will be necessary. One option is to create a network of ocean observatories to enable easy access to standardised data management and archiving systems (UN General Assembly 2006). The ESONET programme is one example of such an endeavour, aiming to create a system of underwater observatories, linking various institutions conducting research in this area, in order to provide long-term monitoring and experimentation of the deep sea and its parameters (ESONET 2008).

Irrespective of the above recommendations, increased collaboration among institutions working on a global spectrum is essential in order to produce a more streamlined, long-term system of managing and accessing critical information and knowledge. Without building capacity in this area, little effective progress will be made.

4. Considerations for Management of High Seas MPAs

In light of the significant gaps that still exist in our knowledge of the high seas and its biodiversity, it is important to consider the methods by which HSMPA planning can progress, and how a precautionary, ecosystem-approach may be applied. Until scientific research significantly increases our knowledge base, it will be important to utilise tools such as the Global Open Oceans and Deep Seabed (GOODS) biogeographic classification system (CBD 2008d) and other proxies to inform the planning process.

4.1 Marine Spatial Planning

Marine Spatial Planning (MSP) is a relatively recent concept that is viewed as a way of improving decision-making and the delivery of an ecosystem-based approach to the management of marine activities. It provides a plan-led framework, including policies and regulations, that incorporates components of environmental management systems and tools utilised in land-use planning (Gubbay 2004). Whilst MSP is not explicitly specified in UNCLOS or the CBD, it can provide practical assistance for States in fulfilling their international obligations under these conventions, as well as helping to ensure the long-term productivity and resilience of high seas ecosystems and services (Ardron et al. 2008).

MSP requires that all human activities are considered proactively, i.e. not just where they cannot occur, but also where they can occur (Ardron et al. 2008). MSP would therefore provide the delineation of spatial zones each with a different management regime dependent upon the needs of all stakeholders; for example, some may be managed for fishing gear type, some temporarily or permanently closed to fishing, and others may be licensed for oil or gas extraction. HSMPAs could be

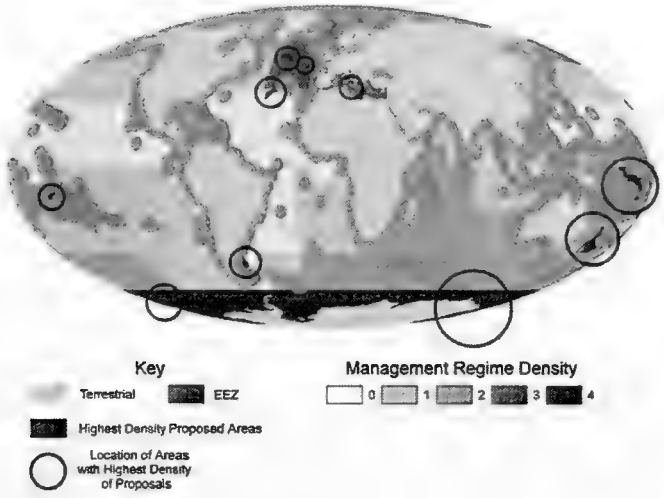
incorporated into such a zoning system being either managed as no-take zones or to allow some controlled, extractive use. Although they would stand in their own right as a sectoral interest, they would also be linked to other sectors, for example by helping industries utilising marine resources fulfil their marine conservation objectives.

Overall, MSP provides a planning and management framework that can increase consistency in decision making and present a transparent strategic approach allowing all industries to be given equal and fair consideration of how their activities may be affected by MPA site selection, management and network design (Gubbay 2004). It will therefore minimise conflicts of use, help address the cumulative impacts of these uses, provide a framework for responding to new and emerging activities, and provide a clearly accessible mechanism for stakeholder involvement. However, for MSP to be effectively implemented on the high seas, States will need to significantly improve coherence among and between global and regional agreements, institutions, and national administrations (Ardon et al. 2008). Ardron et al. (2008) suggest three priorities and actions for improving institutional coherence: (1) reform existing institutional arrangements to better support conservation and sustainable use of biodiversity, for example by an Implementing Agreement (see **Section 5.1**); (2) provide high-level global support and coordination, possibly through a UN established body, and establishing agreed overarching governance rules; and (3) providing regional support through a global cooperative MSP and protected areas programme.

4.2 Management of HSMPAs

All areas of the high seas are under the jurisdiction of some type of governance or management body with varying mandates and responsibilities. However, not all of these regimes are involved with measures that contribute to the protection of the high seas; thus, significant gaps in coverage exist. Management regimes related to the protection of the high seas can be considered according to three main types: (1) Regional Fisheries Management Organizations (RFMOs) and their closures, (2) Regional Seas Conventions, and (3) Institutional Measures, such as the International Maritime Organisation (IMO). In the process of establishing HSMPAs, it will be important to consider where legal instruments can be feasibly used to implement and manage HSMPAs and address who is obliged to abide by them, including what activities they have the mandate to control. **Figure 11** illustrates the location and density of management regimes involved in high seas conservation practices overlaid by the highest priority HSMPA proposals. All but two (areas 3 and 4) high seas priority areas identified in **Section 2.2** falls within the spatial limits of at least one high seas management regime active in conservation measures, and over half lie within areas with more than one. This is encouraging as there is at least one currently active mechanism that could potentially be engaged in the designation of a pilot HSMPA at most identified priority areas as outlined in this report.

Figure 11: Density of management regimes active in high seas conservation overlaid with the nine HSMPA priority areas.



4.2.1 Regional Fisheries Management Organisations (RFMOs)

To date, attempts to achieve sustainable management of high seas fisheries have been primarily through the development of Regional Fisheries Management Organisations (RFMOs) which encourage cooperative management between those who choose to participate (Sumaila et al 2007). In addition to the UNFSA, these responsibilities have been outlined by other international agreements, such as the UN Food and Agriculture Organisation's (FAO) Code of Conduct for Responsible Fisheries, also established in 1995. The Code of Conduct includes a series of technical guidelines that are continually added to advise those involved in fisheries on issues that arise, including implementation of the ecosystem approach to fisheries and (upcoming) marine protected areas. Their main functions are to gather and assess scientific information about fish stocks, establish regulatory measures, and ensure compliance through appropriate enforcement mechanisms (Sydness 2001).

However, there are a number of significant gaps in the current RFMO framework that weaken the protection of the high seas. Very few are carrying out their responsibilities as outlined in the 1995 UNFSA to adopt an ecosystem and precautionary approach, with the scope of their individual mandates varying considerably. Although progress by a number of RFMOs is being made, only one--CCAMLR-- is consistently implementing measures based upon a precautionary and ecosystem-based approach. CCAMLR serves as a model for monitoring and controlling impacts on associated and dependent species such as seabirds and non-target fish. It also has a comprehensive ecosystem-monitoring programme (CEMP) and applies measures to mitigate seabird bycatch (Mooney-Seus & Rosenberg 2007). This inconsistency between RFMOs results in geographically patchy protection for species and ecosystems. Additionally, many areas of the high seas are not covered by RFMOs with the capacity to regulate damaging activities such as bottom fishing and deep-sea trawling. There is also a lack of uniformity with respect to RFMO conservation and management measures where they are in place.

It may be important to consider where Vulnerable Marine Ecosystems (VMEs) need to be fully protected from all adverse impacts, including stringent controls of disruptive activities such as mining, cable laying, etc., as well as the loss of fish biomass through fishing. In areas where this is deemed

necessary, HSMPAs may have an important role to play in defining the boundaries and specific management regime of the area, whilst being supported by the relevant RFMO and other management arrangement. The above example illustrates that when policy responds positively to science, beneficial results can happen. Thus, good governance mechanisms are essential to addressing directly the challenge of implementing future HSMPAs as well as providing a complement by addressing threats to high seas outside of protected areas.

In order to achieve the goal of improved ecosystem management, it has been suggested that a broadening of several RFMO mandates would be necessary in order to take an ecosystem approach to fisheries management, including the establishment of MPAs for conservation reasons (CBD 2008a, UNEP 2006). For example, RFMOs could move to have specific provisions, as in the Antarctic, for a means to ensure coordination at the regional level between HSMPA arrangements and any relevant regional fisheries management organisation. Further cooperation and coordination between RFMOs and other regional entities such as the UNEP Regional Seas conventions, as called for in paragraph 56 of General Assembly resolution 59/25: para.167 would help to facilitate this (Kimball 2005). The FAO is also in favour of broadening and strengthening the mandate of Regional Fisheries Bodies to Regional Oceans Management Organisations (ROMOs), which would monitor and assess the cumulative impacts of activities on the oceans. This would result in more effective fisheries conservation and management and be in support of subregional, regional and global cooperation and coordination in fisheries (FAO Code of Conduct for Responsible Fisheries: Annex 2: Resolution).

An example of an attempt to increase RFMO capacity is illustrated by Greenpeace's current campaign to fully protect three areas of international waters enclosed by EEZs in the Western and Central Pacific Ocean. These "donut holes" are significantly overfished by international fleets which often utilise destructive fishing practices and partake of Illegal, Unreported and Unregulated (IUU) fishing within the adjacent EEZs. Greenpeace is calling on the West and Central Pacific Fisheries Commission (WCPFC) for permanent closure of the three areas to all fisheries under its management, and suggests the option of extending the northern boundary of the South Pacific Regional Fisheries Management Organisation (SPRFMO) – currently under negotiation – to include the areas. Once in force, the SPRFMO could then designate these sites as HSMPAs and close them to all extractive human use (Greenpeace 2008). If successful, these HSMPAs would be the first to offer full protection to a marine area, consequently protecting the species, habitats and communities present, including important tuna spawning and migration routes, and seamount ecosystems.

4.2.2 Regional Seas Conventions (RSCs) and Institutional Measures

Regional Seas Conventions (RSCs) are discussed in Sections 2.2 and 2.3 in this report.

The first International Whaling Commission (IWC) whale sanctuary was first established in Antarctica in 1938 due to the fact that whaling had not yet occurred in this region and it was deemed highly desirable that the immunity enjoyed by whales in this area should be maintained. The Sanctuary was reopened in 1955 as a means of reducing pressure on catches in the rest of the Antarctic whaling grounds. A second Whale Sanctuary was established in the Indian Ocean in 1979 and has been further extended on two occasions since its designation, and a third Sanctuary was designated in 1994 in the Southern Ocean. Two additional proposals for Sanctuaries in the South Atlantic and South Pacific have been submitted to the Commission, but as Whale Sanctuaries can only be designated and sustained based upon sound scientific advice, both proposals have failed to become accepted.

The International Maritime Organisation (IMO) instruments used in the designation of Special Areas have been supplemented by the soft law concept of 'Particularly Sensitive Sea Areas' (PSSAs) (Schwarte and Siegele 2008). A PSSA is defined by IMO as "*...an area that needs special protection through action by IMO because of its significance for recognised ecological or socio-economic or scientific reasons and which may be vulnerable to damage by international maritime activities*" (IMO 2008). Once a site has been designated as a PSSA, measures can be set in place to control the

maritime activities in that area: ships routeing measures can be altered, where the PSSA can be identified as an area to be avoided; strict application of MARPOL discharge and equipment requirements; and the installation of Vessel Traffic Services (VTS) (IMO 2008).

If expanded, these mechanisms implemented by the IMO have been recognised by many States as potential tools for the establishment of MPAs on the high seas (Schwarte and Siegele 2008). More specifically, IMO measures used to regulate international shipping may be used to establish PSSAs on the high seas, and the procedures utilised by IMO to identify and designate PSSAs may be relevant as a model of an internationally agreed procedure to regulate activities (Gjerde 2002). This procedure would be based upon the concept of the "freedom of the sea", where if a State does not comply with regulations, e.g. by overfishing, it may eventually lose its right to participate in that particular high seas freedom (Schwarte and Siegele 2008, Gjerde 2002).

4.3 Discussion

Generally, ocean management will have to adapt as progress is being made toward the establishment of HSMPAs. Precaution will always need to be taken with regard to human activities on the oceans as we gain a better understanding of their impacts. Once ecologically and biologically significant areas are identified, this knowledge can then be fed into the MSP framework in order to inform which spatial zones should be protected and how this relates to other sectoral interests in the area.

Encouragingly, there are a number of management regimes involved in high seas conservation and HSMPA planning; however, the gaps that still exist both within and outside these regimes are substantial. Key to the protection of the high seas will be an integrated, multi-sector approach that maximises protection of priority biodiversity areas from different threats governed by more than one specialised management regime. It must aim to enhance co-ordination among specialised regimes in order to encompass both current and emerging high seas threats (Kimball 2005).

The planning process for HSMPAs benefits from the unique opportunity to apply the lessons learned from the years of experience gained through implementing and managing coastal and nearshore MPAs around the world. A proactive, versus a reactive, approach is possible given the knowledge available on a number of oceanic features, species assemblages, migration patterns, environmental models, and the like (UNGA 2006). What remains important is that action is taken in a timely manner in order to provide a baseline which can then be updated and refined as further knowledge comes to the fore. Additional principles of designing MPA networks can be found in the IUCN WCPA guidelines (see WCPA/IUCN 2007).

Finally, management of HSMPA networks, once established, must have the ability to adapt in light of new scientific research. This is important in all protected area systems, but is vital in the dynamic and ever-changing environment of the high seas, where the physical processes of the ocean, such as currents and convergence zones, directly influence the distribution of many species.

5. Cooperation and Collaboration

Considering that approximately 50% of the earth's surface is beyond national jurisdiction, the creation and implementation of HSMPAs is a vast undertaking and requires cooperation among legal and scientific institutions. According to the IUCN (2004), HSMPAs provide an opportunity for global cooperation to achieve higher levels of protection for specific sites and a coordinated mode for decision-making among diverse stakeholders including governments, industrial sectors (i.e. fishing and shipping) and conservation organisations, at regional and international levels. Aspects of accountability, participation, and transparency are all critical for cooperation to work at such a scale

(UNEP 2006). '10 Principles for High Seas Governance' were released by IUCN at the 2008 World Conservation Congress in Barcelona[25]. These principles aim to provide modern governance guidelines to improve high seas management and ensure sustainable development of the world's oceans. They include aspects ranging from the precautionary approach to the public availability of information, and provide a formal outline for improved future high seas governance decision-making (IUCN 2008). Essentially, progress on HSMPAs will require formal collaboration among those engaged with the management of sector-specific activities as well as those focused on conservation of regions or species at high political levels. Equally important is scientific and academic cooperation among those who gather and analyse data and knowledge regarding high seas marine biodiversity.

5.1 An Implementation Agreement

Significant gaps exist in the legal and governance framework that is needed for the implementation of a network of HSMPAs. No global instrument currently in place is competent to address the threats impacting the high seas in a cross-sectoral manner, nor is there a governance structure with the capabilities to facilitate cooperation and coordination of activities on the high seas (IUCN 2008). There is also a lack of coherence between existing agreements, institutions, and administrations (Ardron et al. 2008), meaning that the harmonised approach necessary for implementing HSMPAs is far from reality.

