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Sixteenth meeting
Montreal, 30 April – 5 May 2012

OCEANS, COASTS, ISLANDS: ACHIEVING THE AICHI BIODIVERSITY TARGETS — ABSTRACTS OF POSTERS PRESENTED AT THE SIXTEENTH MEETING OF THE SUBSIDIARY BODY ON SCIENTIFIC, TECHNICAL AND TECHNOLOGICAL ADVICE

Note by the Executive Secretary

INTRODUCTION

1. In addition to the notes and information documents prepared by the Executive Secretary, it is usual practice to have a poster session during the meetings of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA). Posters presented on the margins of the meeting are accompanied by extended abstracts, which are compiled and published, and made available at the meeting.

2. The theme for the poster session at the sixteenth meeting of the Subsidiary Body, in Montreal, from 30 April to 5 May 2012, is: "Oceans, Coasts, Islands: Achieving the Aichi Biodiversity Targets". This theme was selected to complement the discussions during SBSTTA-16 on the in-depth review of the programme of work on island biodiversity and the agenda items on marine and coastal biodiversity.

3. Parties, other Governments and relevant United Nations bodies, inter-governmental, non-governmental, regional and international organizations, indigenous and local communities, and the private sector were invited to contribute posters and extended abstracts showcasing how the Aichi Biodiversity Targets (www.cbd.int/sp/targets) are being achieved in oceans, coasts and islands.

4. Thirty-three abstracts were accepted for publication and are presented in this information document. All abstracts are presented, unedited, in the form in which they were submitted. They accompany posters exhibited during SBSTTA 16.Abstracts are presented in alphabetical order, according to the last name of the first author.

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1) THE FRONT GARDEN OF NIRAI KANAI - SEA OF HENOKO, OKINAWA

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Introduction

The Asia region is known as the world's center of marine biodiversity and its productive marine ecosystems are sustaining the vast majority of coastal communities' livelihood through fisheries and tourism. Yet the high population and growing demands on these resources have resulted in a serious decline of these ecosystems and in turn causing various social problems.

To halt and reverse the degradation of these ecosystems, the Aichi Biodiversity Targets were adopted in the year 2010. Target 10 describes its goal as "by 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning".

The biologically rich marine area in crisis

A massive destruction plan to build facilities for U.S. base is still ongoing in Okinawa, Japan. The coastal areas of Henoko, Oura Bay (where the base would be constructed) are classified under the Okinawa Prefectural Government's Guidelines for Environmental Protection as rank 1, warranting the highest level of protection. There the internationally protected dugong graze on sea grasses, turtles come to rest and lay their eggs, and multiple rare birds, fish, crustaceans, insects and animals live.

A massive colony of blue coral was discovered only in 2007 (and in 2008 placed on the IUCN's "Red List" or critically endangered list). Subsequently, in 2009, a World Wildlife Fund study found an astonishing 36 new species of crabs and shrimps, and in July 2010 a researcher from Tokyo Marine Science University found 182 different species of sea grasses and marine plants, four of which were probably new species. Then the Nature Conservation Society of Japan recorded 362 species of benthos and fishes in those same waters. This sea is a biological rich area and the result of our survey in 2010 demonstrates the richness of this marine area.

Survey method

A total of 39 volunteer divers participated in the survey on July 24th and 25th. The survey for seagrass was conducted by snorkel and the benthos and fish survey was done by scuba. For the seagrass survey we applied 200m mesh method, and the live seagrass coverage were recorded. For the benthos survey we allowed divers to spend 30 minutes in the water at the five points. The photos taken by divers were analyzed for identification.

Results

362 species of benthos and marine fishes were recorded in only 150 hours for each diver. The results of seagrass distribution prove that this area's seagrass are in good condition, which means dugong could come back to eat seagrass at anytime, as two of them were recorded recently in close areas to the survey area.

