GOBI
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EBSAs: A scientific and technical process

Welcome to the autumn edition of the GOBI newsletter. This issue reflects a range of recent scientific publications of interest to Convention on Biological Diversity's process for describing Ecologically or Biologically Significant Areas (EBSAs). Synopses of a number of these papers are presented here, including an assessment of how the seven criteria for describing EBSAs could be applied to seamounts in the South Pacific, and how the resultant data could be collectively assessed to ensure rigorous and comprehensive coverage (see article by Malcolm Clark, p2). Chemosynthetic ecosystems that have evolved along the world's mid-ocean ridges pose particular problems for conservation since they form patchy colonies of endemic species that vary from place to place. The outcomes of a workshop to define a conservation strategy for such ecosystems are presented by Cindy van Dover (p4).

Parts of the deep ocean remain less well known than parts of the moon, and what is known is often fragmented and not synthesised into a coherent picture. Going some way towards filling this gap, a new global seafloor geomorphic map has been produced that draws on data from many sources (see article by Macmillan-Lawler et al., p6). This will provide a useful basis for developing assessments of habitat distribution and reviewing the representativity of protected areas and EBSAs. Results of this research show that features in more remote and deeper regions of the oceans are less well protected.

The use of physical data such as bathymetry, temperature and biological productivity, combined with what is known of biological communities, has been used in the Southern Ocean to define benthic assemblages at a variety of scales (see article by Kaiser et al., p9). Results show that there are many gaps in the coverage of MPAs in this region that could be filled, given political will.

Marine Protected Areas are of course only useful if they are effective, and a recent study has looked into the value of MPAs on temperate and tropical reefs (see article by Stuart Kininmonth, p8). This study, published in the journal *Nature*, showed that for MPAs to be effective they must be i) no-take, ii) enforced, iii) old (established for more than 10 years), iv) large (more than 100 km^2), and v) isolated. The article by Steve Rocliffe (p11) shows that citizens can take management of marine resources into their own hands and, with a little help, set up Locally Managed Marine Areas (LMMAs) in coastal areas, such as the examples described off Madagascar.

Our final article describes the history of the proposal for a stand-alone goal for oceans and seas to become one of the Sustainable development Goals of the United Nations. Discussions on this will take place at the 69th UNGA in 2014 and conclude in September 2015.

Phil Weaver
GOBI Science Coordinator

Small-scale fisheries support the livelihoods of over 500 million people worldwide. Image Blue Ventures / Garth Cripps.

An update on seamount EBSAs

Malcom Clark, NIWA, New Zealand

The Convention on Biological Diversity (CBD) has adopted a process of using scientific criteria for describing 'Ecologically or Biologically Significant Marine Areas' (EBSAs) in open-ocean and deep-sea habitats. EBSAs are defined using seven criteria: 1) uniqueness or rarity; 2) special importance for life-history stages; 3) importance for threatened, endangered or declining species and/or habitats; 4) vulnerability, fragility, sensitivity, or slow recovery; 5) biological productivity; 6) biological diversity, and 7) naturalness.

These criteria are very broad, with differing levels of relevance in certain environments or locations, and there is limited guidance available on how to assess multiple criteria. Although EBSAs do not necessarily imply that a management response is required, they were initially intended to provide the basis for a network of protected areas, and it is likely that environmental managers will in the future use EBSAs to select sites for some form of management.

To date, EBSA description has been driven mainly by expert opinion collated during regional workshops (see GOBI Newsletter, October 2013), but there is also a need for an objective and transparent process to assist managers if they are faced with a large number of proposed EBSA descriptions. This need was recognised by GOBI back in 2010 and a workshop was held under the auspices of the GOBI Benthic Group and the Census of Marine Life on Seamounts (CenSeam) to develop such a method to describe candidate EBSAs using seamounts in the South Pacific Ocean as a test habitat (see GOBI Newsletter, October 2012). This approach has since been updated and published (Clark et al. 2014).

The method involves four main steps: 1) identify the area to be examined; 2) determine appropriate datasets and thresholds to use in the evaluation; 3) evaluate data for each area/habitat against a set of criteria, and 4) identify and assess candidate EBSAs.

Several options for various combinations of criteria were examined, with one being proposed as the most appropriate to identify a tractable number of seamounts that satisfied the EBSA criteria and which could be combined into larger areas that represent meaningful ecological and practicable management units. This option selects seamounts that meet any one of the 5 biological criteria (i.e. unique/rare, diverse, productive, threatened species, critical habitat) and which contain environmental features that are vulnerable to human activities but not yet significantly impacted by them.

A worked example is presented, which enables the method to be easily understood and followed with any set of data from any area and habitat. Although the example did not utilise all available data, and was primarily to evaluate the utility of the approach, the selection process resulted in 83 seamounts being identified from over 3000 evaluated.

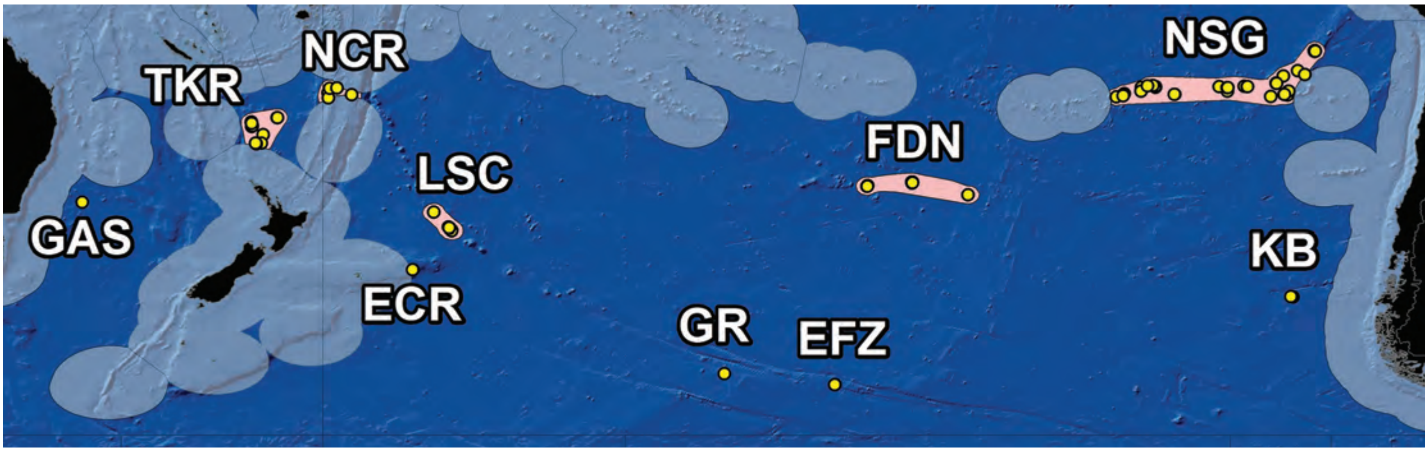

Figure 1: Map of the South Pacific study region showing seamounts and seamount areas identified as candidate EBSAs. Areas shown are Nazca Ridge and Sala y Gomez Seamount Chain (NSG), Three Kings Ridge (TKR), Foundation Seamount (FN), Louisville Seamount Chain (LSC), North Colville Ridge (NCR), Karasev Bank (KB), East Chatham Rise (ECR), Eltanin Fracture Zone (EFZ), Gascoyne Seamount (GAS), and Geracyl Ridge (GR).