A long-term solution to these gaps, which the European Union (EU) and a number of other organisations, including IUCN and Greenpeace, strongly support, is the creation of an Implementation Agreement under UNCLOS. This Agreement would clarify the terms under which States are required to co-operate regarding the utilisation and protection of the high seas, for example through cross-sectoral integrated management, thus reducing the likelihood of conservation measures on the high seas being undermined by non-cooperative States. It would be able to adopt modern approaches such as the precautionary and ecosystem-based approach, and would facilitate and enhance co-operation and co-ordination between existing regulatory frameworks and bodies. Under its remit, it would provide for the establishment of MPAs based on the identification and designation of vulnerable marine ecosystems and species in ABNJ, based on the best available scientific information and the precautionary principle (EU 2006, Hart 2008). Overall, an Implementation Agreement would give substance to the provisions of UNCLOS without necessarily bringing in new principles of international law or new legal elements (Hart 2008). However, some countries feel the need for an UNCLOS implementing agreement has not yet been established despite the wide support for the establishment and management of HSMPAs (Ardron et al. 2008).

5.2 Incorporating Science into Policy

For HSMPAs to be implemented, it is important for policy to be grounded in clear, updated, and easy to understand science so that decisions are most appropriate to current knowledge and reflect best available information needed for decisions. UNEP's Ibrahim Thiaw suggests that "*emerging issues identified by scientists must find their way more quickly onto [the] shortlist of priorities*" for those making decisions (2007). Decisions are often made despite the presence of adequate knowledge that might influence or inform a policy for the benefit of conservation (e.g. Daw and Gray 2005). One way of giving the high seas scientific community a strong, clear voice respected by all is to adopt respected expert mechanisms such as the Intergovernmental Panel on Climate Change (Rochette and Bille 2008). This type of process would provide an overarching scientific view regarding the high seas and allow decisions to be made in a very open, transparent forum.

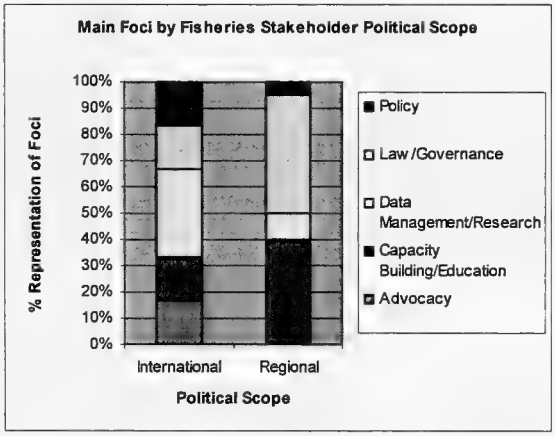
[25] The 10 Principles are as follows: (1) Conditional freedom of activity on the high seas; (2) Protection and preservation of the marine environment; (3) International cooperation; (4) Science-based approach to management; (5) Precautionary approach; (6) Ecosystem approach; (7) Sustainable and equitable use; (8) Public availability of information; (9) Transparent and open decision-making; and (10) Responsibility of States as stewards of the global marine environment.

Future collaborations require identification of those organisations that are engaged with high seas conservation. Strong links between ongoing research initiatives are needed in addition to links between policy and science. **Annex 9** is a list of primary institutions or initiatives that are engaged to a significant degree in the arena of HSMPAs or closely relevant processes. They've been categorised regarding their scope and mission, and represent a breadth of institutional foci including data management and research, capacity building, education, and advocacy, as well as expertise in law, governance, and policy.

Overall, with respect to the institutions and initiatives listed in **Annex 9,** data management and research is well represented by high seas and marine biodiversity stakeholders, but despite the positive activities of RFMOs such as the North East Atlantic Fisheries Commission (NEAFC) and the Northwest Atlantic Fisheries Organisation (NAFO), is under-represented overall in the fisheries sector. This is especially true at the regional level. As the fisheries sector often has a greater capacity for ongoing data collection and so provides a much longer time series than other scientific studies, it has significant potential to inform HSMPA planning. In addition, as some fisheries sector stakeholders in the high seas have significant capacity building as well as political power, they could be instrumental in realising an ecologically coherent network of high seas marine protected areas. It is vital that the fisheries sector also plays a key role in the management of HSMPAs as the geography of the oceans is so vast. Cooperation among sectors, particularly within the fishing group, will be necessary to set up peer agreements and self-policing components to keep anthropogenic pressures off the protected areas in the high seas. This is demonstrated by the 2008 agreement between the four members of the Southern Indian Ocean Deepwater Fishers Association (SIODFA) (see **Section 2.2**).

Since the fishing sector is a particularly important partner in high seas collaboration, we conducted a brief analysis of fisheries stakeholders listed in **Annex 11**, which reveals that regional entities have a greater focus on capacity building and law/governance than international stakeholders, but have little focus on advocating for HSMPAs. In contrast, international fisheries stakeholders have more involvement in HSMPA advocacy, managing data, conducting research, and affecting policy. Since HSMPAs will generally be implemented at the regional level, it will be important to engage the regional fisheries sector in advocating for HSMPAs, especially as their strengths in capacity building and governance will positively contribute to the process of HSMPA implementation. More importantly, communication between the fisheries bodies across levels will be necessary to strengthen their abilities at implementing an ecosystem-based approach to high seas protection. **Figure 12** illustrates the distribution of these foci among international and regional fisheries institutions.

Figure 12: Main Foci of Fisheries Institutions Separated by Political Scope.



Collaboration at the regional level is particularly important for RFMOs, where increased cooperation and communication could see those with mandates of limited scope be improved and updated for more effective high seas management. Some national governments, NGOs, and research/academic institutions either support or actively participate in high seas conservation or understanding. Examples include the United States NOAA Office of Exploration and Research and the German Federal Agency for Nature Conservation (BfN), as well as Canada's Fisheries and Oceans Department (DFO), which manage a Bluefin Tuna Validation Project. Many academic institutions, such as Duke University, also manage research programmes that monitor species and habitats in the high seas and thus are important for the generation of new information.

6. Considerations for Funding

In light of the significant amount of research yet to be undertaken on the high seas, there exists a significant gap in funding available for high seas research. **Annex 12** contains a list of five potential sources of funds for research regarding high seas biodiversity conservation and HSMPAs. While this section is not comprehensive and government sources were not included, we anticipate that it will provide an opportunity to discuss potential ways to fund HSMPAs.

The 2003 IUCN World Parks Congress estimated that US $25 billion in additional annual support is required to effectively maintain the current global system of protected areas within EEZs (IUCN 2003). Costs associated with HSMPAs include establishment, administration, employment, monitoring, and enforcement. On the basis of survey data on the financial requirements of 83 MPAs worldwide, Balmford and colleagues suggest that a global MPA network covering 30% of all the world's seas (both territorial waters and high seas) might cost between US $5 billion and US $19 billion annually to operate (Balmford et al. 2004). Ongoing research is also critical to ensure that future HSMPAs will be sited in the most appropriate locations and adhere to the scientific criteria mentioned earlier in this report.

Funding shortfalls can limit current, important projects. The CoML and OBIS have been in existence for almost ten years and have provided a body of scientific knowledge that is unique and wide-ranging, with equally unique implications for policy and applications for both conservation and development (SCBD 2008). Yet, they also demonstrate that research programmes are still only scratching the surface of what could be potentially learnt regarding the high seas, thus it is vital that secure funding sources are established for these and similar programmes so they continue.

A number of options exist related to financing MPAs on the high seas. Morling (2005) suggests multilateral agencies like the Global Environment Facility (GEF) can play a role, as well as national governments, in terms of providing support for conservation. Market-based approaches can generate income based on ocean activities, such as extractive and bioprospecting activity, fishing, overflights, shipping and permits for commercial activities. Payments for environmental services and private sector investment are also promising (Morling 2005). Additionally, the International Seabed Authority has an Endowment Fund that provides training for developing country professionals to participate in collaborative research.[26] Similar trust funds might create opportunities for gaps as they've been identified in this report.

[26] see http://www.isa.org.jm/en/efund/fund

7. Recommendations

Though there is a growing body of information available about the oceans, there are gaps in knowledge regarding high seas areas, such as the dynamic and complex physical oceanic processes, climatic relationships, and dearth of biological information about deep-sea species and habitats. Overall, the recommendations from this report, including those listed in the Executive Summary, are the following:

High Seas Marine Biodiversity Knowledge Gaps and Priorities

- There is a need for representative, replicated HSMPA networks to increase the resilience of marine ecosystems to both local and wide-scale impacts. It will be important to include permanent, no-take marine reserves in these networks, as well as HSMPAs that are flexibly managed in space and time in order to respond to seasonal fluctuations and species-use patterns.
- Consolidated databases of species and marine research, such as those provided by WoRMS and CoML, should be supported and expanded.
- Existing data, maps and coverage of bioregionalisations, biogeographic features, and geopolitical information should be consolidated into a centralized knowledge management system. We recommend one or more focused workshops for the following: (1) to review available high seas data and agree on parameters for consolidation into an accessible and interoperable system and (2) to identify knowledge gaps and help prioritise funding and research direction. This process should take into consideration work that has already been established for an Interactive Map (IMap) (CBD 2008c).
- Biodiversity knowledge regarding cold-water corals, seamounts, and hydrothermal vents is growing but needs to be tempered with additional research efforts on underrepresented habitats and species such as invertebrates.
- Data validation processes should be adopted, similar to the WoRMs process of removing synonyms among datasets, so that knowledge on the high seas can be better merged and synchronised.

Planning High Seas Marine Protected Areas:

- Spatial mapping of data layers from all sectors (biological data, governance regimes, etc.) will be important in the identification of priority sites and evaluations of the ecological value of proposed HSMPAs.
- The use of biogeographic classification systems, such as that developed in the GOODS report (CBD 2008d), and other biodiversity proxies, such as GIS analysis of seafloor geomorphic features, will be necessary to move HSMPA planning forward in the absence of comprehensive knowledge on high seas biodiversity.
- Future proposals for pilot HSMPAs should be streamlined to correspond to the CBD COP9 criteria and guidelines, and it must include extensive scientific justification for their designation. This level of detail will help instil political support and increase the proposal's probability of implementation. Management implications and political feasibility are important future considerations. Clear and transparent communication must take place among those who are developing such proposals so that pilot sites can provide the best available opportunities to learn quickly from the process and transfer insights.

Improving High Seas Governance and Management:

- Develop an international agreement under UNCLOS to protect biodiversity on the high seas, based on ecosystem-based management and the precautionary approach, which

would promote coordination and harmonisation between relevant international and regional instruments as well as facilitate the establishment of HSMPAs.

- Specific and clear practical guidance is recommended so that institutions and governments understand the next steps required for implementation of HSMPAs, and other sectors such as industry can then plan to avoid carrying out activities in certain areas. This guidance could be developed based on lessons learned through the designation of pilot HSMPA sites as well as experience gained in managing MPAs in remote offshore areas.
- An integrated, multi-sector management approach for HSMPAs is needed which maximises protection of priority biodiversity areas from a range of threats and which are governed by more than one specialised management regime (e.g. the MoU between OSPAR and the NEAFC).
- Scientific findings need to be correlated with political/legal/governance mechanisms for establishing and enforcing MPAs on the high seas. A promising tool to improve this area is the process of Marine Spatial Planning where HSMPAs are considered in relation to other multi-sector interests in the marine environment.
- Planning and management of HSMPA networks must be able to adapt in response to increased scientific research, a growing body of new knowledge, and the wide scale effects of threats such as global climate change.

Coordination, Collaboration, and Communication

- Increase the capacity of coordination and communication between smaller and broad-scale projects to ensure data is standardised and accessible to policy makers. For example, link information from the Census of Marine Life with other high seas information, including Vulnerable Marine Ecosystems and the World Database on Protected Areas.
- Communication of new information, including updates on governance reform and scientific discovery, to decision-makers needs to be accelerated and a sense of urgency for action embedded in the stakeholder community.
- Summaries of technical reports should be developed in a language that is accessible and meaningful to policy makers.
- Identification of innovative funding mechanisms is needed to support implementation of HSMPAs; examples include endowment funds and market-based costs associated with ocean activities.
- Existing research initiatives could expand their mandates through collaboration with underrepresented countries or provide funding for countries, i.e. countries in South America, to research high seas in geographic proximity to national boundaries.
- Coalition building will require input from all involved sectors, but specifically the high seas fishing sector. Cooperation at a regional level will be particularly important for RFMOs with a view to increasing the capacity of their mandates for more effective high seas management. Communication between regional and international fishery bodies will also be important for transferring the skills required to establish HSMPAs.
- The ability to compile biodiversity knowledge and increase its accessibility to the marine conservation community and other relevant sectors, including those whose decisions directly impact the marine environment, is a key consideration is planning for HSMPAs.
- To build broad public support a coherent, well-coordinated education campaign for the high seas should be developed. This would include the preparation and dissemination of clear messages and mechanisms (ie, a simple, informative brochure) on the high seas, their importance regarding biodiversity, the history of protective measures, and the conservation value of MPAs in the open ocean. Additionally, working with journalists can increase the number of articles in mainstream media (ie New Scientist, Washington Post, etc).

- There is a need to develop guidance on the use of proxies to assist with the identification of potential areas of ecological and biological significance, and to identify areas representative of a particular habitat or community type in a specific bioregion, in order to support the development of representative networks of MPAs.

8. Conclusions: A Way Forward for High Seas MPAs

The information and data available on high seas marine biodiversity represents a breadth of species and habitats in the benthic and pelagic realms of the open ocean. While gaps do exist in some geographies, species representation, and habitats beyond major ocean hotspots, it is encouraging that the number of institutions, initiatives, and scientists dedicated to increasing the global understanding of marine biodiversity is expanding. As a new high seas governance framework is slowly moving forward, we recommend that a parallel process be undertaken to maximise our knowledge of high seas marine biodiversity through increased collaboration, knowledge management, and streamlining of interoperable data systems. Despite the challenges with how HSMPAs are defined, they inherently include political and biophysical components. Therefore, it will be critical that future fora on implementing HSMPAs engage equal input from those who are working on building the governance framework for protection of the high seas and those who are managing research and building the knowledge of high seas biological and physical parameters.

A number of tools are already available for assisting with the identification of HSMPAs, including the recently accepted CBD scientific criteria and guidelines for ecologically and biologically significant areas and MPA networks, ecosystem-based management approaches, years of experience and lessons borrowed from coastal and nearshore MPAs. In addition, promising advances in spatial, analytical and other technologies can contribute to the planning, mapping, and prioritisation process for siting a comprehensive and ecologically coherent system of MPAs on the high seas. The ability of technologies to use physical features as proxies for gaps in biodiversity data is also a positive development.

The institutions that have been identified in this report as key contributors to HSMPAs span a range of expertise within research, data collation and analysis, education, advocacy, policy, and governance; in many cases, institutions have expertise in a number of these areas. The critical need is to begin collaboration on coordinated proposals for research and knowledge generation that takes advantage of skills and available data while aiming to enlighten the remaining void.

The World Commission on Protected Area's Marine Summit in April 2007[27] highlighted challenges for marine conservation, such as addressing scientific gaps and gaining practical experience. At this stage, it will be important to draw upon the expertise of the potential partners that have been highlighted in this report to collectively decide upon what available data is most critical to incorporate into a centralised knowledge management system and, furthermore, how to use this to identify and prioritise the valuable and biologically diverse areas of the high seas in need of protection.