You can download the full survey results (available only in Japanese) at http://www.nacsj.or.jp/katsudo/henoko/pdf/20101004henoko_report_ver3.pdf

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Gavan McCormack (2010), "The Battle of Okinawa 2010: Japan-US Relations at a Crossroad", Japan Focus (http://www.japanfocus.org/-gavan-mccormack/3443)

2) GAP ANALYSIS FOR CONSERVATION PRIORITIES OF MARINE BIODIVERSITY IN MEXICO-OCEANS, COASTS AND ISLANDS

Authors: Verónica Aguilar, Diana Hernández and Melanie Kolb (comp.), CONABIO (National Commission for the Knowledge and Use of Biodiversity) and CONANP (National Commission for Protected Areas)

Marine life is an essential component of Mexico's vast biodiversity, namely, the species that inhabit the various coastal, oceanic and insular environments. These ecosystems are of critical importance because they shelter a great amount of species, both endemic and of wide distribution. They are also important as reproductive, breeding, resting and feeding sites for both migratory species and benthonic and pelagic organisms. Likewise, their relevance lies in harbouring the micro fauna involved in oceanographic processes that regulate the environment and sustain commercial fisheries. Mexico is a country with unique marine characteristics; it shares coasts with five seas: North eastern Pacific, Gulf of California, Tropical Pacific, Gulf of Mexico and Caribbean Sea. Its coastline extends along 11,122 km; the territorial sea embraces 231,813 km2 and the Exclusive Economic Zone (EEZ) covers 3,149,920 km2. Furthermore, Mexico possesses 1,567,000 ha of estuaries and over 3,000 geomorphologic structures, of which islands, reefs, islets, shoals and banks stand out.

With the aim of identifying priority sites for the conservation of marine biodiversity, evaluate their representation in protected areas (PA) and give recommendations to strengthen the PA system regarding coastal, marine and insular environments, CONABIO, CONANP, Pronatura and TNC organised a workshop for the Determination of Marine and Coastal Priority Sites for Conservation, which took place in Mexico City in October 2005 and was attended by experts from all over the country. In the workshop, priority sites were delimited based on digital cartography and then were validated with the aid of an internet site, which served, in addition, as a gateway for the exchange of opinions and information among participants and specialists.

105 marine sites were identified of which 79 correspond to the coastal zone and continental margin (from now on to be referred as SCMC, islands included), and 26 are deep sea sites (hereafter SMP, corresponding to sites located in oceanic basins). These priority sites are much more specific and detailed in comparison with the marine priority regions established in 1998, a first advance at a national scale towards a regionalisation of the country's marine environments, due to the advances in the knowledge and spatial representation of marine ecosystems. Marine priority sites have only 25% of the extension of marine priority regions, but manage to represent all of them.

Nearly half of the priority sites are not represented in the current PA system. In terms of surface area, the coincidence between the SCMC and SMP and the PA system is of 21% and 0.01% respectively. 53 sites were detected (50% of the total sites) that did not overlap with any PA; 25 of these sites correspond to SMP and 28 to SCMC. In addition, there are 28 sites (27% of the total sites) that coincide with the PA in less than 20% of their area. These 78 sites represent the gaps and omissions in the conservation of the marine ecosystems, where it is necessary to implement protection actions. Currently, out of the 58 marine PA, 10 protect an important portion of the conservation priorities, since most coincide to a certain extent with the priority sites (56 PA coincide with 57 SCMC and one PA with one SMP).

Mexican islands harbour a vast biological diversity characterized by numerous species exclusively living therein and comprise a large variety of habitats where marine and terrestrial species converge. One of the secondary products of the marine gap analysis is the data base on insular biodiversity. It integrates information on geomorphologic, physical and biological characteristics, as well as the main anthropogenic impacts and existing conservation and managements programmes. It is associated with a map of the insular territory, which includes 1,365 insular elements: 1,218 islands, 75 reefs and shoals, 31 islets, 17 cays, 12 rocks, eight bars, three mounds and one bank. It contains information about the occurrence of 2,450 marine and 1,937 terrestrial species, registered in 151 insular elements (15%). This data base shows a clear lack of information on insular biodiversity. The islands with the highest recorded species richness are Clarion, Cozumel, Banco Chinchorro, Arrecife Alacranes, Espiritu Santo and Guadalupe.

The analysis constitutes an important step in conservation planning and will allow the undertaking of truly effective measures towards the sustainability of the country's marine biodiversity. Gap Analysis has been adopted as a general framework for marine conservation actions and to some extent for the research agenda. It is a reference to strengthen and broaden the current PA system by providing guidelines to help the proposition and creation of new areas, as well as other alternatives of sustainable management. The detailed analysis of the sites permits to select the ones that could be integrated in the current PA system. As a consequence Mexico is one of the few countries to establish two deep seas PA in the Gulf of California in 2010. Protected areas are a conservation instrument of utmost importance. But marine priority sites are not sufficiently represented in protected areas (PA) and we must multiply efforts in our endeavor to manage the sustainability of the Mexican coasts, islands and oceans in the MPS with other conservation tools. Periodic updates of gap analysis are necessary to include new knowledge and data for biodiversity and particularly human threats.