The priority seamounts grouped into 10 areas, consisting of 5 clusters of seamounts, and 5 individual seamounts (Figure 1). The transparent and logically sequential approach enables the relative contribution of each of the EBSA criteria to be visually displayed, making assessment by managers and the public alike easy to interpret. It can be used to assess the "values" of each candidate area, and also how multiple areas link to represent as many criteria as possible (and which characteristics are missing).

The South Pacific seamounts example (Figure 2) illustrates that each of the 10 candidate areas satisfied from 1 to 4 of the biological criteria, but the proportions of seamounts for each criterion varied. This information can be used to further refine the selection of the candidate EBSAs that could form a regional network that satisfies as many of the biological criteria as possible, as well as the number of seamounts.

A data-driven selection process has the potential to complement an expert approach. Two of the areas identified by our worked example have also been identified through the CBD Pacific regional workshops in 2011 and 2012: the Louisville Ridge, and the Nazca Ridge and Sala y Gomez Seamount Chain. Both these areas have been identified partly based on their benthic features. This concordance suggests that the data-driven approach could strengthen the justification of candidate EBSA selection, reduce possible criticism from conflicting stakeholders and improve uptake of the results by environmental managers. In a global EBSA context we hope it can be a useful tool to assist deep-sea management.

Reference: Clark, M.R.; Rowden, A.A.; Schlacher, T.; Guinotte, J.; Dunstan, P.; Williams, A.A.; O'Hara, T.; Watling, L.; Niklitschek, E.; Tsuchida, S. (2014). Identifying Ecologically or Biologically Significant Areas (EBSA): a systematic method and its application to seamounts in the South Pacific. Ocean and Coastal Management 91: 65–79.

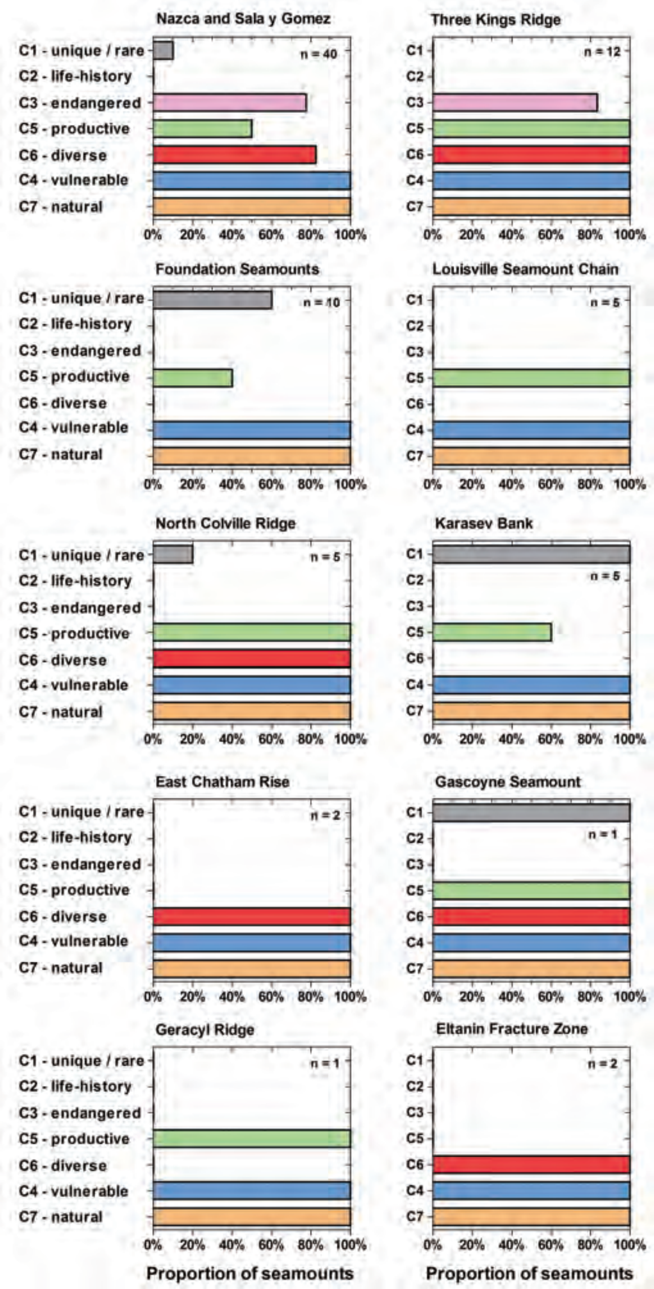

Figure 2 (above right): Bar charts showing the relative contribution of each EBSA criterion to the overall identification of candidate EBSAs for seamounts. Below left: Stony coral Solenosmilia variabilis *at 1000 m on the summit of a small seamount on the Chatham Rise, east of New Zealand. Below right: Benthic assemblage of stony coral, brisingid seastars, sea urchins, and feather stars at 1200 m depth on Forde Seamount, Louisville Seamount Chain. Both images courtesy NIWA, New Zealand.*

The Dinard Guidelines: A conservation strategy for chemosynthetic ecosystems

Clindy Lee Van Dover, Nicholas School of the Environment, Duke University, USA

Deep-sea chemosynthetic ecosystems include hydrothermal vents associated with volcanic spreading centers and seamounts, seeps that occur in a variety of geological contexts (e.g., salt diapirs, mud volcanoes, depositional canyons, continental slopes) of active and passive continental margins, and whale falls. They are patchy habitats characterised by food webs based on microbial primary production using chemical energy (chemosynthesis) rather than photosynthesis.

Human activities with potential for significant adverse effects on chemosynthetic ecosystems, such as bottom trawling and extraction of oil, gas, and minerals, should be undertaken with recognition of multiple values of these ecosystems and with appropriate conservation strategies in place. The Dinard Guidelines highlight a spatial approach to conservation through establishment of networks of Chemosynthetic Ecosystem Reserves. These networks would contribute to conservation goals of protecting the natural diversity and the ecosystem structure, function, and resilience of seep and vent ecosystems, while enabling exploitation of associated mineral or oil and gas resources.