We recommend one or more focused workshops to review and prioritize knowledge gaps as well as agree on high seas data and parameters of information that can be correlated into a central knowledge management system (see CBD 2008c). Likewise, it is important that clear and transparent communication take place among those who are developing proposals for HSMPAs so that pilot sites can provide the best available opportunities to learn quickly from the process and transfer insights. Opportunities such as the CBD's in-depth review of the Programme of Work on Marine and Coastal Biological Diversity (J. Lee, pers. comm. 2008) will be essential to raise attention for protection of the high seas and filling in some knowledge gaps.

[27] See http://groups.google.com/group/wcpamarine-summit/web

Current dialogue among experts, i.e. the Global Forum on Coasts, Oceans and Islands, indicates that an overarching framework may be needed for addressing the growing complexity of issues related to the high seas, particularly climate change. This framework should recognise the immense amount of work that numerous individuals and institutions have undertaken in the past as well as the existing policies, governance structures, and scientific expertise that have driven the work on high seas to date. All existing measures can be placed in this framework so gaps can be more readily visualised, predicted, and tended. It cannot be ignored that existing gaps in governance and science must be addressed. However, this review of literature and recent meetings indicate clearly that action can be taken to select and establish priority HSMPAs based on experience, criteria, and expertise.

This report is the outcome of preliminary research; thus, the discussion should be continued, with attention given to additional needs such as capacity building, targeted high seas valuation studies, and links with socio-economic factors and industries, particularly fisheries, which can influence the feasibility of implementing HSMPAs. Recent scientific discoveries give caution to protection of biodiversity hotspots without consideration or further research on prime habitats of individual species. However, given our current knowledge, there is adequate information about areas of high seas biodiversity, productivity, species migrations, threats, and approaches that can be mapped and should not prevent progress while the compilation of more information continues. Working towards the four steps to be considered in the development of representative networks of marine protected areas outlined at the CBD COP9[28], we recommend the critical next step will be to select pilot HSMPA priorities, based on available data and with expert consultation, so comprehensive and strategic ocean protection is no longer delayed.

[28] 1) Scientific identification of an initial set of ecologically or biologically significant areas, 2) Develop/choose a biogeographic habitat and/or community classification system, 3) Drawing upon steps 1 and 2 above, iteratively use qualitative and/or quantitative techniques to identify sites to include in a network, and 4) Assess the adequacy and viability of the selected sites (CBD 2008)

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10. Acronyms and Abbreviations

ABNJ	Area beyond national jurisdiction
ACCOBAMS	Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area
ASMA	Antarctic Specially Managed Area
ASPA	Antarctic Specially Protected Area
CBD	Convention of Biological Diversity
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CEMP	CCAMLR Ecosystem Monitoring Program
CGFZ	Charlie Gibbs Fracture Zone
CMS	Convention on Migratory Species
CoML	Census of Marine Life
COP	Conference of Parties
EBM	Ecosystem Based Management
EEZ	Exclusive economic zone
FAO	Food and Agricultural Organization
HSMPA	High seas marine protected areas
ICES	International Council for the Exploration of the Seas
ICM	Integrated Coastal Management
IMO	International Maritime Organization
IPCC	Intergovernmental Panel on Climate Change
IWC	International Whaling Commission
MPA	Marine Protected Area
MSP	Marine Spatial Planning
OBIS	Ocean Biogeographic Information System
PIF	Pacific Islands Forum
RFMO	Regional Fisheries Management Organisations
RSC	Regional Seas Conventions
SIODFA	Southern Indian Ocean Deepwater Fishers' Association
SPAMI	Specially protected Areas of Marine Interest
SST	Sea Surface Temperature
UNCLOS	United Nations Convention on the Law of the Sea
UNEP-WCMC	The United Nations Environment Programme World Conservation Monitoring Centre
UNGA	United Nations General Assembly
USPA	Unique Scientific Priority Area
VME	Vulnerable Marine Ecosystem
WSSD	World Summit on Sustainable Development
WTPIA	Western Tropical Pacific Islands Area

11. Annexes

Annex 1. POTENTIAL AND PROPOSED HIGH SEAS CONSERVATION MEASURES						
Sponsoring Organisation	**Date**	**Number of Sites**	**Approach**	**Scope**	**Mapped**	**Coverage**
Antarctic Treaty proposed sites	1999; 2007	2 Antarctic Specially protected Marine Areas (ASPAs); 1 Antarctic Specially Managed Area (ASMA).	Scientific Collaboration	Biological and ecological significance	No	Antarctic
International Whaling Commission (IWC)	June 2001; June 2004	2 whale sanctuaries: 'South Atlantic Sanctuary' and 'South Pacific Sanctuary'	Contracting party submission at the IWC Annual Meeting	Species (Whales)	Yes	South Atlantic; South Pacific
Hjalmar Thiel – Ocean Challenge Journal	2003	3 sites – 'Unique Science Priority Areas' located along the European Deep-Sea Transect	Scientific Collaboration	Scientific research sites	Yes	North-East Atlantic
IUCN/WCPA/WWF Experts Workshop on High Seas Marine Protected Areas	January 2003	7 representative sites for each ocean; 6 sites focussed on specific habitats and political feasibility	Expert Workshop	Representivity and political feasability	No	Global
ACCOBAMS	2004; 2006	2 sites proposed as part of the 'Common Dolphin Conservation Plan' (2004); 2 sites proposed as 'Important Cetacean Areas' (2006)	Scientific Committee	Species (Cetaceans)	Yes	Mediterranean
Greenpeace: Marine Reserves for the Mediterranean Sea	January 2006	32 sites – many of which include high seas areas. Consists of 40% representitaveness of habitats	GIS Overlays	Representivity	Yes	Mediterranean
Greenpeace: Roadmap to Recovery	March 2006	26 large areas covering 41% of the ocean surface; 41 areas identified by experts	MARXAN spatial planning exercise; Expert opinion	Representivity	Yes	Global

Sponsoring Organisation	Date	Number of Sites	Approach	Scope	Mapped	Coverage
Antarctic Treaty/WWF	April 2008	Network of HSMPAs proposed in the Ross Sea, Antarctica	Expert Workshop; Scientific Committee consultation	Biological and ecological significance	No	Antarctic
Fundacion Vida Silvestre Argentina/WWF	April 2008	1 site – 'South-west Atlantic Squid HSMPA'	Scientific conservation of the *Illex* squid species	Species (*Illex* squid)	Yes	South-West Atlantic
Greenpeace/Pacific Islands Forum: The Pacific Commons	May 2008	3 high seas sites located within the boundaries of Pacific Islands EEZs	Multinational Agreement	Representivity and political feasability (IUU fishing)	Yes	South Pacific
OSPAR Convention/WWF	June 2008	1 site submitted to Commission – the 'Charlie-Gibbs Fracture Zone'; identified for representation of biodiversity and ecology	Scientific Collaboration	Representivity	Yes	North-East Atlantic

Annex 2. OTHER GEOGRAPHIC AREAS OF INTEREST FOR HIGH SEAS CONSERVATION			
Source	**Date**	**Sites**	**Area**
Claudio Campagna proposed at Latin America Parks Congress	Sept/Oct 2003	"Agujero Azul" (the Blue Hole)	Outside Argentinean EEZ below the Valdes Peninsula
Craig Smith and Tony Koslow	2007/2008	Abyssal Nodule Province in the Pacific High seas	East Pacific
IUCN-WCPA and MCBI	Oct 2008	10 "High Seas Gems" – areas of conservation interest.	Global
WCPA – Marine High Seas Task Force (Sheila McKenna)	Under development	Sargasso Sea	North Atlantic

Annex 3. SPATIAL DATA REFERENCES FOR POTENTIAL AND PROPOSED HIGH SEAS MARINE PROTECTED AREAS/CONSERVATION MEASURES

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Annex 4. GOVERNANCE MECHANISMS RELEVANT TO HIGH SEAS MARINE PROTECTED AREAS				
LEGAL MECHANISM RELATING TO THE HIGH SEAS (inc. binding and non-binding)	**POLITICAL SCOPE**	**RELEVANT TO HSMPAs?**	**OCEAN SYSTEM** (benthic/pelagic)	**ENVIRONMENTAL FOCUS**
2008 FAO International Guidelines on the Management of Deep-sea Fisheries in the High Seas(voluntary Guidelines)	International	Yes (depending on how you define them and has to how countries/RFMOs implement measures)	Benthic	Fisheries/Ecisystem
2006 UN General Assembly Resolution on Sustainable Fisheries (Res 61/105)	International	Yes	Both	Fisheries
2004 International Convention for the Control and Management of Ships' Ballast Water and Sediments	International	Yes	Both	Ecosystem
2002 Plan of Implementation of the World Summit on Sustainable Development, paragraph 32 (a) and (c)	International	Yes	Both	Ecosystem
2001 UNESCO International Convention for Protection of Underwater Cultural Heritage	International	Yes	Both	Cultural Heritage Sites
1999 Agreement to End Unregulated Fisheries of Regulated Stocks in the High Seas Areas of the Barents Sea	Regional	Yes	Both	Fisheries
1996 Resolution Adopted by the 95th Inter-Parliamentary Conference	International	Yes	Both	Ecosystem Fisheries
1995 Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea	Regional	Yes	Pelagic	Fisheries
1995 FAO Code of Conduct for Responsible Fisheries (reviewed biannually)	International	Yes	Both	Fisheries
1995 Jakarta Mandate on Marine and Coastal Biological Diversity (CBD)	International	Yes	Both	Ecosystem
1995 Kyoto Declaration and Plan of Action on the Sustainable Contribution of Fisheries to Food Security	International	Yes	Both	Fisheries
1995 Rome Consensus on World Fisheries	International	Yes	Both	Fisheries
1995 UNEP Global Programme of Action on Protection of the Marine Environment from Land-Based Activities	International	No	Both	Ecosystem

LEGAL MECHANISM RELATING TO THE HIGH SEAS (inc. binding and non-binding)	POLITICAL SCOPE	RELEVANT TO HSMPAs?	OCEAN SYSTEM (benthic/pelagic)	ENVIRONMENTAL FOCUS
1994 Agreement Relating to the Implementation of Part XI of the Convention on the Law of the Sea	International	Yes	Both	Ecosystem
1994 Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (FAO Compliance Agreement)	International	Yes	Pelagic	Fisheries
1993 UN Conference on Straddling and Highly Migratory Fish Stocks	International	Yes	Both	Ecosystem Fisheries
1992 Cancun Declaration on Responsible fishing	International	Yes	Both	Fisheries
1992 Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area (HELCOM)	Regional	Yes	Both	Ecosystem
1992 OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic.	Regional	Yes	Both	Ecosystem
1992 Rio Convention of Biological Diversity	International	Yes	Both	Ecosystem
1992 UNCED Agenda 21, Chapter 17 - Protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas, and coastal areas and the protection, rational use and development of their living resources	International	Yes	Both	Ecosystem
1991 Bamako Convention on the ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa)	Regional	No	Both	Ecosystem
1991 Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific	Regional	Yes	Both	Marine Species
1991 Espoo U.N. Convention on Environmental Impact Assessment in a Trans-boundary Context	International	No	Both	Ecosystem
1991 Madrid Protocol on Environmental Protection to the Antarctic Treaty	International	Yes	Both	Ecosystem
1991 UN General Assembly Resolution on Large-Scale Pelagic Driftnet Fishing and its Impacts on the Living Marine Resources of the World's Oceans and Seas	International	Yes	Both	Marine Species
1989 Basel Convention on the Control of Transboundary Movements of Hazardous Waste and Its Disposal	International	No	Both	Ecosystem

LEGAL MECHANISM RELATING TO THE HIGH SEAS (inc. binding and non-binding)	POLITICAL SCOPE	RELEVANT TO HSMPAs?	OCEAN SYSTEM (benthic/pelagic)	ENVIRONMENTAL FOCUS
1986 Convention for the Protection of Natural Resources and Environment of the South Pacific Region, 1986.	Regional	Yes	Both	Ecosystem
1985 Kuala Lumpur ASEAN Agreement on the Conservation of Nature and Natural Resources	Regional	Yes	Both	Ecosystem
1985 Rarotonga South Pacific Nuclear Free Zone Treaty	Regional	No	Both	Ecosystem
1984 (reviewed 1997) UNEP Global Plan of Action for the Conservation, Management and Utilisation of Marine Mammals	International	Yes	Both	Marine Species
1984 UNESCO Action Plan for Biosphere Reserves and the 1995 Seville Strategy and Statutory Framework for the World Network of Biosphere Reserves	International	Yes	Both	Ecosystem
1982 United Nations Convention on the Law of the Sea (UNCLOS)	International	Yes	Both	Ecosystem
1982 World Charter for Nature, General Assembly Resolution 37/7 28	International	Yes	Both	Ecosystem
1981 Abidjan Protocol Concerning Cooperation in Combating Pollution in Cases of Emergency	Regional	No	Both	Ecosystem
1979 Bonn Convention on the Conservation of Migratory Species of Wild Animals (CMS) and Agreements	International	Yes	Pelagic	Marine Species
1978 Kuwait Protocol Concerning Regional Cooperation in Combating Pollution by Oil and Other Harmful Substances in Cases of Emergency	Regional	No	Both	Ecosystem
1978 Kuwait Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution	Regional	No	Both	Ecosystem
1976 (amended 1995) Barcelona Convention for the Protection of the Marine Environment and Coastal Region of the Mediterranean	Regional	Yes	Both	Ecosystem
1976 (revised 1995) Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean	Regional	Yes	Both	Ecosystem

LEGAL MECHANISM RELATING TO THE HIGH SEAS (inc. binding and non-binding)	POLITICAL SCOPE	RELEVANT TO HSMPAs?	OCEAN SYSTEM (benthic/pelagic)	ENVIRONMENTAL FOCUS
1974 Convention on Safety of Life at Sea (SOLAS)	International	Yes	Pelagic	Ecosystem
1974 Paris Convention for the Prevention of Marine Pollution from Land-Based Sources	International	No	Both	Ecosystem
1974 (revised 2003) United Nations Environment Programme -Regional Seas Conventions/Protocols/Annexes.	International Regional	Yes	Both	Ecosystem
1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora	International	No	Both	Marine Species
1973 (modified 1978) London International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)	International	Yes	Both	Ecosystem
1973 London Protocol Relating to Intervention on the High Seas in Cases of Marine Pollution by Substances Other than Oil	International	No	Both	Ecosystem
1972 Convention for the Conservation of Antarctic Seals	Regional	Yes	Pelagic	Marine Species
1972 Oslo Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft	International	No	Both	Ecosystem
1971 Brussels Convention Relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material	International	No	Both	Ecosystem
1971 Brussels International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage	International	No	Pelagic	Ecosystem
1971 London Amendements to the International Convention for the Prevention of the Pollution of the Sea by Oil, 1954, Concerning Tank Arrangements and Limitation of Tank Size	International	No	Pelagic	Ecosystem
1971 Seabed Treaty	International	No	Benthic	Ecosystem
1969 Brussels International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties	International	No	Pelagic	Ecosystem
1964 Copenhagen Convention for the International Council for the Exploration of the Sea	International	No	Both	Ecosystem
1963 Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water	International	No	Both	Ecosystem