3) CONSERVATION AND SUSTAINABLE DEVELOPMENT OF MEXICAN ISLANDS: TANGIBLE ADVANCES IN THE FIELD AND THE INTEGRATION OF A NATIONAL STRATEGY

Authors: Alfonso Aguirre-Muñoz (Grupo de Ecología y Conservación de Islas, A.C.); Eduardo Peters-Recagno (Instituto Nacional de Ecología) and Patricia Koleff-Osorio (Comisión Nacional para el Conocimiento y Uso de la Biodiversidad) - Coordinating Committee of the National Strategy for the Mexican Insular Territory
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Background

Mexico has 1,664 islands, islets, cays and reefs, which comprise a total surface of 5,127 km^2 (INEGI 2012). While the total insular area is a small fraction of the continental area of 1,959,248 km^2, 8% of the country's vertebrate and plant biodiversity is restricted to its islands, providing habitat to over 350 endemic species and subspecies (CONABIO 2007). The contribution of island ecosystems to Mexico's mega diversity grows considerably if marine species are considered, with over 2,545 species recorded, 91 of which are endemic (*idem.*). In terms of sovereignty, Mexican islands are strategic territories. Given the location of its remote islands, Mexico has the world's 13th largest Exclusive Economic Zone (EEZ) of 3,188,031 km^2. A group of remote islands in the Pacific Ocean, and in the Gulf of Mexico and the Caribbean are accountable for 50% of the country's EEZ. Thanks to these islands, Mexico has legal rights —under the Convention of the Law of the Sea— to the yellow-fin tuna fishery in the Pacific Ocean and oil deposits in the Gulf of Mexico. The islands are also home to over 250,000 inhabitants. In some of them, tourism is the most important economic activity. Artisanal fisheries are the main source of income for local communities, benefiting 300,000 fishers and their families. Fishers co-operatives, with exclusive long-term fishing rights, sustainably harvest abalone, lobster and sea urchin, particularly in the eastern Pacific islands, with an estimated value of USD$47 million in 2010 (CONAPESCA 2011).

The importance of the Mexican islands can be summarized in terms of biodiversity, sustainability and sovereignty. During the last two decades Mexico, as a country, and following a collaborative network — federal government agencies, academia, local communities and artisanal fishers co-operatives, NGOs, and national and international donors— has conducted relevant and comprehensive actions in favour of its islands, including: (a) The legal protection of islands; (b) The restoration of island ecosystems and biodiversity protection by means of the eradication of invasive alien species (IAS) and active seabird restoration (Aguirre-Muñoz et al. 2011a); (c) The adoption of fishing best practices by artisanal fishers co-operatives with exclusive fishing rights, to develop sustainable livelihoods (Méndez-Sánchez 2012); (d) The creation of permanent naval bases and the construction of basic infrastructure to effectively exercise sovereignty rights (Aguirre-Muñoz et al. 2011b). To consolidate this positive trajectory, the Mexican government, through the Ministry of Environment and Natural Resources (SEMARNAT) and other federal agencies, in collaboration with NGOs, economic sectors and academic institutions, has recently integrated its 'National Strategy for the Conservation and Sustainable Development of the Mexican Insular Territory' (hereafter Mexico's Island Strategy or MIS). The aim of the MIS is to achieve the conservation and sustainable development of Mexican islands using a framework for coordinated action that integrates projects, strengthens sovereignty, induces synergies, and generates knowledge about the natural, cultural, social, and economic values of Mexican islands, and disseminates it to society. The MIS is a national public policy that contributes to protect global biodiversity and attends the Convention on Biological Diversity (CBD), particularly the Aichi Biodiversity Targets by 2020 and the Programme of Work on Island Biodiversity (PoWIB).

Achieving the Aichi Biodiversity Targets: The Mexican Islands Case

Biodiversity, Restoration and Conservation

It is widely recognized that island ecosystems are particularly vulnerable to extinctions and that invasive alien species (IAS) are major agents of global change, particularly on islands (Mack et al. 2001; Simberloff 2003). In Mexico, 71% of all vertebrate extinctions have occurred on islands, where 17 taxa have gone extinct because of IAS (Aguirre-Muñoz et al. 2011a). To prevent more extinction, 51 populations of 12 invasive mammals have

been eradicated from 32 Mexican islands so far. This has helped to protect at least 22 mammals, 31 reptiles, 32 birds and 117 plants, as well as 227 seabird breeding colonies (*idem.*). Specific contributions are related to Target 5: loss, degradation and fragmentation of natural habitats [*e.g.* islands] are at least halved; Target 9: invasive alien species and pathways are identified and prioritized, and controlled or eradicated accordingly; measures to control introduction pathways are in place; and Target 12: extinction of threatened species is prevented and their conservation status improved.