Chemosynthetic ecosystems in the deep sea were first reported in the late 1970s and are considered to be among the greatest scientific discoveries of the 20th century (Garwin & Lincoln, 2003). Study of chemosynthetic ecosystems continues to include an exploration and discovery phase, including the recent discovery of hundreds of seeps off the eastern seaboard of the United States (Skarke et al. 2014). This latest discovery underscores the advancing character of deep-sea science - it is a field where there are frequent and exciting new insights into the way we think about the diversity of life and the manner in which life adapts to extreme environments, and about biological, chemical, and geological processes and dynamics at evolutionary and ecological timescales in the deep ocean.

The value of chemosynthetic ecosystems to science is evident in the abundant, international, interdisciplinary, and high-impact scientific literature on, for example, hydrothermal vent systems and by the number (many hundreds) and worldwide distribution of scientific cruises to vent sites (Godet et al., 2011). Popular interest in chemosynthetic ecosystems is measureable by their coverage in documentary programming, including National Geographic, IMAX, BBC, and Discovery Channel productions. The value of vents and seeps is not just scientific and cultural in nature; many of these systems also have an associated resource values and these different values need to be taken into account when making decisions about resource management in the oceans. Much of the world's population relies on resources from the oceans, and there are existing resource activities, such as oil and gas exploitation and bottom trawling, and pending activities, including mineral extraction, that have potential to impact chemosynthetic ecosystems (Baco et al., 2010).

Above: Tu'i Malila hydrothermal vent field, Lau Basin, where snail- and mussel-dominated vent communities of tremendous interest to science occur on copper-, silver-, and gold-rich sulfide deposits of interest to the mining industry. Watercolor illustration by Karen Jacobsen, In Situ Science Illustration.

Dinard Guidelines for Chemosynthetic Ecosystem Reserves

Human activities with potential for significant adverse effects at chemosynthetic ecosystems in national and international waters should be undertaken with recognition of multiple values of these ecosystems in mind and with appropriate conservation strategies in place that allow these ecosystems and their biodiversity to be maintained while enabling the rational use of resources (Mengerink et al. 2014). The Dinard Guidelines (Van Dover et al., 2011, 2012) call for a systematic spatial approach to the design of Chemosynthetic Ecosystem Reserves (CERs) that:

i) Identifies areas of particular scientific and ecological interest (those that meet the Convention on Biodiversity criteria for Ecologically and Biologically Significant Areas or are otherwise of particular scientific, historical, or cultural importance);

ii) Defines the regional framework for protection of biodiversity (natural management units, i.e. biogeographic provinces and bioregions);

iii) Establishes the expected distribution patterns of chemosynthetic habitats to provide a spatial framework for capturing representativity;

iv) Establishes replicated networks of reserves within bioregions, using guidelines for size and spacing of CERs to allow for exchange of larvae between sites (connectivity);

v) Defines human uses and levels of protection for each CER to achieve conservation goals while enabling responsible use of resources.

Designation of CERs should thus consider information on benthic resource quality as well as their contribution to science, conservation, cultural, and other stakeholder community values. The Dinard Guidelines further elaborate management strategies for CERs, including prescriptive criteria to trigger closer monitoring or cessation of activities that jeopardise conservation goals within a bioregion and use of a two-level approach for establishing CERs: i) select CER sites of extraordinary stand-alone value; ii) fill in the 'gaps' with additional sites to establish replicated networks of CERs.

For seafloor mineral resources of chemosynthetic ecosystems in international waters, where there exists an opportunity to establish a regulatory framework for reserve networks before exploitation begins, the International Seabed Authority or other competent body should adopt the Dinard Guidelines or their derivatives. In areas under national jurisdiction, where valuable fisheries and oil and gas industries already exist, the way forward must involve raised awareness of the scientific and biodiversity value of chemosynthetic ecosystems and creation or amendment of policies and guidelines, including establishment of networks of Chemosynthetic Ecosystem Reserves designed to promote responsible use of resources. The Dinard Guidelines may be applied to conservation and multi-use strategies for other patchy deep-sea environments, such as seamounts and deep-water coral reefs.

Acknowledgements

This report derives from products of the 2010 Dinard Workshop and acknowledges the important contributions of the workshop participants and sponsors.

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A new global seafloor geomorphic features map

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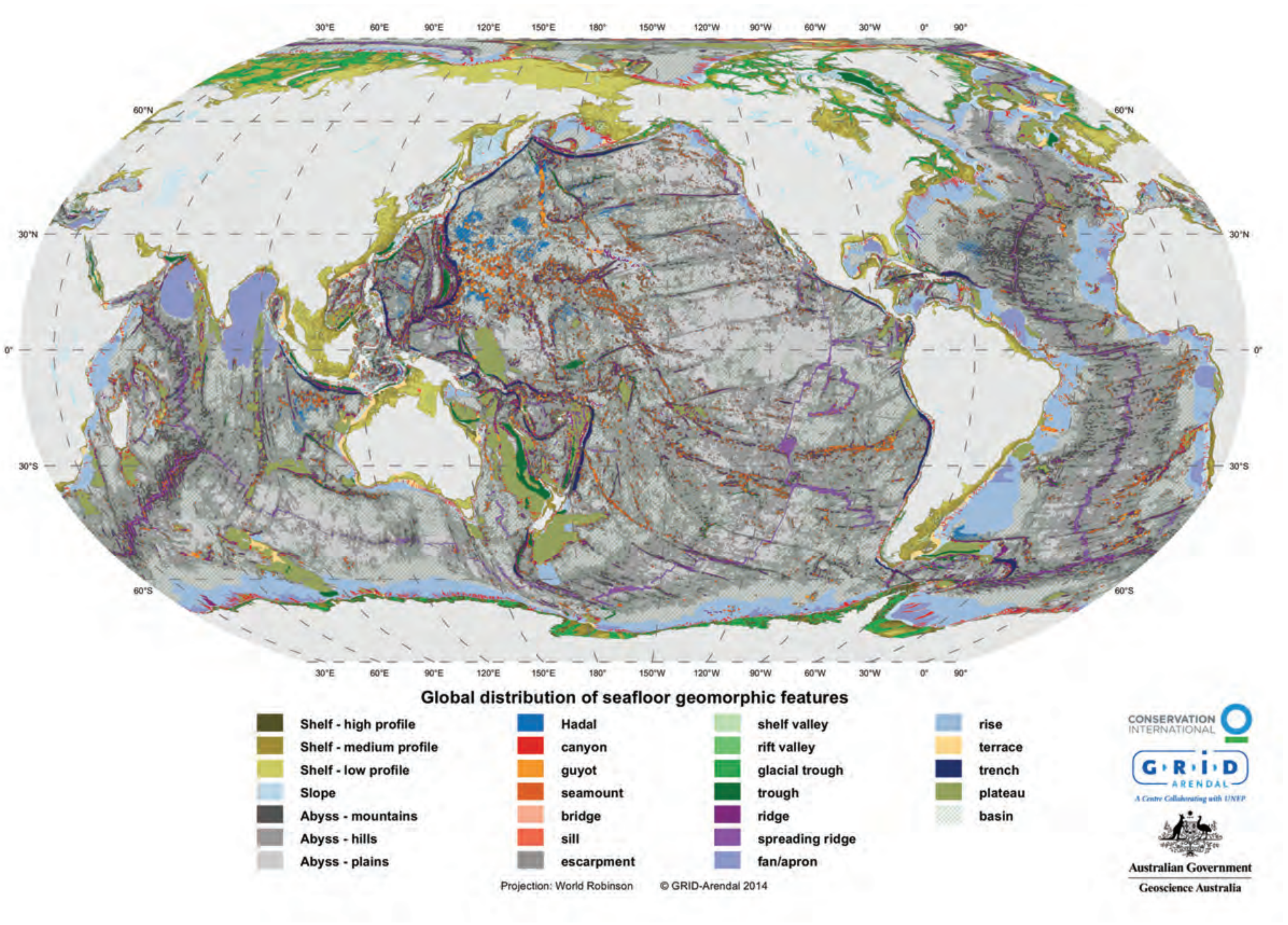
A new global seafloor geomorphic features map (below) has recently been published through collaboration between GRID-Arendal, Geoscience Australia and Conservation International. This map represents the first new global seafloor geomorphic features map in over 30 years. The map includes 131,192 separate polygons in 29 geomorphic feature categories. It consists of four base layers, the continental shelf, slope, abyss and hadal, upon which other geomorphic features have been mapped, including seamounts, guyots, ridges, valleys, canyons, and plateaus. The new map has application for both scientific research and ocean management.