LEGAL MECHANISM RELATING TO THE HIGH SEAS (inc. binding and non-binding)	POLITICAL SCOPE	RELEVANT TO HSMPAs?	OCEAN SYSTEM (benthic/pelagic)	ENVIRONMENTAL FOCUS
1962 Warsaw Agreement Concerning Cooperation in Marine Fishing	International	No	Both	Fisheries
1959 Antarctic Treaty	International	Yes	Both	Ecosystem
1958 Geneva Convention on Fishing and Conservation of the Living Resources of the High Seas	International	Yes	Both	Fisheries Marine species
1958 Geneva Convention on the High Seas	International	No	Both	Ecosystem
1954 London International Convention for the Prevention of the Pollution of the Sea by Oil	International	No	Pelagic	Ecosystem
1946 International Convention on the Regulation of Whaling (IWC)	International	Yes	Both	Marine Species
1911 Washington Convention for the Preservation and Protection of Fur Seals	International	Yes	Pelagic	Marine Species
Migratory Bird Conventions	Regional	Yes	Pelagic	Migratory Birds

Annex 5. REGIONAL FISHERIES MANAGEMENT ORGANISATION (RFMOS) AGREEMENTS

Agreement	URL	Description
Not yet in Force interim agreement) North West Pacific Ocean Fisheries Agreement (NWPOFA)	n/a apparently it is currently in development	Sustainable management of fish stocks and protection of vulnerable marine ecosystems in the high seas areas of the North Western Pacific Ocean.
2006 (not in force) (also includes interim measures that have already gone into force) South Pacific Regional Fisheries Management Agreement (SPRFMA)	http://www.southpacificrfmo.org/	RFMO will be established and operate consistent with international law, including the United Nations Convention on the Law of the Sea 1982 (UNCLOS) and the United Nations Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks 1995 (UNFSA), and best practice. The 6th meeting for the establishment of this RFMO will take place in October, 2008.
2006 (not in force) Southern Indian Oceans Fisheries Agreement (SIOFA)	http://www.fao.org/Legal/TREATIES/035s-e.htm	To ensure the long-term conservation and sustainable use of fishery resources other than tuna in areas that fall outside national jurisdiction. It contains specific reference to the needs of developing countries, the precautionary approach, ecosystem approach and duty to protect biodiversity in the marine environment.
2001 Convention on the Conservation and Management of Fishery Resources in the Southeast Atlantic Ocean (SEAFO)	http://www.seafo.org/welcome.htm	SEAFO's objective is to ensure the long-term and sustainable use of fishery resources on the high seas, other than highly migratory stocks, taking into account other living marine resources and the protection of the marine environment.
1980 Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) Ecosystem Monitoring Programme CEMP)	http://www.ccamlr.org/pu/e/gen-intro.htm	The aim of the Convention is the conservation, including rational use, of the marine life of the Southern Ocean.
1980 Convention on Future Multilateral Cooperation in Northeast Atlantic Fisheries (NEAFC)	http://www.neafc.org/index.htm	The North East Atlantic Fisheries Commission was formed to recommend measures to maintain the rational exploitation of fish stocks in the Atlantic and Arctic Oceans. NEAFC has updated its convention in order to enlarge its mandate to ensure the long-term conservation and optimum utilization of fishery resources in the Convention Area, providing sustainable economic, environmental and social benefits.
1978 Convention on the future of Multilateral Cooperation in the Northwest Atlantic Fisheries (NAFO)	http://www.nafo.int/about/frames/about.html	NAFO's overall objective is to contribute through consultation and cooperation to the optimum utilization, rational management and conservation of the fishery resources of the Convention Area. NAFO is an intergovernmental fisheries science and management body. NAFO was founded in 1979 as a successor to ICNAF (International Commission of the Northwest Atlantic Fisheries) (1949-1978).
1949, amended 1997 Agreement for the Establishment of the General Fisheries Council/Commission for the Mediterranean (GFCM)	http://www.gfcm.org/gfcm	GFCM's objectives are to promote the development, conservation, rational management and best utilization of living marine resources, as well as the sustainable development of aquaculture in the Mediterranean, Black Sea and connecting waters.

Annex 6. SPECIES-SPECIFIC RFMO AGREEMENTS

Agreement	URL	Description
2000 Convention on the Conservation and Management of the Migratory Fish Stocks in the Western and Central Pacific Ocean	http://www.intfish.net/treaties/westpac.htm	To ensure, through effective management, the long-term conservation and sustainable use of highly migratory fish stocks in accordance with UNCLOS and UNFSA. Agreement reflects the principle environmental law principles incorporated in UNFSA.
1993 Agreement for the Establishment of the Indian Tuna Commission (IOTC Convention)	http://www.fao.org/fishery/about/bodies/regional	The objective of the Indian Ocean Tuna Commission (IOTC) is to promote cooperation among its Members with a view to ensuring, through appropriate management, the conservation and optimum utilisation of tuna and tuna-like fishes and encouraging sustainable development of fisheries based on such stocks.
1993 Commission for the Conservation of Southern Bluefin Tuna (CCSBT)	http://www.ccsbt.org	The Commission's objective is to ensure, through appropriate management, the conservation and optimum utilisation of the global SBT. The Commission also provides an internationally recognised forum for other countries/entities to actively participate in SBT issues.
1992 North Pacific Anadromous Fish Commission under the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean (NPAFC)	http://www.npafc.org/new/index.html	The main objective of the Convention is to promote the conservation of anadromous stocks in the Convention Area.
1982 North Atlantic Salmon Conservation Organization (NASCO)	http://www.nasco.int/	The objective is to contribute through consultation and cooperation to the conservation, restoration, enhancement and rational management of salmon stocks subject to the Convention taking into account the best scientific evidence available. The Convention applies to the salmon stocks which migrate beyond areas of fisheries jurisdiction of coastal States of the Atlantic Ocean north of 36°N latitude throughout their migratory range.
1972 International Commission for the Conservation of Atlantic Tunas (ICCAT)	http://www.iccat.int/	An inter-governmental fishery organization responsible for maintaining populations of tunas and tuna-like species in the Atlantic Ocean and its adjacent seas at levels which permit the maximum sustainable catch for food and other purposes. Covers 30 tuna and tuna-like species.
1949 (reviewed 2003) Convention for the Establishment of an Inter-American Tropical Tuna Commission (IATTC)	http://www.iattc.org/HomeENG.htm	To maintain populations of yellowfin and skipjack tuna as well as other species taken by tuna vessels at levels permitting maximum sustainable yield (MSY) year after year. This was strengthened in 2004 (not yet in force) by the Antigua Convention which increased the mandate to ensure long-term conservation and sustainable use of tunas and other species taken by tuna-fishing vessels in the EPO, in accordance with relevant rules of international law.

Annex 7. HIGH SEAS RELEVANT ECOSYSTEM AND SPECIES DATABASES						
DATABASE	**URL**	**CONTACT**	**DATA CONTENT SCOPE**	**DESCRIPTION**	**OCEAN SYSTEM**	**DATA FOCUS**
Array for Real-time Geostrophic Oceanography (ARGO)	http://www-argo.ucsd.edu/ http://argo.jcommops.org/	E-mail: aic@jcommops.org	International	ARGO is a global array of 3000 free-drifting profiling floats that measure the temperature and salinity of the upper 2000 m of the ocean. This allows continuous monitoring of the climate state of the ocean, with all data being relayed and made publicly available within hours after collection.	Pelagic	Oceanography
University of the Azores Department of Oceanography and Fisheries (DOF)	http://www.horta.uac.pt/	Ricardo Serrão Santos ricardo@horta.uac.pt	Regional	Following are the most relevant databases: geo-referenced distribution of coastal habitats and species of Nature 2000 sites; mesopelagic fishes of the North-eastern Atlantic Region, based on data from museum collections mining and recent cruises (334 stations); marine mammals, based on annual acoustic and visual census and fisheries observers programs; tuna, based on fisheries observers programs; sea-birds and breeding colonies, based on annual census and fisheries observers programs; sea-turtles based on annual census, fisheries observers programs and standard tagging and satellite tracking, coastal fishes, based on visual census; demersal and seamount fishes, based on fisheries cruises, and sets of images for ocean colour and temperature analysis within physics oceanography. Main habitats and ecosystems covered are: open-ocean; seamounts and banks; coastal areas (intertidal and subtidal); hydrothermal vents (both shallow and deep-sea).	Benthic Pelagic	Chemistry Habitats Fisheries Marine species Oceanography Physiography
Baltic GIS Portal	http://gis.ekoi.lt/gis/index.php	WebMaster - Dr. Gedas Vaitkus E-mail: gedas@ekoi.lt; skype: gedas_vaitkus.	Regional	Hosted by GIS Group of the Institute of Ecology of Vilnius University, which currently acts as GIS/Data Coordination Center of the Baltic Sea Regional Project (Helsinki Commission (HELCOM) and the International Council for the Exploration of the Sea (ICES)). Datasets include protected areas through the World Database on Protected Areas (WDPA), Catalogs of on-line GIS/RS datasets, original LANDSAT images, GLCF Landsat Mosaic of Europe 2000, and GLCC Land Cover datasets.	Pelagic	Physiography
Bermuda Atlantic Time-series Study - Zooplankton (BATS)	http://www.vims.edu/bio/zooplankton/BATS/	Zooplankton Ecology c/o Deborah Steinberg Virginia Institute of Marine Science P.O. Box 1346, Gloucester Pt., VA 23062-1346, USA Tel: 804-684-7838 Fax: 804-684-7293	Regional	BATS zooplankton is a multi-species inventory of zooplankton and micronekton at the Bermuda Atlantic Time-Series Study (BATS) station, a 13-year, ongoing oceanographic time series situated in the western North Atlantic subtropical gyre, or Sargasso Sea.	Pelagic	Marine species Physiography

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
Birdlife International - Tracking Ocean Wanderers	http://www.birdlife.org/action/science/species/seabirds/tracking.html	E-mail : Cleo.small@rspb.org	International	The database is a unique collaboration between scientists worldwide and includes over 90% of the world's existing albatross satellite-tracking data. Data holders have established a protocol for access to and sharing of the database, which is held and managed by BirdLife International.	Pelagic	Marine species
British Antarctic Survey (BAS)	http://www.antarctica.ac.uk//bas_research/data/access/index.php	British Antarctic Survey High Cross, Madingley Road CAMBRIDGE CB3 0ET United Kingdom Telephone: +44 (0)1223 221400 Fax: +44 (0)1223 362616 E-mail: online form	Regional	British Antarctic Survey (BAS) is responsible for the UK's national scientific activities in Antarctica. Databases include dredge sampling information, geochemical analysis, geophysical analysis, sediment cores and molluscs.	Benthic Pelagic	Chemistry Oceanography Physiography
British Oceanographic Data Centre (BODC)	http://www.bodc.ac.uk/	British Oceanographic Data Centre Bidston Observatory Bidston Hill Prenton Merseyside CH 43 7RA Tel: 0151 653 1510 Fax: 0151 652 3950 E-mail: Enquiries@bodc.ac.uk	Regional	The British Oceanographic data Centre (BODC) holds a wealth of publicly accessible marine data collected using a variety of instruments and samplers and collated from many sources. Handles biological, chemical, physical and geophysical data containing measurements of nearly 19,000 different oceanographic variables. Also contains ocean metadata, cruise information and datasets, online data systems and inventory searches.	Pelagic Benthic	Chemistry Oceanography Physiography

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
Canada Marine Environmental Data Service	http://www.meds-sdmm.dfo-mpo.gc.ca/meds/Home_e.htm	Marine Environmental Data Service Department of Fisheries and Oceans Canada 12W082 - 200 Kent Street Ottawa, Ontario Canada K1A 0E6 Tel.: (613) 990-6065 Tel.: (613) 990-0243 (request services) Fax: (613) 993-4658 E-mail: services@meds-sdmm.dfo-mpo.gc.ca	National Regional	The Canada Marine Environmental Data Service holds physical, chemical and biological oceanographic observations reported in daily and historical time frames; national contacts for biological databases within the Department of Fisheries and Oceans (DFO); hyperlinks to regional web sites for satellite data and products within DFO and regional web sites for time series data and products; the National Contaminants Information System; and environmental observations (i.e. winds, ice, etc.) from historical offshore oil and gas sites.	Pelagic Benthic	Chemistry Oceanography Physiography
Canadian Sea Turtle Research Project	http://www.leatherback.ca/	Contact: Michael James (principal invesigator) E-mail: mjames@mathstat.dal.ca	Regional	Information and list of publications relating to sea turtle migratory research in northern latitudes.	Pelagic	Marine species
Commission for the Conservation of Antarctic Marine living Resources (CCAMLR)	http://www.ccamlr.org/pu/e/sc/dat/intro.htm	PO Box 213 North Hobart 7002 Tasmania Australia Phone +61 3 6210 1111 Fax +61 3 6224 8744 E-mail ccamlr@ccamlr.org	Regional	CCAMLR is responsible for the acquisition, compilation, analysis and dissemination of data from all the fisheries it regulates as well as from research activities on harvested, dependent and related species. setMost data is collected by Member countries via their fishing operations and research programs. The data are submitted to the Secretariat's Data Centre where they are archived for subsequent analysis and discussion by the Commission, Scientific Committee and Working Groups. Managed data includes: fishery catch and effort data, data collected by scientific observers, research survey data, and data collected under CCAMLR Ecosystem Monitoring Programme. Standard formats are used to facilitate the submission of data and to help ensure their completeness, comparability and accuracy.	Benthic Pelagic	Fisheries Marine species

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
Global Census of Marine Life on Seamounts (CENSEAM	http://www.censeam.niwa.co.nz	Dr Mireille Consalvey National Institute of Water and Atmospheric Research (NIWA), Private Bag 14–901, Wellington, New Zealand Phone: +64 4 386 0853 (or ext. 8589) Fax: +64 4 386 0574 E-mail: m.consalvey@niwa.co.nz	International	CenSeam aims to fill critical knowledge gaps on understudied regions/types of seamounts and how seamount ecosystems are structured and function. CenSeam consolidates and synthesize existing data e.g. historical data that to date has been functionally inaccessible to the scientific community.	Benthic	Chemistry Habitats Marine species Oceanography Physiography
Census on Marine Life (CoML)	http://www.coml.org/	Ron O'Dor Senior Scientist Consortium for Oceanographic Research and Education (CORE) Secretariat, CoML 1755 Massachusetts Avenue, NW, #800 Washington, DC 20036 Tel.: 202-332-0063 Fax: 202-332-9751 Email: rodor@COREocean.org	International	The Census of Marine Life (CoML) is a ten-year international research program with the goal of assessing and explaining the diversity, distribution and abundance of marine organisms throughout the world's oceans. The emphasis of the program is field studies, which are to be conducted in poorly known habitats as well as those assumed to be well known. In both coastal and deep waters, projects will identify new organisms and collect new information on ocean life. Emphasis is placed upon poorly known habitats and new organisms.	Pelagic Benthic	Marine species