Another strategic task is the creation of ecologically representative and well connected protected areas, attending the direction of CBD's Target 11. With the exception of Cozumel and the Pacific islands off the Baja California Peninsula, all the islands in Mexico are legally protected under 23 natural protected areas.

Sustainable Use, Livelihood and Well-being

The communities that inhabit the islands rely heavily on the marine environment around the islands. The high natural productivity on many of these islands, allow the occurrence of highly valuable fisheries. Internationally valued species such as abalone, lobster, top shell, sea urchin, sea cucumber and seaweeds are sustainably harvested by well-organized fishers co-operatives, created in the 1930s. For over eight decades, these social organizations have successfully applied co-management approaches. A group of these co-operatives (FEDECOOP) that work on the Baja California Pacific Islands were internationally recognized with the Marine Stewardship Council (MSC) eco-certification for their sustainable practices in their lobster fishery. Other co-operatives are following the example, now on the Caribbean islands, looking for a sustainable use of natural resources while securing the local communities livelihoods. The latter contributes to the following 2020 targets: Target 4: users have implemented plans for sustainable production and have kept the impacts of use of natural resources well within safe ecological limits; Target 6: fish and invertebrate stocks are managed and harvested sustainably, legally and applying ecosystem-based approaches; and Target 14: ecosystems that provide essential services [*e.g.* islands] contributing to livelihoods and well-being are safeguarded.

Policy Implementation, Funding and Outreach

Mexico's Island Strategy is a deliberate public policy, product of a participatory social construction. It pretends to align and direct the efforts during the next eight years (up to 2020) to conserve biodiversity, sustainably use natural resources and exercise national sovereignty. The strategy will also serve as a focal point to raise awareness about the importance of the islands as Mexico's natural capital. As a programmatic instrument, defines goals and objectives in the short (2014), medium (2016) and long (2020) term, coordinating as well the diverse institutions and actors. By doing so, Mexico will be contributing to the following targets: Target 1: people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably; Target 19: knowledge, the science base and technologies relating to biodiversity, and the consequences of its loss, are improved, shared, transferred and applied; Target 20: the mobilization of financial resources for effectively implementing the Strategic Plan of Biodiversity 2011-2020 should increase substantially from the current levels.

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4) CORAL REEFS CONSERVATION IN THE STATE OF KUWAIT

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Introduction

Coral reefs are the world's most diverse and beautiful marine ecosystems. The incredible variety of life on them as well as the bright colorations and complex interactions of reef organisms have fascinated many tourists and scientists, who have taken their pleasure visiting and studying these extraordinary rainforests of the sea wherever they can be found on the planet. Coral reefs in Kuwait located in the southern territorial waters around 3 main islands (Kubbar, Qaro and Um Al-Maradem) in addition to some scattered patch reefs. About 35 species of coral has been recorded in Kuwait's coral reefs. They constitute four main colonies including Branching colony, Encrusting colony, plate colony and massive colony.

In Kuwait, coral reefs are of international interest mainly because they have grown in environmental conditions previously thought to be too extreme to allow corals to survive. They have not been destroyed by the massive Gulf War oil-spills in 1991 and this was documented by several international scientific expeditions.

Factors that affect coral reefs

Climate change is now recognized as the greatest long-term threat to coral reefs. Kuwait coral reefs are already under stress due to their location at the north-western part of the Arabian Gulf as well as the physical parameters (salinity, high temperature fluctuations, turbidity, etc.) of the marine environment in that location. Climate change increases the stress on coral reefs leading to decreased resistance and resiliency and that make them vulnerable and more susceptible to climate change-related phenomena such as coral bleaching. There were several coral bleaching incidents, one minor in August 1997 where about 10% of the corals were affected and two major incidents in August 2000 and November 2010 with 80% and 60% of the corals affected respectively.

The impact of the human activates on coral reefs in Kuwait include damage from fishing and anchors, flipper damage from divers, over-fishing, lost fishing gear, solid waste disposal and the extreme environmental conditions. Most of the reefs are close to shore and are major tourist and fishing areas. Anchors have destroyed large tracts of the reefs at all sites, and over-fishing has reduced populations of large predators, such that few fish greater than 20cm are seen. Oil pollution, however, has not caused massive mortality to reefs, even though most were in the path of the massive oil spill during the Gulf War.