The distribution of seafloor features is a useful surrogate for biodiversity and, importantly, one that can be mapped across a broad scale. The new global seafloor geomorphic features map has provided insight into the distribution of seafloor features on both the global, regional and national scales which can be used to help improve marine management. Each of the major ocean basins are characterised by a different composition of geomorphic features. For example the South Pacific Ocean is characterised by a small proportion of continental shelf (less than 3%) and a large proportion of abyss (93%), while the Arctic Ocean is the opposite (52% and 41% respectively). Certain features are more common in the different ocean basin; for example seamounts are most common in the North Pacific Ocean (nearly 4% compared to a global average of 2.2%), escarpment (areas of steep seafloor) are most common in the Mediterranean and Black Seas (8% compared to a global average of 5.8%), fans are most common in the Indian Ocean



(6% compared to a global average of 2.3%), and glacial troughs are most common in the Southern Ocean (40% compared to a global average of 11%). Similarly, trends exist between national jurisdictions, with a different composition of seafloor features present in each nation's jurisdiction.

These differences in the seafloor features between oceans and between nations are an important consideration for ongoing marine management, especially given the increasing push for marine spatial planning and area-based management. To highlight some of these important differences the distribution of global seafloor geomorphic features has been used to assess the representativeness of global marine protected areas (MPAs). Assessing the representativeness of MPAs is important for ensuring that the Convention on Biological Diversity Aichi Target 11 is met not just in terms of area of ocean conserved, but also in terms of ensuring areas of particular importance for biodiversity and ecologically representative areas are included.

Preliminary analysis suggests that currently all geomorphic features are represented at less than 10% of their area, with many, such as the abyssal plains, rises and fans represented at less than 1% cent of their area. Even the most well-represented feature, the trenches, which are represented at 8.5% of their area, are in fact only well represented in two of the ocean basins, the South Atlantic and the South Pacific. Further the representation of the trench features in the South Atlantic and South Pacific comes mainly from a single large protected area in each ocean basin. The analysis also highlighted that features that were more characteristically found in areas beyond national jurisdiction were generally less well represented that those within national jurisdictions. Using seafloor geomorphology to examine the representativeness of existing MPAs can help identify gaps in the existing MPAs coverage. This type of analysis can help guide countries and regions to set and meet their conservation objectives.

The global seafloor geomorphic features map has also been used to examine the effect of geological processes on shaping the modern day seafloor. The map allows quantitative assessments of differences between passive and active margins, with the continental shelf width of passive margins (88 km) shown to be nearly three times that of active margins (31 km)and the average width of passive margin slopes (46 km) greater than the width of active margin slopes (36 km). The active margin slopes were found to have more escarpments (where the gradient exceeds 5 degrees) than passive margin slopes, escarpment on active margin slopes cover an area of 3.4 million km^2, compared with 1.3 million km^2 on passive margin slopes. Finally, there is more continental rise adjacent to passive margins (27 million km^2) compared to active margins (less than 2.3 million km^2).

Since its release the map has been utilised in a number of projects additional to those outlined above. The International Seabed Authority has identified a number of areas of particular environmental interest (APEIs) in the Clarion-Clipperton Fracture Zone. These APEIs were assessed using the map to examine if they were representative of the seafloor within the region. The map has also been used to inform marine planning in the south-west Pacific as part of the Pacific Ocean Ecosystem Analysis project (PACIOCEA), a project jointly run by the French MPA Agency (AAMP) and the Secretariat of the Pacific Regional Environment Programme (SPREP). Finally, the map has been used in several of the recent EBSA workshops to help refine the distribution of ecologically and biologically important areas.

The global seafloor geomorphic features map and accompanying analysis has been published in the 50th anniversary edition of Marine Geology. The paper 'Geomorphology of the Oceans' (Harris et.al. 2014) can be downloaded freely from the Marine Geology website: www.sciencedirect.com/science/article/pii/S0025322714000310

The spatial data from the map have been released under the Creative Commons license to make the data open and freely available. To date the data have been downloaded over 150 times since release for a range of uses including research, teaching, deep seas conservation and marine spatial planning. The data are available for download from the blue habitats web site: www.bluehabitats.org

For further Information contact Peter Harris (peter.harris@grida.no)

Reference: Harris, P.T., Macmillan-Lawler, M., Rupp, J. and Baker, E.K. 2014. Geomorphology of the oceans. Marine Geology, 352: 4-24.

Global study of marine protected areas reveals critical features and troubled fish populations

Stuart Kininmonth, Stockholm Resilience Centre, Stockholm University

In recognition that over-fishing around the world is causing unsustainable pressure on the marine environment there is a global commitment to protect 10% of the coastal waters through marine protected areas by 2020. If these protected areas substantially modify the fishing behavior then we should expect to see a change in the fish populations. This change, at the most basic level, should be the amount of fish present in the reserve as measured by the biomass.