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
CephBase	http://www.cephbase.utmb.edu/	E-mail: cephbase@hotmail.com	International	CephBase is a dynamic relational database-driven web site. The purpose of CephBase is to provide taxonomic data, life history, distribution, images, videos, references and scientific contact information on all living species of cephalopods (octopus, squid, cuttlefish and nautilus) in an easy to access, user-friendly manner.	Benthic Pelagic	Marine species
Biogeography of Deep-Water Chemosynthetic Ecosystems ChEss)	http://www.soc.soton.ac.uk/chess/database.html	Prof Paul A. Tyler Coordinator Southampton Oceanography Center European Way, Empress Dock SO14 3ZH, Southampton United Kingdom Tel.: +44 2380 592557 Fax. +44 2380 593642 E-mail: pat8@soc.soton.ac.uk	International	ChEss contains data on species from deep-water hydrothermal vents and cold seeps. The information is obtained by both literature research and participation of laboratories/institutions/researchers willing to include their vent and seep data. ChEssBase is a dynamic relational database, geo- and bio-referenced, available via the web site and through OBIS. At the biological level, the database provides taxonomic, biological, ecological and distributional information, including photographs, video, references, links to specific data (quantitative samples, cruises) and scientific contacts in a user-friendly interface. At the geographical level, the database includes information on the location of vent and seep sites, general characteristics of the sites, faunal community description and references.	Benthic	Habitat Marine species Physiography
Continuous Plankton Recorder (CPR)	http://www.sahfos.org/	SAHFOS The Laboratory, Citadel Hill, Plymouth PL1 2PB. Tel:+44 (0) 1752 600016 Tel:+44 (0) 1752 633271 Fax:+44 (0) 1752 600015 Email: Sahfos@mail.pml.ac.uk	Regional	The Sir Alister Hardy Foundation for Ocean Science (SAHFOS) is an international charity registered in the UK that operates the Continuous Plankton Recorder (CPR) survey. The Foundation has been collecting data from the North Atlantic and the North Sea on the biogeography and ecology of plankton since 1931. The CPR database currently contains information for 185,902 samples with 2,198,052 plankton entries (every second sample analyzed yet all preserved).	Pelagic	Marine species Physiography

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
Data Buoy Co-operation Panel	http://www.jcommops.org/dbcp/	Hester Viola JCOMMOPS 8-10, rue Hermès Parc Technologique du Canal, 31526 Ramonville Saint-Agne, France Tel: +33 5 61 39 47 82 Email: viola@jcommops.org	International	Relevant objectives of the DBCP include the review and analyse requirements for buoy data, improvement of quantity and quality of buoy data distributed onto the Global Telecommunication System (GTS), information exchange and technology development, and liaison with relevant international and national bodies and programmes. Datasets include interactive maps for a number of oceanographic variables collected by buoys.	Pelagic	Oceanography
Database Resources for Marine Ecological Genomix (Megx.net)	http://www.megx.net/	E-mail: megx@mpi-bremen.de	International	Megx.net provides specialized databases and tools for genome-wide analysis of marine bacteria and metagenomics.	Benthic Pelagic	Marine species
Deep Sea Floor Image Database System	http://www.jamstec.go.jp/dsidb/index.eng.html	Kiyoshi Othuka Japan Marine Science & Technology Center E-mail: otsukak@jamstec.go.jp	International	The Japan Marine Science & Technology Center has collected 300,000 video and photographic images of deep-sea floor collected by manned submersible survey vessels "Shinkai 2000" and "Shinkai 6500", the remote controlled unmanned exploration system "Dolphin 3K" and the towed deep sea exploration system "Deep Tow Camera".	Benthic	Physiography
Deutsches Ozeanographisches Institut (Bundesamt für Seeschiffahrt und Hydrographie)	http://www.bsh.de/en/Marine%20data/Geodata/index.jsp	Datenzentrum, Hamburg Monika Woisin-Michelsen Monika E-mail: Michelsen@bsh.de Tel: +49 40 3190-1015	Regional	This database consists of the Marine Environmental Database, North Sea and Baltic Sea by 1° rectangles, Atlantic Ocean by 10° rectangles, stations of the Baltic Monitoring Programme, cruise inventories and North Sea oil spill information.	Atmospheric Benthic Pelagic	Meteorology Oceanography Physiography

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
EarthTrends	http://earthtrends.wri.org/searchable_db/index.php?theme=1	World Resources Institute 10 G Street, NE Suite 800 Washington, DC 20002 USA Phone: 1.202.729.7600 Fax 1.202.729.7610 E-mail: acassara@wri.org	International	EarthTrends is a comprehensive online database, maintained by the World Resources Institute, that focuses on environmental, social, and economic trends. Databases include aquaculture production, capture production, fisheries, marine jurisdictions, species and trade in fish and fisheries products.	Benthic Pelagic	Fisheries Marine species
Earth Observation (EO) Portal	http://services.eoportal.org/portal/service/ListService.do;jsessionid=18902D7E83DA9AD807D875F35D28ED3F?serviceCategoryId=8B80F380	Online e-mail form	International	The Service Support Environment (SSE) service directory offers access to a continuously expanding set of basic and complex Earth observation and GIS services	Atmospheric Pelagic	Meteorology Oceanography Physiography
Ecocean.org	http://www.whalesshark.org/index.jsp?langCode=en	Brad Norman E-mail : ecocean@ozemail.com.au	International	New technology for identifying Whale Sharks by photographs of their spot patterns. Database of sightings worldwide by tourists and scientists of individual sharks which can be used to work out their migration routes.	Pelagic	Marine species

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
The European Seafloor Observatory Network (ESONET)	http://www.abdn.ac.uk/ecosystem/esonet/index2.htm	Oceanlab Newburgh Aberdeenshire Scotland AB41 6AA United Kingdom Tel.: + 44 1224 274408 Fax + 44 1224 274402 Email. l.e.g.priede@abdn.ac.uk	Regional	The objective is to produce a practical plan for long-term monitoring of the ocean margin environment around Europe as part of GMES (Global Monitoring for Environment and Security) with capability in geophysics, geotechnics, chemistry, biochemistry, oceanography, biology and fisheries. ESONET is be complementary to oceanographic networks such as GOOS, (Global Ocean Observing System), EuroGOOS and DEOS (Dynamics of Earth and Ocean Systems), and will work with industries that are deploying sea-floor cable networks. ESONET is multidisciplinary and it contains both long-term data collection and alarm capability in the event of hazards (e.g., earthquakes).	Benthic Pelagic	Chemistry Marine species Oceanography Physiography
European Directory of the Ocean-observing System (EDIOS)	http://www.edios.org/	Online feedback form.	Regional	The EDIOS directory provides a new internet-based tool for searching information on observing systems operating repeatedly, regularly and routinely in European waters. The EDIOS directory contains metadata on European observing systems such as platforms, repeated ship-borne measurements, buoys, remote imagery, etc. EDIOS is an initiative of the European Global Ocean Observing System (EuroGOOS). The directory was developed during the EDIOS project.	Atmospheric Benthic Pelagic	Chemistry Marine species Meteorology Oceanography Physiography
EUROCORE	http://www.maris.nl/eurocore.htm www.eu-seased.net	Marine Information Service Dillenburgsingel 69 2263 HW Leidschendam The Netherlands Tel.: +31 (0)70-3170960 Fax: +31 (0)70-3903546 E-mail: maris@xs4all.nl	Regional	A very large number of sediment cores collected by and stored at European research centres, universities and core repositories. EUROCORE will cover seafloor core data collected: by European Universities, research institutes and marine stations (i.e. by non-commercial institutions); from anywhere in the world ocean, providing the data was collected by, and is held at, an European Institution; seaward of the continental shelf (i.e. from > 200 m water depth)	Benthic	Chemistry
Food and Agriculture Organisation - Fisheries and Aquaculture department (FAO)	http://www.fao.org/fishery/en	E-mail FI-Inquiries@fao.org	International Regional	The Department promotes policies and strategies aiming at sustainable and responsible development of fisheries and aquaculture in inland and marine waters. Since 1980, the Unit has been maintaining statistical data collections on global level and regional capture fisheries production.	Benthic Pelagic	Fisheries

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
Fleet Numerical Meteorology and Oceanography Center	https://www.fnmoc.navy.mil/public/	Fleet Numerical Meteorology & Oceanography Center 7 Grace Hopper Ave., Stop 1 Monterey, CA 93943-5501 E-mail: fnmoc.cdo@navy.mil	International	Automated numerical, meteorological, and oceanographic (METOC) analyses and predictions.	Atmospheric Pelagic	Meteorology Oceanography
FishBase	www.fishbase.org	R. Froese, and D. Pauly E-mail: www.fishbase.org	International	Global information database of nearly all fishes. FishBase was developed at the WorldFish Center in collaboration with the Food and Agriculture Organization of the United Nations (FAO). Since 2001 FishBase has been supported by a consortium of seven research institutions.	Benthic Pelagic	Fisheries Marine species
French National Oceanographic Data Centre	http://www.ifremer.fr/sismer/index_UK.htm	Centre IFREMER de Brest BP 70 29280 Plouzane (FRANCE) Tel. : +33 (0)2 98 22 49 16 Fax: +33 (0)2 98 22 46 44 E-mail: sismer@ifremer.fr	International National Regional	SISMER is the Designated National Oceanographic Data Centre for France (French NODC) for the International Oceanographic Data Exchange programme (IODE) of UNESCO Intergovernmental Oceanographic Commission. This national data banking activity dates from 1968, and covers the fields of marine physics, chemical, underway geophysics and general information on French oceanographic cruises and data sets. SISMER contributes to data management structures of several international scientific projects, especially in the frame of the European Marine Science and Technology Program (MAST) programme.	Pelagic	Chemistry Oceanography Physiography
GEOROC Geochemistry of Rocks of the Oceans and Continents	http://georoc.mpch-mainz.gwdg.de/Start.asp	E-mail: comsarbas@mpch-mainz.mpg.de	International	Published chemical and isotopic data as well as extensive "metadata" for rocks, minerals and melt/fluid inclusions, including igneous rocks from oceanic islands and large igneous provinces (seamounts, oceanic plateaus, submarine ridges, and oceanic and continental flood basalts).	Benthic	Chemistry Physiography
Global Environment Outlook (GEO) Data Portal	http://geodata.grid.unep.ch/	Online contact form	International	The authoritative source for data sets used by UNEP and partners for GEO. Includes fisheries data, exclusive economic zones, lists of threatened species (birds, crustaceans, molluscs and reptiles), and protected areas.	Benthic Pelagic	Fisheries Marine species Physiography

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
GloBallast Partnership	http://globallast.imo.org	Jose Matheickal Chief Technical Adviser Email: jmatheic@imo.org Tel +44 (0)20 7587 3279 Fax +44 (0)20 7587 3261	International	Global ballast assessment unit of the International Maritime Organisation is currently looking at the impacts of invasive alien species on the marine environment. Links to global, regional and national databases and directories on invasive marine species, including those in high seas areas. Some databases are still under development.	Benthic Pelagic	Marine species
Global Ocean Observing System (GOOS)	http://ioc.unesco.org/goos/	GOOS Intergovernmental Oceanographic Commission 1, rue Miollis 75732 Paris Cedex 15 France	International	GOOS is a permanent global system for observations, modelling and analysis of marine and ocean variables to support operational ocean services worldwide. GOOS provides accurate descriptions of the present state of the oceans, including living resources; continuous forecasts of the future conditions of the sea for as far ahead as possible; and the basis for climate-change forecasts.	Pelagic Benthic	Oceanography
The Great Sea Turtle Race 2	http://www.greatturtlerace.org/2008/therace.php	Mark Breier Conservation International's Chairman Council http://www,markbreier.com George Shillinger phD candidate Stanford University TOPP Researcher E-mail: georges@stanford.edu	Regional	Satellite tracking data of leatherback sea turtles across the Pacific. Collaboration between Conservation International, NOAA, Tagging Of Pacific Predators programme, and Drexel University.	Pelagic	Marine species

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
Gulf of Mexico Geological Long-Range Inclined Asdic mapping program (GLORIA)	http://kai.er.usgs.gov/gloria/gomex/index.html	E-mail: vpaskevich@usgs.gov	Regional	In 1985, the USGS conducted surveys of the US Exclusive Economic Zone (EEZ) in the Gulf of Mexico (GOM) and around Puerto Rico and the U.S. Virgin Islands. The 1985 survey abutted an area surveyed in 1982 as part of the Outer Continental shelf geohazards work that focused on the Texas-Louisiana continental slope and preliminary work for the Deep Sea Drilling Project in the Mississippi Fan. Includes continuous imagery of the seafloor and side-scan coverage of the EEZ in the GOM. Although the database is only concerned with EEZs, the GLORIA system is a digital sidescan sonar system capable of producing digital image maps of the seafloor from reflected sound waves, and could be applied to high seas research.	Benthic Pelagic	Physiography
High Seas Salmon Research Programme	http://www.fish.washington.edu/research/highseas/research.html#data	Box 355020, Seattle, WA 98195-5020 Street address 1122 NE Boat St, Seattle, WA 98105 Tel.: 206-543-4270 Fax: 206-685-7471 Email: frontdesk@fish.washington.edu	International	The High Seas Salmon Research Program has accumulated a number of data sets. Data come from US salmon tagging and research cruises in the North Pacific Ocean and Bering Sea, cooperative tagging and research cruises with Canadian, Japanese, and Russian fishery agencies, measurements of salmon scales for stock identification and growth studies, examination of salmon stomach contents carried out aboard Japanese research vessels, and salmon research cruises of the former Bureau of Commercial Fisheries, predecessor to the US National Marine Fisheries Service. The program also maintains the high-seas tag release and recovery databases for the North Pacific Anadromous Fish Commission (NPAFC), these data are jointly controlled by the national sections of NPAFC. There are plans to provide some of the program's data sets through web-pages of the High Seas Salmon Research Program.	Pelagic	Fisheries
International Commission for the Conservation of Atlantic Tunas (ICCAT)	http://www.iccat.int/assess.htm	Mr. Papa Kebe Statistics Department Head E-mail : Papa.kebe@iccat.int	International	The ICCAT Secretariat maintains over 2 gigabytes of information in various databases. Most are accessible from the web page links. Data includes Nominal Catch Information, Sample fishing statistics and fish sizes, tagging data and other information.	Pelagic	Fisheries

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
Institute Council for the Exploration of the Seas (ICES)	http://www.ices.dk/aboutus/aboutus.asp	ICES H. C. Andersens - Boulevard 44-46 DK-1553 Copenhagen V Denmark Tel: +45 3338 6700 Fax: +45 3393 4215 E-mail: info@ices.dk	International	Marine ecosystem data is held at the ICES Data Centre. The cross-discipline department has expertise in fisheries, oceanography and the marine environment, which includes some of the largest databases in the world on these subjects, including DATRAS (Database Trawl Survey).	Benthic Pelagic	Fisheries Habitat Oceanography
The Indian Ocean Climatology and Oceanography (IOCO) Gateway	http://indianocean.free.fr/	E-mail- Jean-Luc Le Blanc at jllb2@wanadoo.fr	Regional	Gathers information on oceanography (physical, biological, geological, chemical, etc.) of the Indian Ocean, as well as data on seas and currents.	Atmospheric Benthic Pelagic	Chemistry Fisheries Habitats Marine species Meteorology Oceanography Physiography
Integrated Ocean Drilling Project (IODP)	http://iodp.wdc-mare.org/	E-mail: info@pangaea.de	International	Within the Integrated Ocean Drilling Project, WDC-MARE/PANGAEA®, is responsible for the data handling, long-term storage and publication of scientific cruise and post-cruise data of IODP-Mission Specific Platform (MSP) expeditions. WDC-MARE/PANGAEA® is contractor of the ECORD Science Operator (ESO). The World Data Center for Marine Environmental Sciences, WDC-MARE is aimed at collecting, scrutinizing, and disseminating data related to global change in the fields of environmental oceanography, marine geology, paleoceanography, and marine biology. It focuses on georeferenced data using the information system PANGAEA®. Includes data on chemistry, palaeontology and sediment cores.	Benthic	Chemistry Physiography