Development projects on the island and the main land also affect coral reefs directly (removal or relocation of corals) and/or indirectly (increased water turbidity).

Conservation effort

With regard to legislation related to coral reefs in Kuwait, Decision No. 210/2001 regarding the executive regulations of the law of establishing the Environment Public Authority item (81) states that: Catching, hunting, killing, collecting or causing harm to all land or marine wildlife species are banned as well as harming their young, destroying their eggs, nests or refuges for two years as from the date of this by-law. Uprooting or causing harm to the coral reef and their compound is also exclusively prohibited. Excluded are hunting for scientific purposes, the common welfare or by authorization from the Public Authority for Agricultural Affairs and Fish Resources.

In Kuwait, government and nongovernment sectors cooperate and contribute to coral reefs conservation. These efforts include the establishment of mooring buoys around the islands and patch reefs to provide anchor for recreational boaters in order to decrease the threat of anchor damage to corals. Also, annual debris removal campaigns are organized to clean the marine environment and especially coral reefs.

Public awareness is an important component to any conservation plan. Therefore, government agencies as well as NGOs contribute efforts towards increasing public awareness with regard to the importance and value of coral reefs through mixed media publication, lectures and seasonal seminars as well as specialized training courses provided by diving clubs.

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5) VALUABLE, VULNERABLE, VITAL: BUILDING PARTNERSHIPS FOR EUROPE OVERSEAS TO MEET BIODIVERSITY AND CLIMATE CHANGE CHALLENGES

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Valuable: Havens of Biodiversity

There are 34 European Union (EU) Outermost Regions and Overseas Countries and Territories (or Europe overseas for short)1 that are linked to six EU Member States: Denmark, France, the Netherlands, Portugal, Spain and the United Kingdom (see Figure 1).

Europe overseas covers a land area of 4.4 million km^2, equivalent in size to continental Europe, and has a combined Exclusive Economic Zone (EEZ) of over 15 million km^2, the largest in the world. Spread across all oceans and home to a unique diversity of species and ecosystems, Europe overseas are of crucial importance for biodiversity at a global scale. Found outside the European continent, they host most of Europe's biodiversity, which is not only globally significant, but also essential for the livelihoods of local people.

These regions and territories:

- are found in biodiversity hotspots (Caribbean islands, Madagascar and Indian Ocean islands, Mediterranean basin, New Caledonia, Polynesia-Micronesia),
- are located in major wilderness areas (Guiana shield),
- include key regions for both polar ecosystems and fish stocks (Greenland, Falkland islands -Malvinas, French Southern and Antarctic Territories, South Georgia).

Together, these regions have more endemic animal and plant species than continental Europe as a whole, and host more than 20% of the world's coral reefs and lagoons. New Caledonia alone has about as many endemic species as the entire European continent, and French Guiana includes an area of Amazon rainforest the size of Portugal.

Vulnerable: Climate Change and other Challenges

The natural wealth of Europe overseas is highly vulnerable to human-induced impacts such as habitat destruction, alien invasive species, over-exploitation of natural resources, pollution and increasingly the impacts of climate change. Europe overseas shares these threats with other countries in their regions and showcase a cross section of the likely impacts of climate change on global biodiversity. They serve to highlight the extent of these impacts on the majority of global ecosystems and on a large variety of taxonomic groups.

Europe overseas is not only vulnerable to climate change, but also provides natural solutions to address these challenges. Conservation, restoration and effective management of ecosystems will help safeguard islands from the negative impacts of climate change and maintain social, economical and environmental benefits now and for future generations. Integration of ecosystem-based approaches into climate change adaption measures is essential.

Vital: A Shared Responsibility

In 2010, IUCN reviewed the implementation of the Convention on Biological Diversity (CBD) in Europe overseas2 and submitted the report to the CBD Secretariat as a contribution to the in-depth review of the PoWIB.