But is this really the case for the existing reserves? A team led by Professor Graham Edgar and Dr Rick Stuart-Smith has recently published in *Nature* the findings from a worldwide survey of temperate and tropical reefs with surprising conclusions. The University of Tasmania's 'Reef Life Survey' programme engaged highly-trained citizen scientists to collect abundance counts of 2,544 species on 1,986 sites around the world, including 87 marine protected areas. For each reserve they were able to examine the type of fishing regulations, level of enforcement, the age of establishment, the area and the isolation. It should be noted that isolation relates to the reserve boundary encompassing the entire habitat used by that marine population rather than distant from human populations. To measure the impact eight fish metrics were used: species richness for all fish and just large (greater than 25cm) fish, biomass of all fish, large fish, sharks, groupers, jacks and damselfishes.

The results can only be described as the good, the bad and the ugly. The conservation benefit of reserves increased exponentially with the accumulation of the five key features, namely i) no take, ii) enforced, iii) old (more than ten years), iv) large (more than 100 km^2) and v) isolated (denoted as NEOLI). Good news indeed for marine planners in that properly implemented reserves really do work. However the bad news is that 59% of reserves surveyed had only one or two NEOLI features and were indistinguishable from the neighbouring fished areas. Better design and implementation is needed for reserves to be successful.

The ugly aspect of the study was that total fish biomass has declined by an estimated two-thirds from historical baselines. Sharks, in particular, have suffered a 93% decline in biomass. Conservation aspirations demand a refugial network of effective reserves if the impacts of population increases are to be mitigated. Further analysis will address connectivity effects and observed changes in trophic structure. Citizen science is clearly a powerful research tool when properly conducted and the work by the Reef Life Survey team gives both hope and cause for concern.

Reference: Edgar et al. (2014) Global conservation outcomes depend on marine protected areas with five key features. Nature 506, 216-220.

Reef Life Survey volunteer conducting the 50m surveys in the Coral sea. Image courtesy Rick Stuart-Smith.

A new classification to assist marine spatial planning aimed at conserving the benthic biodiversity of the Southern Ocean

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The Southern Ocean is globally significant, hosting unique biodiversity and is one of the most intact marine environments in the world. Unique historical and oceanographic factors are emerging as important to the evolution of the, apparently rich and highly endemic, Southern Ocean benthos. Long-term trends such as geographic separation as well as oceanographic and thermal isolation by the Antarctic circumpolar current system, coupled with recurrent glaciations probably drove speciation and endemism, whilst ice disturbance is thought to maintain biodiversity at local to regional scales (Kaiser et al. 2013). However, with pressures on Southern Ocean marine environments currently increasing (notably fisheries, tourism and climate-induced changes), there is an urgent need to protect its biodiversity and ecosystems.

International agreements such as the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) aim to conserve marine life while, among other roles, managing exploitation in the Southern Ocean. CCAMLR has committed to establish a system of marine protected areas (MPA) which would increase protection from the currently small number of MPAs spanning less than 1% of the region (see map). CCAMLR made a significant step toward achieving this goal in 2009 by designating the world's first MPA entirely outside national jurisdiction. Since then, MPA proposals including those to protect the Ross Sea and East Antarctica continue to be deliberated within CCAMLR but are yet to reach agreement (Kaiser et al. 2013).

Above: Drifting icebergs along the NW Antarctic Peninsula. Ice-mediated disturbances are strong drivers of distribution and biodiversity of Antarctic shelf benthos. Photo: Armin Rose, Bioconsult SH.

Above: Amphipod crustaceans are particularly diverse in the Southern Ocean. To date more than 850 species have been described from Antarctic waters. This species belongs to the stenothoid genus Scaphodactylus, *collected during Benthic Disturbance Experiment (BENDEX) 2 aboard RV Polarstern near Kapp Norvegica, Eastern Weddell Sea (260 m). Photo: Armin Rose, Bioconsult SH.*

A recently published study aims to assist marine spatial planning in the Southern Ocean by providing a classification to identify areas where benthic marine assemblages are likely to differ (Douglass et al., 2014). It also uses the classification to assess the extent to which the current system of MPAs encompasses benthic biodiversity and identifies sites for consideration for future protection. The hierarchical classification subdivides benthic assemblages at increasingly finer scales (i.e., ecoregions – bathomes – environmental types) using known or inferred relationships between abiotic factors and the distribution of the benthos. Environmental data (such as geomorphic features, seabed temperature and sea-surface productivity) were used as surrogates for biological data since high-resolution distributional data for Southern Ocean benthos are scarce – particularly for remote areas, such as the Amundsen Sea, as well as areas at greater depths (De Broyer et al. 2014).

Ecoregions represent broad-scale units delineated on the basis of previously defined biogeographic regions and environmental factors influencing the dispersal of benthic invertebrates. For example, depth-correlates have been often found to be isolating factors shaping marine communities. To account for variation in assemblage structure with depth, bathomes (i.e. depth classes based on depth-species relationship studies) were identified and nested within ecoregions. Geomorphic

Above: Map showing existing and proposed marine protected areas in the Southern Ocean (modified from Douglass et al. 2014). Top right: Eunoe spica *Hartman, 1978, a polynoid polychaete species from the Weddell Sea shelf. Bottom right:* Nymphon australe *Hodgson, 1902 - the most abundant sea spider (pycnogonid) in the Southern Ocean. Both photos Torben Riehl, Zoological Museum Hamburg.*

features are a classification of the seabed based on its surface morphology. Geomorphic features are the best Southern Ocean wide dataset for incorporating changes in ecology related to different seafloor substrates. The units at the finest scale of the classification are referred to as environmental types and represent each unique nested combination of ecoregion, bathome and geomorphic feature. Environmental types that were restricted either spatially or by number were identified for future consideration as sites for protection since there are limited options to include these unique environments in a system of MPAs.

Douglass et al. (2014) identified 23 ecoregions, 9 bathomes, 562 environmental types and 107 spatially restricted environmental types. Using the environmental types as surrogates of different assemblages of benthic biodiversity it was shown that the system of MPAs is currently not representative of the diverse benthic biodiversity present in the Southern Ocean. Twelve ecoregions are not included in MPAs and none of the twenty-three ecoregions has their full range of environmental types represented within MPAs. Thus, conservation efforts in the Southern Ocean would need to aim for a greater representation of ecoregions and environmental types in additional MPAs in order to effectively preserve and protect the Southern Ocean environment and its unique and highly diverse benthic biota. The MPA proposals currently under consideration by CCAMLR if implemented, would substantially increase the representation of environmental types in MPAs particularly for eight ecoregions. CCAMLR is currently poised at an important juncture in the development of its system of marine protected areas. Will proposals that progress the development of the system of MPAs continue to be vetoed by some member countries? Or will CCAMLR find a way to agree on a system of marine protected areas to protect the Southern Ocean's unique marine life?