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
Interactive Mapping System (IMAPS) - UNEP - World Conservation Monitoring Centre (UNEP-WCMC)	http://www.unep-wcmc.org/	UNEP World Conservation Monitoring Centre, 219 Huntingdon Road, Cambridge, CB3 0DL. Tel: +44 (0)1223 277314 Fax: +44 (0)1223 277136	International	The system is designed to facilitate the integration of public-domain field data, such as distribution, abundance, migration, trends, status, photographs, and information on index beaches, together with habitat information such as presence and extent of sea grasses, coral reefs, mangroves, priority areas such as Internationally and Nationally Protected Areas, and physical background parameters. A high seas IMAPS is currently being developed as a new data platform.	Benthic Pelagic	Fisheries Marine species Oceanography Physiography
International Cooperation in Ridge Studies	www.interridge.org	InterRidge Office: Woods Hole Oceanographic Institution 266 Woods Hole Road MS#24 Woods Hole, MA 02543 USA phone: (+001) 508 289 3821fax: 508 457 2150or E-mail:coordinator@interridge.org	International	Database regarding known and suspected ocean basin vents as well as taxonomic, ecological, biological, and distribution information about species associated with deep-water chemosynthetic ecosystems.	Benthic	Habitat Marine species Oceanography Physiography
International Seabed Authority (ISA) - Central Data Repository (CDR)	http://www.isa.org.jm/en/scientific/cdr	International Seabed Authority, 14-20 Port Royal St.,Kingston, Jamaica. Tel: 1 876 9229105; Fax: 1 876 922-0195 E-mail: Online Form	International	The Central Data Repository (CDR) holds centralized data of public and private information on marine mineral resources acquired from various institutions worldwide.	Benthic	Chemistry Physiography

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
IUCN Global Marine Species Assessment	http://sci.odu.edu/gmsa	Kent E. Carpenter, PhD Global Marine Species Assessment Coordinator Office: (001) 757 683 3481 Fax: (001) 757 683 5283 Email: kcarpent@odu.edu Skype: gmsaatodu	International	First global review of the threat of extinction for all marine vertebrates, plants and selected invertebrates. Links to Shark, Marine turtle and Cetacean Specialist Groups. The project involves a range of partners in compiling and analyzing all existing data on approximately 20,000 marine species, and will determine the risk of extinction according to the IUCN Red List Categories and Criteria.	Benthic Pelagic	Marine species
Japan Oceanographic Data Center	http://www.jodc.go.jp/aboutJODC_work_data.html	Hydrographic and Oceanographic Department Japan Coast Guard 5-3-1 Tsukiji, Chuo-ku, Tokyo, 104-0045 Japan Tel: +81-3-3541-4295 Fax: +81-3-3545-2885 Email: mail@jodc.go.jp	National	JODC receives worldwide physical-chemical oceanographic data from government agencies, academic institutes, and other organizations in Japan as well as from international joint projects. JODC's data holdings provide global coverage of basic oceanophysical, hydrophysical properties such as temperature, salinity, ocean current, tide, tidal current, geomagnetism, gravity and bathymetry.	Pelagic	Oceanography
Large Pelagics Research Lab	http://www.tunalab.unh.edu	Nuno M. Fragoso Programme manager/Research Administrator E-mail : Nuno.fragoso@unh.edu	Regional	Established in 2003 the laboratory serves to promote research on the large pelagic species of the Atlantic including the tunas, billfish, sharks and sea turtles. Research is directed towards filling current gaps in knowledge on these top ocean predators and valuable marine resources. Specific efforts are geared towards improving current satellite tracking technologies as well as addressing questions concerning biology, population dynamics and ecosystem dynamics. The long term aim is to establish comprehensive information on highly migratory Atlantic species that can lead to improved fisheries management and stock rebuilding.	Pelagic	Fisheries Marine species

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
Marine Data for GIS Systems (MarineGIS)	http://www.marinegis.com/dataen.html	Rodolphe Devillers E-mail: devillers@marinegis.com	International	The purpose of this site is to provide information and links for those who work in geology, oceanography and GIS related domain. (GIS Data and Software Library). Links to bathymetry, sea ice, geology, geophysics, sea surface temperature, physical and chemical properties, hydrothermal vents, productivity.	Benthic Pelagic	Chemistry Habitats. Oceanography Physiography
Marine Information Service (MARIS), Netherlands	http://www.maris.nl/frames.asp?databases.htm	Marine Information Service (MARIS) Dillenburgsingel 69 2263 HW Leidschendam The Netherlands Tel.: +31 (0)70-3170960 Fax: +31 (0)70-3903546 Email: maris@xs4all.nl	Regional	MARIS includes information on the North sea research projects (oceanography, biology, hydrography, geology, chemistry, meteorology) Offshore oil and gas activities, sand and gravel extraction, and a European directory of marine Environmental Data.	Atmospheric Benthic Pelagic	Chemistry Meteorology Oceanography Physiography
The Marine Life Information Network (MarLIN)	http://www.marlin.ac.uk/	Marine Life Information Network for Britain and Ireland - MarLIN, The Marine Biological Association of the UK, The Laboratory Citadel Hill, Plymouth, PL1 2PB United Kingdom Tel.: +44 (0)1752 633336 Fax: +44 (0)1752 633102 Email: marlin@mba.ac.uk	Regional	MarLIN provides a structure for linking available data on marine life around Britain and Ireland. It is a comprehensive source of information about marine habitats, communities and species and their sensitivity to natural events and human activities.	Benthic Pelagic	Marine species Oceanography Physiography

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
NASA - Global Change Master Directory	http://gcmd.nasa.gov/KeywordSearch/Keywords.do?Portal=GCMD&KeywordPath=Parameters%7COCEANS&MetadataType=0&lbnode=gcmd3a	Online e-mail form.	International	A directory to earth science data and services. Oceans data includes fisheries, bathymetry/topography, marine environment monitoring, sediments, geophysics, volcanism, acoustics, chemistry, circulation, heat budget, ocean optics, pressure, temperature, waves, winds, salinity, sea ice, sea surface topography, tides and water quality.	Atmospheric Benthic Pelagic	Chemistry Fisheries Marine species Meteorology Oceanography Physiography
National Center for Atmospheric Research Selected Data for Oceanic Research (COADS)	http://dss.ucar.edu/catalogs/oceanlists/ocean_by_category.html	E-mail: dssweb@ucar.edu,	International	COADS Data Set includes sea-surface temperature, surface wind and wind stress, air-sea heat budgets, ocean depth and land elevation, buoy data, sea ice and remote sensing data.	Atmospheric Pelagic	Meteorology Oceanography Physiography
National Oceanic and Atmospheric Administration (NOAA)	http://www.noaa.gov/index.html	National Oceanic and Atmospheric Administration 1401 Constitution Avenue, NW Room 6217 Washington, DC 20230 Phone: (202) 482-6090 Fax: (202) 482-3154	International National	NOAA's National Ocean Service maintains databases that include: General Bathymetric Chart of the Oceans (GEBCO), the Center for Operational Oceanographic Products and Services (CO-OPS), Marine Zones, the National Geophysical Data Centre (NGDC), the National Buoy Data Centre, the Office of Protected Resources (OPR), the United States National Oceanographic Data Centre, and the Vents Programme.	Atmospheric Benthic Pelagic	Chemistry Fisheries Habitats Marine species Meteorology Oceanography Physiography

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
Ocean Biogeographic Information System - Spatial Ecological Analysis of Megavertebrate Populations (OBIS SEAMAP)	http://obismap.env.duke.edu/data/	Dr. Andy Read DUML BRL 104 Duke University Marine Laboratory Tel.: 202 504 7590 Fax: 252 504 7648 E-mail : aread@duke.edu	International	As part of the Ocean Biogeographic Information System (OBIS), a group of investigators have created a digital database of marine mammal, seabird, and sea turtle distribution and abundance. Partners include UC San Diego, University of Washington, College of the Atlantic, St. Andrews University, British Antarctic Survey, SAHFOS, NMFS Southeast Fisheries Center, and several industries. The web-based system will allow the interactive display, query, and analysis of Digital Archive in conjunction with environmental data.	Benthic Pelagic	Marine species
Ocean Floor databases	http://ocean-ridge.ldeo.columbia.edu/	Dr Bill Ryan E-mail: billr@ldeo.columbia.edu Dr Bill Haxby E-mail: bill@ldeo.columbia.edu	International	The Ridge Multibeam Synthesis is a compilation of multibeam bathymetry data, digital elevation models, and shaded relief images of the seafloor from the world's mid-ocean ridges. This effort is funded by the Marine Geology and Geophysics program, run by the Ocean Sciences Division, National Science Foundation.	Benthic	Physiography
Petrological Database of the Ocean Floor (PETDB)	http://petdb.ldeo.columbia.edu/petdb/	Kerstin Lehnert Senior Staff Associate, LDEO Columbia University Tel.: (845) 365-8506 Email: lehnert@ldeo.columbia.edu	International	A searchable petrologic and chemical database for ocean-floor basalts.	Benthic	Chemistry

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
South African Data Centre for Oceanography (SADCO)	http://sadco.csir.co.za/	Dr. Marten Gründlingh, Manager, SADCO P O Box 320 7599, Stellenbosch South Africa Telephone: +27 21 888 2520 Fax: +27 21 888 2693 email: mgrundli@csir.co.za	Regional	Hydrographic station and surface data from the southern African coastline, as well as the wider Atlantic, Indian and Southern oceans.	Atmospheric Pelagic	Meteorology Oceanography
Satellite Images and Datasets	http://www.itc.nl/~bakker/satellite.html	Wim Bakker ITC, department of GeoInformatics Hengelosestraat 99, 7514 AE Enschede P.O.Box 6, 7500 AA Enschede, the Netherlands tel +31 53 4874566, fax +31 53 4874335 E-mail:bakker@itc.nl	International	Provides links to a range of remotely sensed information, by database/organisation/portal in one website.	Atmospheric Pelagic	Marine species Meteorology Oceanography Physiography
Sea Around Us	www.seaaroundus.org	Fisheries Centre, University British Columbia, Vancouver (British Columbia, Canada). E-mail: office@fisheries.ubc.ca	International	A global database of historic expeditions and surveys, marine fisheries, North Atlantic trends and global MPAs. Data is sorted by Exclusive Economic Zone (EEZ), High Seas areas, Large Marine Ecosystems, and World Oceans.	Benthic Pelagic	Fisheries Habitats
SEA-SEARCH	http://www.sea-search.net/background/welcome.html	E-mail-info@sea-search.net	Regional	This website provides an effective navigation tool for oceanographic data and information sources in Europe and to centres in Europe with expertise and skills in oceanographic and marine data & information management. Marine environmental data is sourced from the European Directory of Marine Environmental Datasets (EDMED) database.	Atmospheric Benthic Pelagic	Chemistry Fisheries Marine species Meteorology Oceanography Physiography

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
SeamountsOnline	http://seamounts.sdsc.edu/	San Diego Supercomputer Center, University of California, San Diego MC 0505 9500 Gilman Drive La Jolla, CA 92093-0505 Tel.: 858 534-5009 Fax: 858 822-3631 Email: kstocks@sdsc.edu	International	The SeamountsOnline database is designed to hold records of species of all metazoan types that have been found on seamounts globally. The data held within this system are primarily from published literature, with a few electronic data sets that have been provided by researchers. This is a work in progress, with new data being added periodically – see the "Database Content" page of the website for more information and a description of the current holdings.	Benthic	Marine species Physiography
SEATURTLE.ORG	http://www.seaturtle.org	E-mail : support@seaturtle.org	International	Satellite tracking maps for individual sea turtles and some albatross. Maptool to create own maps. All data requires permission before use.	Pelagic	Marine species
Tagging of Pacific Predators	http://www.topp.org	On-line request form	Regional	Movement data of White Shark, Salmon Shark, Leatherback Turtle, Black-footed albatross, North Atlantic bluefin tuna, Shortfin Mako. Data accessible for use upon request.	Pelagic	Marine species
Tuna Research and Conservation Centre	http://www.tunaresearch.org/index.html	Dr. Barbara Block E-mail : bblock@stanford.edu	Regional	Home of the Tag-a Giant Tuna tagging programme; also containing information and publications on sharks, marlin and swordfish.	Pelagic	Marine species
United Nations Atlas of the Oceans	http://www.oceansatlas.com/	E-mail: UN-Atlas-Oceans-Project@fao.org.	International	The Atlas is an information system designed for use by policy makers who need to become familiar with ocean issues and by scientists, students and resource managers who need access to underlying data bases.	Atmospheric Benthic Pelagic	Chemistry Fisheries Habitats Marine species Oceanography Meteorology Physiography

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
The University of Hawaii Sea Level Center (UHSLC)	http://uhslc.soest.hawaii.edu/uhslc/data.html	UH Sea Level Center University of Hawaii 1000 Pope Road, MSB 317 Honolulu, Hawaii 96822-2336 Tel.: (808) 956-8083 Fax: (808) 956-2352	International	In-situ tide gauge data from around the world in support of climate research.	Pelagic	Oceanography
Waterbase - Transitional, coastal and marine waters	http://dataservice.eea.eu.int/dataservice/metadetails.asp?id=805	Headoffice European Environment Agency Kongens Nytorv 6 1050 Copenhagen K Denmark Mon-Thur: 09:00-17:00 Friday: 09:00-16:00	Regional	Waterbase is the generic name given to the EEA's databases on the status and quality of Europe's waters, specifically transitional, coastal and marine waters, and on the quantity of Europe's water resources. Waterbase contains timely, reliable and policy-relevant data collected from EEA member countries through the Eionet-Water (formerly known as Eurowaternet) process for periodic assessment reports. Marine data includes aquaculture, marine fisheries and water quality assessments.	Benthic Pelagic	Chemistry Fisheries
Whaleresearch.org	http://www.whaleresearch.org/index.htm	Nan Hauser, CCRC E-mail: info@whaleresearch.org	Regional	Details of the Greenpeace-funded Great Whale Trail following Humpback whales tagged in the Cooke Islands. Also links to publications regarding this data.	Pelagic	Marine species
World Data Centre for Biodiversity and Ecology	http://wdc.nbii.gov/ma/home.htm	E-mail: info@millenniumassessment.org	International	The World Data Center for Biodiversity and Ecology (WDCBE) is a collaborative web site project with the Millennium Ecosystem Assessment. The Data Viewer and Maps provide access to the Millennium Ecosystem Assessment datasets through an interactive mapping tool and maps created to illustrate selected results from the Millennium Ecosystem Assessment. Includes a variety of ocean databases such as bathymetry and Longhurst biomes.	Benthic Pelagic	Physiography