1 Europe overseas includes Anguilla, Aruba, the Azores, Bermuda, Bonaire, British Antarctic Territory, British Virgin Islands, Canary Islands, Cayman Islands, Curacao, French Guiana, French Polynesia, French Southern and Antarctic Territories (TAAF), Greenland, Guadeloupe, Madeira, Martinique, Mayotte, Montserrat, New Caledonia, Pitcairn, Portugal, Reunion Island, Saba, Saint Barthélemy, Saint Eustatius, Saint Martin, Saint Pierre and Miquelon, Saint Maarten, Wallis and Futuna

This IUCN report entitled "Future Directions for Biodiversity Action in Europe Overseas: Outcomes of the Review of the Implementation of the CBD, December 2010" states that the EU's commitment to the global biodiversity goals set by the CBD will benefit from action in its overseas territories. In this respect, the CBD Strategic Plan for Biodiversity 2011-2020 and its 20 Aichi Targets provide a strong framework of work not only at the global level, but also at the regional and national levels. The review proposes recommendations to protect and sustainably manage the unique natural heritage of Europe overseas and calls for shared responsibility and increased action and collaboration between all actors involved – EU institutions, EU Member States, ORs, OCTs, regional institutions, CBD, Global Islands Partnership (GLISPA) and IUCN.

The results obtained during the review were measured against the goals and targets of the PoWIB and the report presents impacts made in achieving these goals and targets across Europe overseas.

Funded by the government of France, this work is part of the IUCN Europe Overseas Programme3, which builds on IUCN's earlier efforts in support of biodiversity conservation and adaptation to climate change in Europe overseas and aims to advance the implementation of the Message from Reunion Island (2008)4 – a series of concrete actions to protect biodiversity, economies and diverse ways of life of Europe overseas5.

In 2011, IUCN and partners received a grant from the European Commission to undertake a project on Building Partnerships and Awareness of Biodiversity and Climate Change in Europe Overseas for the Future of a Voluntary Scheme on Biodiversity and Ecosystem Services in Europe Overseas (BEST). The project will facilitate strategic partnerships, propose governance and financial mechanisms for biodiversity, climate change and green infrastructure, as well as enhance mobilization and strengthen communication, including through the web-based Europe Overseas Forum6.

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2 See the report in English, French or Spanish at http://www.iucn.org/about/union/secretariat/offices/europe/activities/overseas/overseas_publications/cbd_implementation_euoverseas.cfm

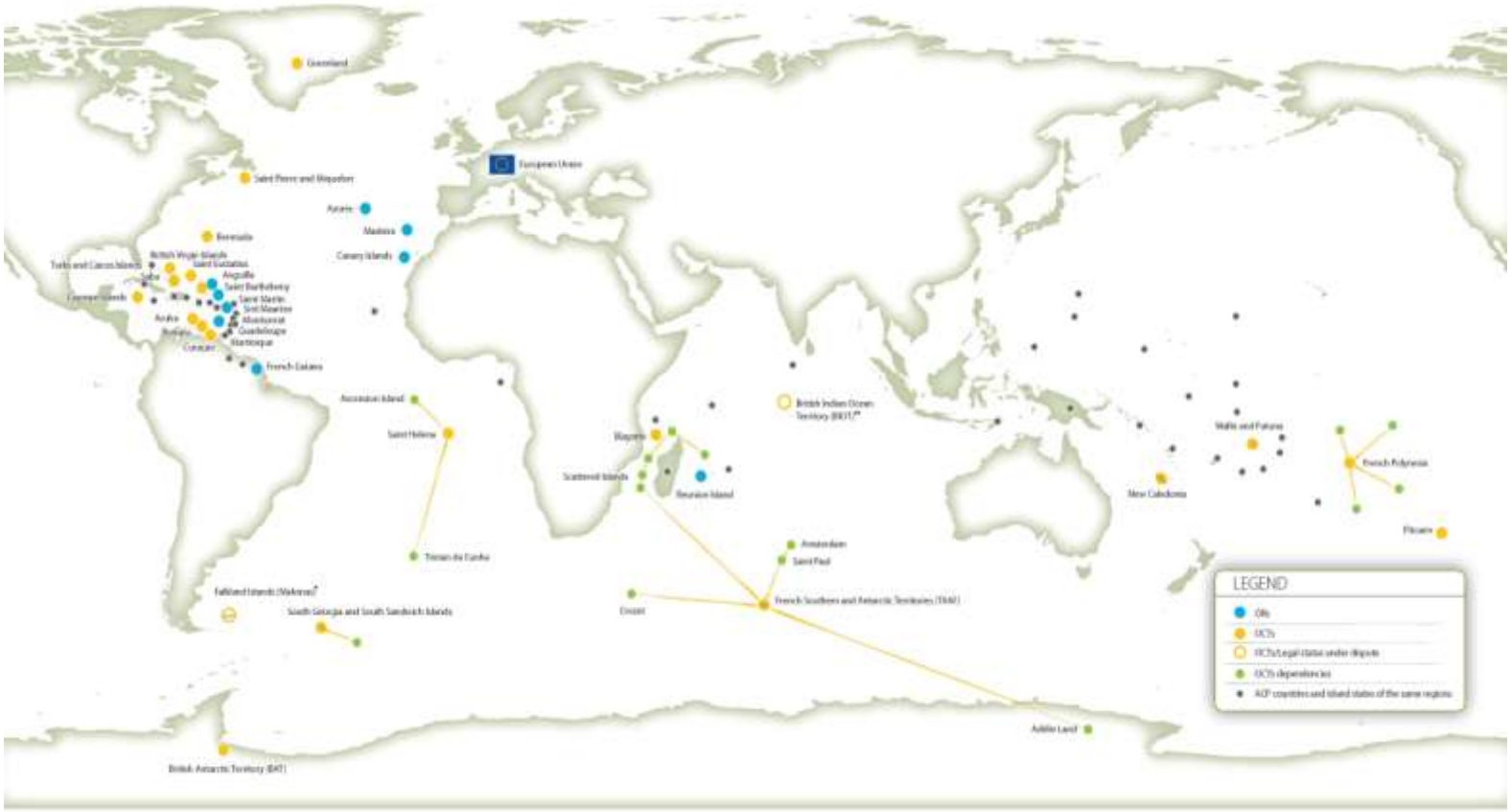
3 More information on the IUCN Europe Overseas Programme at http://www.iucn.org/euoverseas