Further reading:

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De Broyer, C., Koubbi, P., Griffiths, H.J., Raymond, B., Udekem D'Acoz, C. et al. (eds.) (2014) Biogeographic Atlas of the Southern Ocean. Scientific Committee on Antarctic Research, Cambridge, XII, 498 pp.

Kaiser, S., Brandão, S.N., Brix, S., Barnes, D.K.A., Bowden, D.A. et al. (2013) Patterns, processes and vulnerability of Antarctic and Southern Ocean benthos - a decadal leap in knowledge and understanding. Marine Biology, doi:10.1007/s00227-013-2232-6.

Recovering coastal fisheries village by village in the Western Indian Ocean

Steve Rocliffe, University of York and Alasdair Harris, Blue Ventures

When some of the older residents of Andavadoaka village in southwestern Madagascar were children, they were forbidden to swim in the sea at dawn or dusk, for fear of attracting unwelcome attention from the sharks.

Today the sharks have all gone, fished, along with sea cucumbers, for lucrative export markets. Most of the larger fish and invertebrates have also vanished, sold to local markets or consumed by a coastal population that is doubling in size every 10-15 years.

Rural Malagasy in the arid south west have been hit particularly hard by the declines. For the nomadic Vezo communities that inhabit this region, seafood is the sole source of protein in 99% of household meals. Income is just over a dollar per person per day.

And they're far from alone. At least 97% of the world's fishers live in developing countries, the vast majority working in small-scale fisheries in the tropics. These artisanal and traditional fisheries are vital to hundreds of millions of people, providing a lifeline for families and coastal economies, and underpinning food security for entire nations. Already around 3 billion people live within 100 miles of the ocean, a number that may double over the coming decade.

But the Vezo's story is not one of acceptance of this ecological crisis. They're fighting back, village by village. With technical and financial assistance from British NGO Blue Ventures, they set up The Velondriake Community Managed Protected Area. With nearly 1,000 km^2 of coral reefs, mangroves, lagoons, beaches and sea grass beds, Velondriake is the one of the largest marine managed areas in Madagascar and the first to be managed at the local level.

Velondriake's success has triggered a wave of grassroots replication. In 7 years, 34 new Locally Managed Marine Areas (LMMAs) have been created around Madagascar's shores, covering nearly 7% of the country's seabed. At over 6,500 km^2, this is almost three times more than in centrally managed marine protected areas.

[continued overleaf]

Images, from top: Within the Velondriake LMMA 87% of the adult population are fishers. Traditional sailing pirogues like these are essential for transportation and fishing. Middle: Globally around 500 million people are dependent on coral reefs for food or income and community-managed protected areas are vital for protecting fisheries and safeguarding marine biodiversity. Bottom: Octopus gleaning is a vital source of income for the people of the Velondriake LMMA in southwest Madagascar, with the majority of catches sold to local collectors and exported to overseas markets. All images courtesy Blue Ventures / Garth Cripps.

Madagascar isn't the only country in the region where this revolution in marine management is underway. Almost half of the Western Indian Ocean's (WIO) protected areas are under some form of community stewardship. And in Kenya, Mozambique and Tanzania especially, LMMAs are proving themselves to be a cost-effective, scaleable, resilient and more socially acceptable alternative to more traditional 'top-down' methods of marine resource management. Taken together, these sites are protecting more than 11,000 km^2 of marine resources, an area the size of 1.5 million football pitches.

Translating these figures into progress towards Aichi Target 11 – the Convention on Biodiversity (CBD) goal to effectively conserve 10% of marine and coastal areas by 2020 – reveals that the region's LMMAs now cover 3.6% of the continental shelf. And whilst Comoros, Kenya, Tanzania and Mozambique have achieved the 10% through centrally managed MPAs alone, Madagascar will do so only because of its LMMAs.

Yet despite emerging as a tool of choice in parts of the WIO, LMMAs are often hampered by underdeveloped legal structures and enforcement mechanisms. To address these issues, work is underway in both Madagascar and across the region to establish LMMA networks. By enabling LMMA practitioners to share experiences and best practice, and through promoting local management to other communities and governments, these forums will form the basis for scaling-up LMMAs in the region towards a network that is lasting, effective and representative, and one that is complementary to centralised conservation efforts.

For more information on LMMAs in the Western Indian Ocean please see:

Rocliffe S, Peabody S, Samoilys M, Hawkins JP (2014) Towards A Network of Locally Managed Marine Areas (LMMAs) in the Western Indian Ocean. PLoS ONE 9: e103000. doi:10.1371/journal.pone.0103000.

Harris, A.R., 2011. Out of sight but no longer out of mind: a climate of change for marine conservation in Madagascar. Madagascar Conservation & Development 6.

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Sustainable Development Goal on Oceans and Seas in the Post-2015 Development Agenda

Biliana Cicin-Sain and Alexis Martin, Global Ocean Forum

It is a big accomplishment that a stand-alone goal on oceans and seas is among the proposed sustainable development goals (SDG) in the United Nations process to craft the post-2015 global development agenda. While the 2012 United Nations Conference on Sustainable Development (UNCSD or Rio+20 Conference) process firmly established oceans and their role in planetary survival and human well-being on the global agenda, oceans and seas still had a long way to go to become a major issue highlighted in the SDG process.

Initially, Member States and stakeholders were pessimistic about an SDG on Oceans and Seas. In the several brainstorming meetings and UN side events between late 2012 and early 2013, very few argued that an SDG on Oceans and Seas was essential to ensure the ocean's central role in sustainable development.

The tide of opinion started to turn during the summer of 2013, with specific proposals on an SDG on Oceans and Seas being distributed and meetings held to discuss the importance of oceans in sustainable development. In particular, the Mission of Palau to the United Nations organized, with the leadership of the Pacific Island Developing States (PSIDS) and Timor Leste, a key meeting that brought together Member States from all regions of the world and presented a proposal for a SDG on Oceans and Seas focusing on ensuring the health of the marine environment and sustainable fisheries. During the meeting, the idea of building a coalition for oceans and seas in the SDG process was emphasized by the PSIDS, and was supported by many other governments, including high-level representatives from Colombia, Costa Rica, New Zealand, Singapore, Dominican Republic, and Samoa. Ambassador Isabelle Picco of Monaco stressed that an oceans SDG must centrally incorporate social and economic dimensions and have people at its core. By the end of the meeting, Biliana Cicin-Sain, President of the Global Ocean Forum (GOF), noted that the meeting marked the beginning of a broad alliance of nations from all regions of the world to actively pursue an SDG on oceans.

As well, GOF co-organized two UN side events in June and August 2013 to discuss various proposals for integrating oceans in the SDGs and for exploring opportunities to ensure that oceans would be adequately addressed in the SDGs.