DATABASE	URL	CONTACT	DATA CONTENT SCOPE	DESCRIPTION	OCEAN SYSTEM	DATA FOCUS
World Database of Protected Areas (WDPA)	http://sea.unep-wcmc.org/wdbpa/	E-mail: protectedareas@unep-wcmc.org	International	The most comprehensive dataset on protected areas worldwide and is managed by UNEP-WCMC in partnership with the IUCN World Commission on Protected Areas (WCPA) and the World Database on Protected Areas Consortium. This platform is available for hosting future data on High Seas MPAs.	Benthic Pelagic	Physiography
World-wide Ocean Optics Database (WOOD)	http://wood.jhuapl.edu/	Principal Investigator Jeffrey H. Smart Tel.: (240)228-4331 Fax: (240)228-6908 E-mail: jeff.smart@jhuapl.edu Database Manager Linda Peco Tel.: (240)228-6178 E-mail: linda.peco@jhuapl.edu	International	The Worldwide Ocean Optics Database is a collection of several hundred ocean optics (the study of how the intensity and spectrum of light in the ocean influences biological processes) data sets gathered over time that encompass much of the world's oceans. Because WOOD comprises so many different data sets, multiple parameters are available, gathered by many different instruments, with varying levels of quality and editing. Because numerical representation of all data in the database is quickest and easiest, all of this "metadata" is stored as numerical codes by the database.	Pelagic	Chemistry Oceanography Physiography
WWF - Leatherback tracking programme	http://www.panda.org/about_wwf/where_we_work/latin_america_and_caribbean/our_solutions/marine_turtle_programme/projects/leatherback_tracking_project/index.cfm	Carlos Drews - Regional coordinator for marine turtle conservation in Latin America and the Caribbean. E-mail: cdrews@wwfca.org	International	Maps of movements of leatherbacks deployed from various international locations, primarily central America.	Pelagic	Marine species

Annex 8. KEY INSTITUTIONS ENGAGED IN HIGH SEAS ISSUES RELATED TO MPAs								
KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
Secretariat for the Agreement for the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and the Contiguous Atlantic Area (ACCOBAMS)	http://www.accobams.org/	Regional	ACCOBAMS is the second of two regional agreements adopted under the auspices of the 1979 Convention for the Conservation of Migratory Species of Wild Animals ("the Bonn Convention"), concerned with the conservation of cetaceans: the other is ASCOBANS (see next institution). The basic purpose of ACCOBAMS is to promote close cooperation in order "to achieve and maintain a favourable conservation status" for cetaceans in the Black and Mediterranean Seas and the principal measures by which this objective is to be achieved are outlined in a Conservation plan. The agreement was concluded in 1996 and entered into force in June 2001.		Y	Y		Y
The Antarctic and Southern Ocean Coalition (ASOC)	http://www.asoc.org	Regional	The Antarctic and Southern Ocean Coalition's (ASOC) Southern Ocean Fisheries Campaign works on five continents to stop Illegal, Unregulated and Unreported (IUU) fishing. ASOC is also concerned with ecological impacts of bottom trawlers on fragile and unique ecosystems such as seamounts.	Y	Y			
Birdlife International	http://www.birdlife.net	International	BirdLife International is a global Partnership of conservation organisations that strives to conserve birds, their habitats and global biodiversity, and works with people towards sustainability in the use of natural resources. BI is working towards high seas MPAs for the protection of migratory sea-birds and their prey.	Y	Y	Y		Y
British Antarctic Survey (BAS)	http://www.antarctica.ac.uk/	Regional	British Antarctic Survey (BAS) is responsible for the UK's national scientific activities in Antarctica. Research includes: biodiversity, evolution and ecosystems; and sustainability of southern ocean biological resources.		Y	Y		

KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
Canadian Department of Fisheries and Oceans (DFO-MPO)	http://www.dfo-mpo.gc.ca/us-nous_e.htm	National	Fisheries and Oceans Canada is the lead federal government department responsible for developing and implementing policies and programs in support of Canada's economic, ecological and scientific interests in oceans and inland waters. DFO-MFO play a pivotal role in advancing high seas protection through their 'Sustainable Development Strategy' programme, focused on the sustainable use of the high seas, and its associated workshops.			Y	Y	Y
Census of Marine Life (CoML)	http://www.coml.org/	International	The Census of Marine Life is a global network of researchers in more than 80 nations engaged in a 10-year scientific initiative to assess and explain the diversity, distribution, and abundance of life in the oceans. Seventeen projects conduct reseach and analysis on six ocean realms that will be reported in the world's first comprehensive Census of Marine Life-past, present, and future-will be released in 2010.		Y	Y		
Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) Ecosystem Monitoring Programme (CEMP)	http://www.ccamlr.org/pu/E/sc/cemp/intro.htm	Regional	CEMP was established in 1985 by CCAMLR to monitor the effects of fishing on both harvested (target species) and dependent species (predators) to ensure that the commercial harvesting of Antarctic marine living resources is regulated in accordance with the 'ecosystem approach' embodied in Article II of the Convention.			Y		

KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
Conservation International	http://www.conservation.org/Pages/default.aspx	International	High seas work includes: the identification of threat hotspots; work with businesses like Wal-Mart and McDonald's to help them develop sustainability guidelines for the fish they sell to consumers; partnerships with the cruise industry to help them understand their impact on the oceans and make operational adjustments to protect marine life and coastlines; advising policymakers on effective ways to balance economic necessities with the health of our oceans; development of an innovative fund to support conservation projects focused specifically on marine habitats. Considerations are currently under way to determine CI's role regarding high seas issues.		Y	Y		Y
Convention of Biological Diversity (CBD) Secretariat	http://www.cbd.int/secretariat/role.shtml	International	Established to support the goals of the Convention, including Programme of Work on Protected Areas that includes high seas marine biodiversity and habitats within protected areas; also includes Programme of Work on Marine and Coastal Biodiversity. The CBD Secretariat plays a key role in compiling scientific information in order to inform policy making by the Parties.		Y	Y	Y	
Convention on Migratory Species (Secretariat)	www.cms.int	International	Main objective: to conserve migratory species of wild animals throughout their range by providing strict protection for species and habitats of endangered animals listed in Appendix I and by promoting international agreements for the protection of migratory species that require or would benefit significantly from international cooperation, listed in Appendix II.		Y	Y	Y	
Deep Sea Conservation Coalition (DSCC)	http://www.savethehighseas.org/highseas.cfm	International	The DSCC currently comprises of 67 organisations working together to protect seamounts, cold-water corals and vulnerable deep-sea ecosystems. Through the Save the High Seas programme, The Deep Sea Conservation Coalition (DSCC) is joining forces with this scientific community to calling on the United Nations General Assembly to secure a moratorium on deep-sea bottom trawling on the high seas.	Y	Y	Y		

KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
Foundation for International Environmental Law and Development (FIELD) - Guide to MPAs on the High Seas	http://www.field.org.uk/	International	FIELD is a UK based charity staffed by international environmental lawyers from around the world with professional experience in government, international organisations, environmental campaigning, corporate legal practice and academia. FIELD have a Biodiversity and Marine Resources Programme which includes projects on the high seas.		Y		Y	Y
Fundacion Vida Silvestre Argentina	http://www.vidasilvestre.org.	Regional	In 2003, FVSA created the Marine Programme with the support of WWF. Its mission is to work together with different sectors related to the sea to ensure the sustainable management of ecosystems in the Argentine Sea and South-West Atlantic, for the benefit of present and future generations. Action is divided into the following three modules of work: marine and coastal protected areas, sustainable fisheries and key marine species.	Y	Y			
German Federal Agency for Nature Conservation (BfN)	http://www.bfn.de/themen.html	International National	The BfN advises the Federal Government, provides support for federal development programmes, approves imports and exports of protected animal and plant species, conducts its own research and awards research assignments, provides information about the results of its work. The Marine and Coastal Nature Conservation Programme advises on high seas and MPA issues.		Y	Y		Y
The Global Forum on Oceans, Coasts, and Islands	http://www.globaloceans.org/	International	The Global Forum on Oceans, Coasts, and Islands was created at the World Summit on Sustainable Development (WSSD) 2002 to advance the interests of oceans and islands. A Working Group on High Seas was formed in 2005 prior to the 3rd Global Conference in order to address governance issues in areas beyond national jurisdiction (ABNJ). The Working Group continues as a 'knowledge network' and to consider the need for further research and analytical work. The Forum are also working towards networks of national and high seas MPAs.		Y		Y	Y

KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
Greenpeace International	http://www.greenpeace.org/international/	International	Greenpeace have published two documents of proposed high seas MPAs, namely the 'Marine Protected Areas of the Mediterranean' consisting of 32 sites, many of which include high seas areas, and 'Roadmap to Recovery' – A gap analysis to help identify the marine areas that need immediate protection from over-fishing, destructive fishing, mining and pollution. The resulting 26 proposed sites constitute 40% biological representivity. Greenpeace also play an important policy role in creating high seas MPAs, such as the 3 'Pacific Commons' sites agreed upon in conjunction with the Pacific islands Forum.	Y				
Hotspot Ecosystem Research on the Margins of the European Seas	http://www.eu-hermes.net/	International	HERMES is an international, multidisciplinary research programme bringing together marine scientific experts in order to understand the relationships between biodiversity and ecosystem function. HERMES study sites extend from the Arctic to the Black Sea and include biodiversity hotspots such as cold seep, cold –water coral mounds and reefs, canyons and anoxic environments, and communities forund on ocean slopes. HERMES is a four-year programme due to conclude in April 2009.		Y	Y		
International Council for the Exploration of the Sea (ICES)	http://www.ices.dk/indexfla.asp	International	ICES coordinates and promotes research in the North Atlantic including the adjacent Baltic and North Seas. ICES is responsible for planning and coordinating marine research, advising governments and international regulatory bodies and publishing scientific advice and information in reports.		Y	Y		
International Maritime Organisation (IMO)	http://www.imo.org	International	Includes a comprehensive body of international conventions, supported by hundreds of recommendations governing every facet of shipping. Measures are aimed at the prevention of accidents, including standards for ship design, construction, equipment, operation and manning – key treaties include the International Convention for the Safety of Life at Sea (SOLAS), the International Convention for the Prevention of Pollution from Ships (MARPOL) and the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).				Y	

KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
International Seabed Authority (ISA)	http://www.isa.org.jm/	International	The International Seabed Authority is an autonomous international organization established under the 1982 United Nations Convention on the Law of the Sea and the 1994 Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea. The ISA is the organization through which States Parties to the Convention organize and control activities in the seabed and ocean floor and subsoil of areas beyond the limits of national jurisdiction (the 'Area'), particularly with a view to administering the resources of the Area.				Y	
International Whaling Commission (IWC)	http://www.iwcoffice.org/	International	Created through the International Convention for the Regulation of Whaling to provide for the proper conservation of whale stocks the orderly development of the whaling industry. Led to the creation of Whale Sanctuaries in the Indian and Southern Ocean.		Y	Y	Y	
Marine Conservation Biology Institute	http://www.mcbi.org/	International	Marine Conservation Biology Institute (MCBI) began in 1996 with a new approach: to encourage scientists who want to safeguard the oceans' web of life. Their mission is to advance the science of marine conservation biology and secure protection for ocean ecosystems. The Institute played a lead in a ban on bottom trawling in the high seas. A new programme on the High Seas is currently in development.	Y	Y	Y		
North Pacific Marine Sciences Organisation (PICES)	http://www.pices.int/	Regional	PICES is an intergovernmental organisation established in 1992 to promote and coordinate marine research in the northern North Pacific and the adjacent seas. PICES also aims to advance scientific knowledge about the ocean environment, global weather and climate change, living resources and their ecosystems, and human impacts, as well promoting the collection and rapid dissemination of this information.		Y	Y		

KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
Ocean Biogeographic Information System (OBIS)	http://www.iobis.org/	International	OBIS was established by the Census of Marine Life program (www.coml.org). It is an evolving strategic alliance of people and organizations sharing a vision to make marine biogeographic data, including that of the high seas, freely available over the World Wide Web. It is not a project or programme and is not limited to data from CoML-related projects. Any organization, consortium, project or individual may contribute to OBIS. OBIS provides taxonomically and geographically resolved data on marine life and the ocean environment including high seas; interoperability with similar databases; software tools for data exploration and analysis.		Y	Y		
OSPAR Commission	http://www.ospar.org/eng/html/welcome.html	Regional	The objective of the Commission is to protect and conserve ecosystems and biological diversity of the maritime area which are, or could be, affected as a result of human activities and to restore, where practicable, marine areas which have been adversely affected, in accordance with the provisions of the Convention, including Annex V and Appendix 3.		Y	Y	Y	
UNEP-Regional Seas Programme	http://www.unep.org/regionalseas/default.asp	International	The Regional Seas Programme aims to address the accelerating degradation of the world's oceans and coastal areas through the sustainable management and use of the marine and coastal environment by engaging neighbouring countries in comprehensive and specific actions to protect their shared marine environment. 13 Regional Seas programmes are established and key issues related to the high seas are Marine Protected Areas, Marine Mammal protection and Large Marine Ecosystems (LMEs).		Y		Y	

KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
United Nations Coral Reef Unit	http://coral.unep.ch/	International	The Coral Reef Unit is helping to lead international efforts to save the planet's threatened coral reefs. It works actively with international partners around the world in a concerted effort to reverse coral reef degradation and to increase international, national and local support for coral reef conservation and sustainable use. Includes comprehensive scientific studies on cold-water corals of the high seas.		Y	Y		Y
United Nations Office of Legal Affairs	http://untreaty.un.org/OLA/	International	Providing to States and intergovernmental organizations a range of legal and technical services, such as information, advice and assistance as well as conducting research and preparing studies relating to the United Nations Convention on the Law of the Sea (UNCLOS), the Agreement relating to the implementation of Part XI of UNCLOS and the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UN Fish Stocks Agreement) with a view to promoting a better understanding of UNCLOS and the implementing Agreements.;		Y		Y	
United Nations Shelf Programme	http://www.continentalshelf.org/	International	The UNEP Shelf Programme was established to assist developing States and Small Island Developing States (SIDS) to complete the activities required to delineate the outer limits of the continental shelf. Work will help to define high seas areas and therefore clarify legal and management issues regarding these areas.		Y	Y		
United Nations University	http://www.unu.edu/	International	The mission of UNU is to contribute, through research and capacity building, to efforts to resolve the pressing global problems that are a concern of the United Nations, its Peoples and Member States. An oceans-related programme that will include a high seas focus is currently in development.		Y	Y		

KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
United Nations-World Conservation Monitoring Centre (UNEP-WCMC)	http://www.unep-wcmc.org/	International	UNEP-WCMC links biodiversity knowledge with policy decisions and has expertise in managing data, knowledge, mapping and analyses. Two key programmes, Protected Areas and One Ocean, combine expertise to assist with the development of high seas MPAs. The WCMC seeks to synthesise, analyse and disseminate marine and coastal biodiversity knowledge. It liberates and gives direct, applied marine MPA data and knowledge in order to assist UNEP and partners with emerging issues of importance for the marine environment, such as climate change, regular assessment of the marine environment, the high and deep seas, 2012 MPA target, marine bio-prospecting, etc.		Y	Y		Y
World Conservation Union (IUCN) - Global Marine Programme	http://www.iucn.org	International	The IUCN Global Marine Programme provides expertise and advice on the following themes that impact the high seas: Conserving Threatened Species; Energy and Industry; Fisheries and Aquaculture; Managing Marine Invasive Species; Marine Protected Areas (MPAs) run by the World Commission on Protected Areas (WCPA) High Seas MPA Task Force; and Ocean Governance.			Y		Y
WWF	http://www.panda.org/	International	WWF's Global Marine Programme has created a High Seas Initiative which focuses on creating an action plan for high seas MPAs, creating MPAs (WWF has played a pivotal role in the progress of HSMPAs in the North-East Atlantic), protection from industrial exploitation, and raising awareness. Other foci include sustainable fisheries involving work with fishermen and local communities, commissioning and publishing impartial data, developing political advice for governments, campaigning through the media, lobbying decision-makers, and championing sustainable livelihoods and the conservation of our oceans and coasts.	Y	Y	Y		