4 See the full text of the Message from Reunion Island at http://cmsdata.iucn.org/downloads/080711_reunion_msg_en_1.pdf

5 See http://www.reunion2008.eu/

6 Visit the Forum online at http://groups.google.com/group/europe_overseas_forum

Figure 1: Map of Europe overseas (as of December 2010



A map from the publication on Future Directions for Biodiversity Action in Europe Overseas: Outcomes of the Review of the UEO Implementation. December 2011 (UCOL 2011)

The designation of geographical entities on this map and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of UCOL concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

* A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

** The Republic of Mauritius has initiated proceedings against the United Kingdom of Great Britain and Northern Ireland under the dispute settlement provisions of the 1982 United Nations Convention on the Law of the Sea (UNCLOS).

6) GOING BACK TO BASICS: MARINE CONSERVATION WITHOUT CAPACITY-BUILDING IS JUST A DREAM

Authors: Georgina Bustamante, Coordinator, Caribbean Marine Protected Area Management Network and Forum, and Alessandra Vanzella-Khouri, Programme Officer, UNEP Caribbean Environment Programme

With over 300 marine protected areas (MPAs) established or declared in the Wider Caribbean Region, protecting less than 10% of the coastal and marine resources of the region and with only 6% of those MPAs effectively meeting their conservation objectives due to ineffective management and/or insufficient funding, addressing conservation gaps and strengthening existing MPAs are priorities for the region. Since 1997, the MPA managers and practitioners of the Wider Caribbean agreed that communication and sharing would greatly assist in addressing many of the needs of their MPAs. To this end, the Caribbean Marine Protected Area Management Network and Forum (CaMPAM) was born under the aegis of UNEP's Caribbean Environment Programme (CEP), one of the 18 Regional Seas Programmes of UNEP, its legal framework, the Cartagena Convention and its regional biodiversity-related treaty, the SPAW Protocol (http://www.cep.unep.org/cartagena-convention/spaw-protocol/overview-of-the-spaw-protocol).

CaMPAM was developed modestly and gradually, focusing initially on fostering communications and exchanges between managers of MPAs and other marine resources throughout the region to share information, knowledge and lessons-learnt relevant to MPAs, as well as relevant to the sustainable management of coastal and marine resources. A comprehensive capacity-building programme was created in 1999 to provide training through regional intensive 2-week annual courses followed by local training activities by each of the trainees in their respective countries. Since then thousands of professionals have been trained through this MPA Training of Trainers programme, as well as through a combination of tools such as Learning Exchanges between MPA managers and fishers; sponsoring their attendance to scientific conferences; exchanging a wealth of information through an active internet list and forum; a regional MPA database; and technical expertise from scientists and managers within the CaMPAM coordinating team and partners. Additionally through a Small Grants mechanism, CaMPAM has been providing technical assistance to those MPAs, which qualify to address specific management needs within their MPAs, from updating their management plans or developing a business plan, to improving their infrastructure or acquiring small equipment.