A defining moment for an SDG on Oceans and Seas came at the 8th meeting of the United Nations Open Working Group on Sustainable Development Goals (OWG) in February 2014, where oceans issues were centrally addressed. Previously, the perception of many of the OWG members seemed to be that oceans were mainly an environmental issue, and did not have strong social and economic dimensions. Therefore, many of the interventions made during the meeting, including a presentation made by President Tommy Remengesau, Jr. of Palau, were geared towards demonstrating the importance of oceans for all three pillars of sustainable development.

With the leadership of the PSIDS and Timor-Leste countries, led by Papua New Guinea, a joint side event was co-organized with the Intergovernmental Oceanographic Commission of UNESCO and the Global Ocean Forum on Towards a Sustainable Development Goal (SDG) on Oceans and Seas: Healthy, Productive and Resilient Oceans and Seas- Prosperous and Resilient Peoples and Communities at the 8th Session. Key ocean leaders spoke on the centrality of oceans to sustainable development, and the imperative of oceans and seas as a universal agenda. The event was widely attended, drawing over 100 participants from Member States, intergovernmental organizations, and civil society organizations, with numerous Member States vocalizing their support for a stand-alone SDG on Oceans and Seas during the comment period. The main conclusions arrived at the meeting were that there must be a dedicated SDG on Oceans and Seas in the Post-2015 Development Agenda and that next steps and discussions must focus on goals, targets, and indicators to measure and ensure the health and vitality of the ocean for present and future generations.

Sustainable Development Goals must sustain people and planet. Image courtesy D.Johnson.

Since the February 2014 meeting, support for a stand-alone SDG on Oceans and Seas continued to grow with 79 Member States eventually supporting the SDG on Oceans and Seas by the end of the OWG meetings in July 2014. As well, civil society support for a stand-alone SDG on Oceans and Seas was expressed; during the 10th meeting of the OWG (April 2014), GOF convened a "Friends of the Sustainable Development Goal on Oceans and Seas" meeting, which produced a civil society statement to Member States of strong support for a stand-alone oceans SDG. Civil society support for a stand-alone SDG on Oceans and Seas continued to grow, coordinated by the Pew Charitable Trusts in the development of issued statements at OWG 11 and OWG 12.

In early August 2014, the SDG Outcome Document was released, with proposed Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development. The SDG on Oceans and Seas and accompanying targets address marine pollution from all sources, including land-based, marine debris, and nutrient pollution; managing, protecting, and restoring ecosystems to achieve healthy and productive oceans; minimizing ocean acidification; sustainable fisheries; conservation of 10 per cent of coastal and marine areas; prohibiting destructive fishing subsidies; and increasing economic benefits to the small island developing States (SIDS) and least developed countries (LDCs) from the sustainable use of marine resources. In addition, means of implementation were agreed upon to increase the capacity of scientific knowledge and technology in developing countries, in particular SIDS and LDCs, as well as increasing access to small-scale artisanal fisheries and the full implementation of existing international law. Overall, the goal, targets, and means of implementation reinforce and give renewed focus and urgency to existing international prescriptions on oceans and seas emanating from the 1992 UN Conference on Environment and Development, the 2002 World Summit on Sustainable Development, and the 2012 Rio+20 Conference. For a more detailed analysis of proposed Goal 14 (SDG on Oceans and Seas), please see the GOF News Article "UN OWG Adopts Proposal for Global Sustainable Development Goals Including Oceans."

The SDG Outcome Document is a proposed package for action by the UN General Assembly. Leading up to the start of the 69th UNGA, a High-Level Stocktaking Event will take place 8-9 September 2014, where the President of the General Assembly will deliver a summary of the post-2015 processes and consultations. The summary will inform the UN Secretary General's synthesis report on the post-2015 development agenda to be released in November 2014. Intergovernmental negotiations will commence during the meetings of the 69th UNGA, and will continue until August 2015, where revisions and changes to the package could take place. Adoption of the set of global goals, targets, and means of implementation will take place at a high-level summit in September 2015.

Sustainable Ocean Initiative: Facilitating achievement of the marine Aichi Biodiversity Targets

David Johnson, GOBI Coordinator

A recent paper published in the *Journal of Coastal Research* (Johnson et al., 2014) explained the efforts undertaken by experts to describe Ecologically or Biologically Significant Areas for the Southeast Atlantic. The process included the Regional EBSA Workshop in Namibia in 2013 but also, a capacity building workshop as requested by African countries at CBD; expertise provided by GOBI Partners; and two specific opportunities set to take advantage of the data collated. The latter were firstly a study to consider the feasibility of an International Maritime Organisation designation, a Particularly Sensitive Sea Area, for the Banc d'Arguin and an adjacent sea area in Mauritania and secondly, a sub-regional project (2014-2019) in partnership between the Benguela Current Commission and the German Implementing Agency for Development Cooperation (GIZ).

CBD COP 10 adopted the 10-year Strategic Plan for Biodiversity (2011-2020) together with 20 Aichi Biodiversity Targets to guide international and national efforts to reverse biodiversity loss. The Sustainable Ocean Initiative (SOI) was born at the margins of COP 10, through the support of Japan, COP 10 Presidency, and in collaboration with various partners who were willing to provide the necessary expertise, technical and financial resources. The SOI concept was further developed in subsequent meetings, such as the SOI Programme Development Meeting (2-4 August 2011, Kanazawa, Japan) and SOI High-level Meeting (5 June 2012, Yeosu, RO Korea). To date implementation of the Sustainable Ocean Initiative has been largely funded by the Government of Japan through the Japan Biodiversity Fund and the French marine protected areas agency (Agence des Aires Marines Protégées), with additional in-kind funding (e.g., Republic of Korea, China) and technical support (e.g., FAO, UNEP, IUCN-CEM-FEG, CSIRO, GOBI, Abidjan Convention Secretariat, PEMSEA, etc.) mobilized for different implementation activities. Its implementation is being coordinated by the CBD Secretariat.

The opening statements of the West African SOI capacity building workshop underlined an explicit commitment by the Government of Senegal (acting as hosts), recognizing the urgency and need to address the underlying causes of marine biodiversity loss and the inter-relationship between different economic sectors in West Africa. A representative selection of presentations by Workshop participants illustrated region specific challenges and opportunities. Protocols and legislation are at different stages of updating. A variety of scientific programmes and protection measures have been applied and stakeholders have been involved at different levels. Several countries are concerned about how resources can be mobilised for marine biodiversity conservation. The RAMPAO network of marine protected areas presented an ecological coherence and gap analysis evaluation using their MPA database, having consulted regional experts, suggesting examples of potential EBSAs.