Annex 9. INSTITUTIONS RELATED TO THE PROTECTION OF THE HIGH SEAS								
KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
Secretariat for the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas	http://www.ascobans.org/index.html	Regional	ASCOBANS was signed on 17 March 1992 in order to address the threats to the conservation of cetaceans in the Baltic and North Seas. The Agreement was concluded under the auspices of the Bonn Convention on the Conservation of Migratory Species and, as such, was the first agreement to be adopted under the Bonn Convention concerning the conservation of cetaceans. It entered into force on 29 March 1994. The basic purpose of ASCOBANS is to promote close cooperation in order to achieve and maintain a favourable conservation status for small cetaceans in the Baltic and North Seas.		Y	Y		Y
Australian Conservation Foundation	http://www.acfonline.org.au/	National	ACF is working to broaden its campaign commitment to marine and coastal conservation and increase community awareness about and their protection. Ongoing efforts on marine national parks, oceans legislative reform and regional marine planning will also increase efforts for high seas protection in the face of overfishing, marine pollution, inappropriate coastal development, introduced marine pests and threats associated with the oil and gas industry.	Y	Y			Y
Blue Oceans Institute	http://www.blueocean.org/	International	The Blue Ocean Institute works to inspire a closer relationship with the sea through science, art, and literature. Programmes that affect the high seas include bycatch reduction and sustainable seafood.	Y	Y	Y		
Centre for International Environmental Law	http://www.ciel.org	International	The Center for International Environmental Law (CIEL) is dedicated to using international law and institutions to protect global environment and human health while promoting sustainable development. CIEL is currently conducting work on trade and other issues related to protecting marine living resources and on the ratification by the United States of the UN Convention on the Law of the Sea.				Y	

KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
Centro Ecoceanos	http://www.ecoceanos.cl (Spanish)	International National	Centro Ecoceanos for Conservation and Sustainable Development is an independent, non governmental, non-profit organization. Based in Chile, working to promote conservation and sustainable management of coastal and ocean ecosystems, the strengthening of public participation in decision-making related to those ecosystems, and the sustainable development of artisanal fisheries and local costal communities. Centro Ecoceanos actively supports the Deep Sea Conservation Coalition's call for a moratorium on bottom trawling activities on the high seas.	Y	Y	Y		
Deepwave	http://www.deepwave.org	International	DEEPWAVE was founded in the spring of 2003 in order to develop and enforce environmental tools to protect the ecosystem of the high and deep seas. Work includes education, political engagement, scientific research and its dissemination.	Y	Y	Y		Y
German Research Consortium (KDM)	http://www.deutsche-meeresforschung.de/en/home_en.htm	National	KDM - the German Marine Research Consortium is made up of thirteen institutions and universities of Germany in the field of marine and polar sciences as well as coastal research. The members are part of a European and global network of such institutions. With approximately 2,200 scientists of basic and applied marine research, KDM provides comprehensive expertise to meet global challenges having to do with the sea and our environment. Projects include the European Seafloor Observatory Network (ESONET) which includes high seas areas.		Y	Y		

KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
George Institute for Biodiversity and Sustainability (GIBS)	http://www.GIBSconservation.org	International	GIBS is dedicated to the conservation of nature, focusing on selected marine ecosystems such as cold-water coral reefs, deep-sea, pelagic ecosystems, seamounts and deep-sea coral habitats. GIBS is working, inter alia, to facilitate the establishment of Marine Protected Areas and to conduct original research on deep-sea coral reefs. GIBS collaborates with NGOs and Government Organisations to implement ecosystem based fisheries management (EBFM) in the high seas and EEZs.			Y		
Humane Society International (HIS)	http://www.hsus.org/about_us/humane_society_international_hsi/	International	The Humane Society of the United States is the nation's largest and most effective animal protection organization. One of their campaigns is concerned with protecting marine mammals and their habitats, including in the high seas.	Y	Y			
International Dolphin Conservation Programme (IDCP)	http://www.intfish.net/orgs/other/idcp.htm	International	IDCPs objectives are to progressively reduce incidental dolphin mortalities to levels approaching zero; to seek ecologically sound means of capturing large yellowfin tunas not in association with dolphins; and to ensure the long-term sustainability of the tuna stocks in the Agreement Area (Eastern Pacific Ocean including high seas areas), as well as that of the marine resources related to this fishery.			Y	Y	
International Ocean Institute (IOI)	http://www.ioinst.org/	International	As a non-governmental body with consultative status at the United Nations, the International Ocean Institute works to uphold and expand the principles enshrined in the United Nations Convention of the Law of the Sea – namely that the seabed and the oceans are the common heritage of humankind and that all benefits are distributed.	Y	Y	Y		

KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
Living Oceans Society	http://www.livingoceans.org/	National	Living Oceans Society is a marine conservation organization based in the fishing village of Sointula, British Columbia. Supporting ecosystem-based management, healthy oceans and healthy coastal communities and bans on high seas bottom trawling.	Y				
National Oceanic and Atmospheric Administration (NOAA)	http://www.noaa.gov	International	NOAA's scientists use research and high-tech instrumentation to provide decision makers with reliable information they need. Data includes daily weather forecasts, severe storm warnings and climate monitoring, fisheries management, coastal restoration, and marine commerce. Relevant international programmes include the MPA Center and Sanctuaries.		Y	Y		
Natural Resource Defense Council (NRDC)	http://www.nrdc.org/	National	NRDC is a national environmental action group, incorporating 1.2 million members and 350 lawyers, scientists and other professionals. Work for the protection of the high seas includes a moratorium on bottom trawling, the establishment of 'safe zones' for wildlife, and sustainable fisheries.	Y				
The Nature Conservancy (TNC)	http://www.nature.org/	International	TNC are working on an Ecosystem Based Management approach (EBM) at ecological scales that are helping to develop marine ecoregions and large marine ecosystems. That can inform management decisions, for example, the creation of MPAs in the high seas.	Y	Y	Y		Y
North Atlantic Marine Mammal Commission (NAMMCO)	www.nammco.no	Regional	To contribute through regional consultation and cooperation to the conservation, rational management and study of marine mammals in the North Atlantic.			Y		Y
Oceana	http://www.oceana.org/	International	An NGO, Oceana campaigns to protect and restore the world's oceans. The team of marine scientists, economists, lawyers and aims to influence policy changes to reduce pollution and to prevent the collapse of fish populations, marine mammals and other sea life.	Y				Y

KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
Scott Polar Research Institute	http://www.spri.cam.ac.uk/	Regional	The Institute, part of the University of Cambridge, is a well-known and long-established centre for research into both polar regions. Several research groups investigate a range of issues in the environmental and social sciences with relevance to the Arctic and Antarctica, including the high seas.				Y	
Sea At Risk	http://www.seas-at-risk.org/	International	The European association of non-governmental environmental organisations working to protect and restore to health the marine environment of the European seas and the wider North East Atlantic. Issues include bottom trawling and destructive fishing practices on the high seas.		Y	Y		

Annex 10. INSTITUTIONS RELATED TO THE FISHERIES SECTOR

KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
Asia-Pacific Fisheries Commission (APIC)	http://www.apfic.org/	Regional	The main objective of APFIC is to promote the full and proper utilization of living aquatic resources of the Asia Pacific area by the development and management of fishing and culture operations and by the development of related processing and marketing activities in conformity with the objectives of its members.				Y	
FAO Fishery Committee for the Eastern Central Atlantic (CECAF)	http://www.fao.org/fishery/rfb/cecaf	International	The purpose of the Committee is to promote the sustainable utilization of the living marine resources within its area of competence by the proper management and development of the fisheries and fishing operations. Published report of the workshop on Vulnerable Marine Ecosystems (VME) in February 2008, for their identification (via vulnerability to certain fishing activities) and their subsequent management.				Y	

KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
The Fisheries Secretariat	http://www.fishsec.org	International	The Fisheries Secretariat is a non-profit organisation working towards sustainable fisheries in Europe and worldwide including the high seas. The Stockholm-based Secretariat was set up in 2003 by three environmental NGOs: The Swedish Society for Nature Conservation, WWF Sweden and The Swedish Anglers' Association with governmental support. The Secretariat is working towards more sustainable fisheries through information, international co-operation and lobbying at an international level, but with a focus on the European Union.	Y	Y			Y
High Seas Task Force	http://www.high-seas.org/	International	Representing the fishing industry, the High Seas Task Force was established in 2003 to set priorities among a series of practical proposals for confronting the challenge of illegal, unreported and unregulated (IUU) fishing on the high seas. Members comprise Ministers, other key stakeholders from NGOs, philanthropic foundations, institutes and business, and include the Earth Institute, IUCN-World Conservation Union, WWF International and the Marine Stewardship Council.				Y	Y
Pacific Salmon Commission (PSC)	http://www.intfish.net/orgs/fisheries/psc.htm	Regional	The main objectives of the Treaty are the conservation, research, and rational management of Pacific salmon stocks.		Y			Y
Permanent Commission for the South Pacific (CPPS)	http://www.intfish.net/orgs/fisheries/cpps.htm	Regional	The main objective of the Commission is to obtain the greatest benefits from the conservation, protection and regulation of the utilization of the natural resources off the coasts of party States up to the 200-mile limit, including managing shared stocks in the extended zone in the areas adjacent to their respective EEZs.		Y	Y	Y	

KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
Regional Commission for Fisheries (RECOFI)	http://www.fao.org/world/regional/rne/statut/region/page57/page57_en.htm	Regional	The RECOFI convention area is situated in the Persian Gulf and the Gulf of Oman. It promotes the development, conservation, rational management and best utilization of living marine resources, as well as the sustainable development of aquaculture in the area covered by the Commission.				Y	
Regional Fisheries Management Organisations (RFMO)		Regional	15 RFMOs exist with a mandate to sustainably manage the regions' fisheries resources. (see Appendix ….High Seas Legal Mechanisms for comprehensive list).		Y		Y	
Southwest Indian Ocean Fisheries Commission (SWIOFC)	http://www.intfish.net/orgs/fisheries/swiofc.htm	Regional	SWIOFC was established in November 2004 by Resolution 1/127 of the FAO Council and under Article VI(1) of the FAO Constitution as a regional fisheries advisory body for coastal States in the South West Indian Ocean region.				Y	
Southern Indian Ocean Deepwater Fishers' Association (SIODFA)	http://www.scoop.co.nz/stories/BU0607/S00061.htm	Regional	SIODFA is committed to biologically-sustainable and economically-viable commercial fishing operations in the southern Indian Ocean. The benthic protected areas declared by Southern Indian Ocean Deepwater Fishers' Association (SIODFA) are a global first as no such zones in the high seas existed prior to this announcement.				Y	
Sub-Regional Commission on Fisheries (SRCF)	http://www.intfish.net/orgs/fisheries/srcf.htm	Regional	The SRCF convention area is situated in the East-Central Atlantic Ocean. The main objective of the Commission is to harmonize the long-term policies of member States in the preservation, conservation and exploitation of the fisheries resources for the benefit of the member States.		Y		Y	

KEY INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	Focus				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
Western Indian Ocean Tuna Organisation (WIOTO)	http://www.intfish.net/orgs/fisheries/wioto.htm#des	Regional	The Organization's objectives are: harmonization of policies with respect to fisheries; relations with distant water fishing nations; fisheries surveillance and enforcement; fisheries development; and reciprocal access to EEZs of other members. The Organization does not have regulatory powers.		Y			
Western Central Atlantic Fishery Commission (WECAFC)	http://www.fao.org/fishery/rfb/wecafc	Regional	WECAFC was established in 1973, under Article VI of the FAO Constitution, to assist in international cooperation efforts for the conservation, development and utilization of all living resources - shrimp in particular - in the Western Central Atlantic. The main objectives of WECAFC are: to facilitate the coordination of research, encourage education and training, and assist its members in establishing policies to promote the rational management of resources that are of interest for two or more countries. The Commission has the competence to deal with all living marine resources occurring within the Commission area, including high seas stocks, although in practice it has almost exclusively concerned itself with in-zone fisheries issues.		Y		Y	

Annex 11. SELECTION OF MAJOR FUNDING BODIES FOR HIGH SEAS RESEARCH

INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	FOCUS				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
The David and Lucile Packard Foundation	http://www.packard.org/home.aspx	International	The David and Lucile Packard Foundation was created in 1964 by David Packard (1912–1996), the co-founder of the Hewlett-Packard Company. Funding is available for high seas projects with a focus on sustainable marine fisheries projects, ecosystem-based management, targeted marine research, and linking science to policy.		Y			
Global Environment Facility	http://www.gefweb.org/	International	As the financial mechanism of the Convention on Biological Diversity (CBD), the Global Environment Facility (GEF) helps developing countries and countries with economies in transition to achieve the objectives of the CBD and generate global environmental benefits in the area of biodiversity. Between 1991 and 2006, the GEF provided approximately $2.2 billion in grants (over one third of total grants), and leveraged about $5.17 billion in cofinancing in support of more than 750 biodiversity projects in 155 countries. In addition to a Biodiversity programme, the GEF also funds an International Waters programme including sustainability of the high seas.		Y			
The Gordon and Betty Moore Foundation	http://www.moore.org/	International	The Moore Foundation funds projects in three main themes, one of which is environmental conservation. Funded high seas marine projects include: Wild Salmon Ecosystems Initiative; Conservation International Wal-Mart and McDonalds projects; and case-by-case special projects.		Y			
International Seabed Authority (ISA) Endowment Fund.	http://www.isa.org.jm/en/efund	International	The ISA Fund's purpose is to promote and encourage the conduct of marine scientific research in the Area (the seabed and ocean floor and subsoil of areas beyond the limits of national jurisdiction) and to increase the capacity of scientific participation in developing countries through training, technical assistance and scientific cooperation programmes.		Y			

INSTITUTION	URL	POLITICAL SCOPE	RELEVANCE TO HIGH SEAS MARINE BIODIVERSITY	FOCUS				
				Advocacy	Capacity Building/ Education	Data Manage-ment/ Research	Law/ Govern-ance	Policy
J.M. Kaplan Fund	http://www.jmkfund.org/programs_worldwide.html	International National	The Fund supports a small number of multinational approaches to the conservation of the atmosphere and the high seas.		Y			
Natural Environment Research Council (NERC)	http://www.nerc.ac.uk/	International	NERC funds world-class science in universities and research centres that increases knowledge and understanding of the natural world with emphasis on climate change, biodiversity and natural hazards. Includes the Antarctic Funding Initiative and the Ocean 2025 research programme concerned with the sustainable management of high seas resources.		Y			