A sustainable fishing community, Kayar, Senegal (Aichi Target 6). Image courtesy D. Johnson

The main elements of the Workshop tackled:

a) Aichi Target 6: recalling worrying signals for fisheries with significant take up of recommended action in some places and little take up in most others. Achieving Target 6 raises numerous policy issues (such as risks, trade offs and alternatives, transferable rights, compensation, tariff trade barriers) and many management questions (such as knowledge levels, resources, techniques, uncertainty, management plans, operational objectives, reference points etc.). There are also significant costs of inaction. Ways of integrating institutions must be found and it is important to take into account what has already been done;

b) Aichi Target 11: recognising that important places for biodiversity require systems of protected areas. The EBSA process sets up a systematic stepwise way of moving towards more intelligent marine spatial planning and coordinated responses to human impacts. Practical advice includes mapping features of central relevance, recognising persistent features (such as seamounts and canyons), adopting scales that are stable to perturbations, and understanding that EBSAs are not MPAs;

c) The EBSA process itself: which draws on scientific information and requires collaboration by dedicated experts. For the open oceans and deep seas both within and beyond national jurisdiction the process has already generated significant momentum and made substantial progress. Scattered data needs to be collected, building on national expertise and mobilising international support; and

d) Data for describing EBSAs: that represents an investment involving universal challenges. The expert driven process requires both physical and biological data and sources can be global, regional, national and from existing databases. Sensitivities noted included data availability, ownership and sharing, and problems of combining datasets for transboundary features.

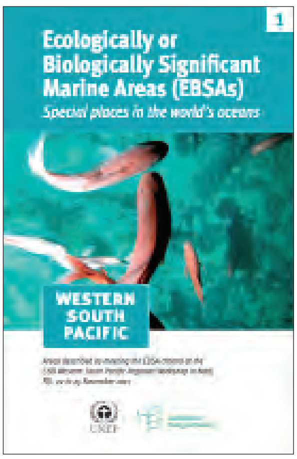
SOI specifically aims to address capacity gaps, governance shortcomings and situations where the information base is limited. A second SOI capacity building workshop was held for East Asia, South Asia and Southeast Asia (9-13 December 2013) in Ghangzhou, China. SOI has subsequently developed web-based and guidance tools to inform capacity building and further workshops are planned for South America, East Africa and the South Pacific. Whilst GOBI supports scientific data needs to describe EBSAs, SOI aims to support application of agreed data. Recognising the urgency for additional capacity building to assist Parties to meet marine Aichi Targets by 2020, SOI will be given major impetus at CBD COP12.

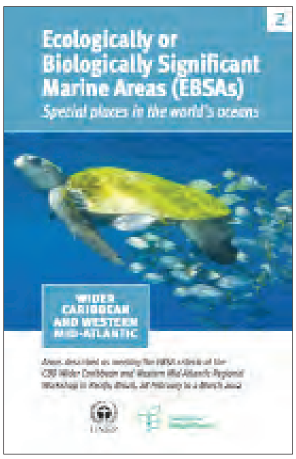
Reference: Johnson D, Lee J, Bamba A, Karibuhoye C. 2014. West African EBSAs: Building Capacity for Future Protection. In Green AN and Cooper JAG (eds) Proceedings 13th International Coastal Symposium (Durban, South Africa), Journal of Coastal Research, Special Issue No. 70, pp. 502-506, ISSN 0749-0208.

Royal Terns in the Saloum Delta National Park, Senegal. Image D. Johnson.

SCBD Dialogue Forum on Integrating the perspectives of Indigenous and Local Communities (ILCs) in the application of the scientific criteria for EBSAs

Immediately prior to the eighteenth meeting of the CBD Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), the CBD Secretariat convened an event to review the EBSA process and scientific criteria in the context of the needs, interests and perspectives of indigenous and local communities. The aim was to enhance the use of traditional knowledge in the application of the EBSA criteria.





Co-chaired by Gunn-Britt Retter (Saami Council) and David Johnson (GOBI), the event received inputs on the scientific process of EBSA description from Piers Dunstan (CSIRO) and information on experiences in applying traditional knowledge in the application of similar criteria (e.g. FAO and IMO). Involvement of indigenous and local communities and their knowledge in EBSA description was exemplified with interventions by Parnuna Egede (Inuit Circumpolar Council) and Elizabeth Moari Munro (Cook Islands). Participants noted the recent IPBES Expert Workshop on indigenous and local knowledge systems (Tokyo, 9-11 June 2013). Critically the event provided input to draft training materials on integrating traditional knowledge in application of EBSA criteria currently being prepared by Marjo Vierros (UNU). Round-table discussion agreed on the need to raise awareness, the importance of including elements of traditional knowledge in future capacity building initiatives, and a corresponding need to train EBSA scientists on the value and format of ILC contributions.

Left: Regional Workshop EBSA booklets produced by the CBD are available at www.cbd.int.

GOBI
Global Ocean Biodiversity Initiative

Global Ocean Biodiversity Initiative

Working towards high seas conservation

The Global Ocean Biodiversity Initiative is an international partnership advancing the scientific basis for conserving biological diversity in the deep seas and open oceans. It aims to help countries, as well as regional and global organisations, to use and develop data, tools and methodologies to identify ecologically significant areas with an initial focus on the high seas and deep seabed beyond national jurisdiction.

This initiative began in late 2008 as a collaboration amongst the German Federal Agency for Nature Conservation (BfN), IUCN, UNEP World Conservation Monitoring Centre, Marine Conservation Institute, Census of Marine Life, Ocean Biogeographic Information System and the Marine Geospatial Ecology Lab of Duke University. The initiative continues to seek additional collaborators to help bring the best science and data to bear on the identification of ecologically significant areas beyond national jurisdiction.

The work under this initiative ultimately aims to help countries meet the goals adopted under the Convention on Biological Diversity (CBD), the United Nations General Assembly resolutions, and at the three Earth Summits (Rio 1992; Johannesburg 2002; Rio 2012). These global goals relate to reducing the rate of biodiversity loss, applying ecosystem approaches, determining areas of ecological and biological significance and vulnerable marine ecosystems as well as establishing representative marine protected area networks.

Objectives

- Establish and support International scientific collaboration to assist States and relevant regional and global organisations to identify ecologically significant areas using the best available scientific data, tools, and methods.
- Provide guidance on how the CBD's scientific criteria and UN resolutions can be interpreted and applied towards management, including representative networks of marine protected areas.
- Assist in regional capacity building and developing regional analyses with relevant organisations and stakeholders.

The GOBI partnership and activities are coordinated by a Secretariat team, provided by Seascape Consultants Ltd and funded by the German Federal Agency for Nature Conservation (BfN; www.bfn.de).

For more information about GOBI please visit our website at www.gobi.org

BfN Federal Agency for Nature Conservation

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