In 2010, UNEP-CEP, thanks to the generous support of the Italian Ministry of Foreign Affairs, joined forces with other partners in the region to support countries with their conservation objectives under the Caribbean Challenge Initiative. The focus of this support was targeted to MPAs and hence it was agreed to be delivered through the existing platform of CaMPAM. The MPA strengthening activities were initially focused on the eight Caribbean islands nations associated with the Initiative: Antigua and Barbuda, The Bahamas, Dominican Republic, Grenada, Jamaica, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines. All the Parties to the Cartagena Convention and the Convention on Biological Diversity with common objectives and common needs for the sustainable management of their coastal and marine resources.

The overall objective of this UNEP-CEP project with the Italian government is to support the efforts of the Caribbean Challenge countries towards the establishment of a fully biologically representative, climate-change resilient and functional MPA network, in accordance with the objectives of the Protocol on Specially Protected Areas and Wildlife (SPAW) of the Cartagena Convention, as well as the GLISPA initiative. Synergies and coordination have been developed with other related projects in support of the Caribbean Challenge, such as those of TNC on the Biodiversity Fund and the relevant GEF projects on strengthening of protected areas systems in the same countries. The project is expected to be completed by the end of 2012 with the following outcomes:

- Enhanced coherence and financial sustainability of large-scale transboundary (national and eco-regional) MPA networks;
- Enhance regional networking of MPA sites sharing and collaborating on common issues;
- MPA regional database to support national MPA decision-making;
- Improved capacity of MPA practitioners for more effective MPA management.

Today CaMPAM has grown and evolved, but still remains the only region-wide programme providing continuously assistance to MPAs to improve management and strengthen capacities. The experience of these 15 years has showed that regional exchanges, communication and partnering are critical to expedite the process of disseminating best marine management practices; that the creation of social and economic incentives around the MPAs is essential for the local acceptance and compliance of the resource management regulations and its financial sustainability; that the private sector (fisheries, tourism and conservation community) could and should play an important role in developing innovative approach to marine conservation; and that successes in MPA management usually include an array of arrangements, which must be flexible, adaptive and tailored to the local needs and circumstances.

7) GULF OF CALIFORNIA MARINE PROTECTED AREAS NETWORK: STRATEGIES FOR THE USE AND CONSERVATION OF MARINE RESOURCES

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Introduction

The Comisión Nacional de Áreas Naturales Protegidas or the Commission for Natural Protected Areas (CONANP) is the Federal Agency in charge of the administration and management of the natural protected areas in Mexico.

As a result of the different processes of strategic planning, within the northwest region of Mexico, conducted between 2002 and 2007, important information voids were detected in relation to the main attributes that require monitoring within the protected areas in order to strengthen the decision making and adaptive management processes. In most cases, there was not a baseline to start a monitoring program of the main physical and biological variables. In other cases, the monitoring efforts were independent or with diverse protocols and without a regional approach.

Institutional Monitoring Efforts

From the results obtained with the regional strategic planning, and with the purpose of continuing the efforts of systematization and organizing the information, in 2007 the operative offices of the marine protected areas, in particular the five teams in charge of protecting and managing the reserve "*Área de Protección de Flora y Fauna Islas del Golfo de California*", which includes an area of coastline shared by five Mexican states, more than 900 islands, and with associated economic activities as well as an intricate network of socio-cultural relations, made it an excellent monitoring target throughout the Gulf of California. Thus, the work team of *Islas del Golfo de California* established a coordinated effort with the teams of other marine reserves within the region, and began a joint monitoring program of several of the most representative marine and shorebird species like Brown Pelican (*Pelecanus occidentalis*) and Yellow-footed Gull (*Larus livens*)7, as well as some marine mammals of wide distribution like the California sea lion (*Zalophus californianus californianus*)8.

In addition to the work by CONANP, at least two regional initiatives launched by civil organizations, academic institutions and international organizations have started efforts to establish an information baseline at a regional level in order to help the state and federal governments in improving decision-making and instituting public policies that promote the conservation of the marine and coastal patrimony.

7 CONANP 2012. Monitoreo de anidación de aves playeras migratorias en 11 sitios prioritarios del Noroeste de México.

8 CONANP 2011. Monitoreo de la población y condición de salud del Lobo marino de California (*Zalophus californianuas californianus*) en las colonias de reproducción del Golfo de California.

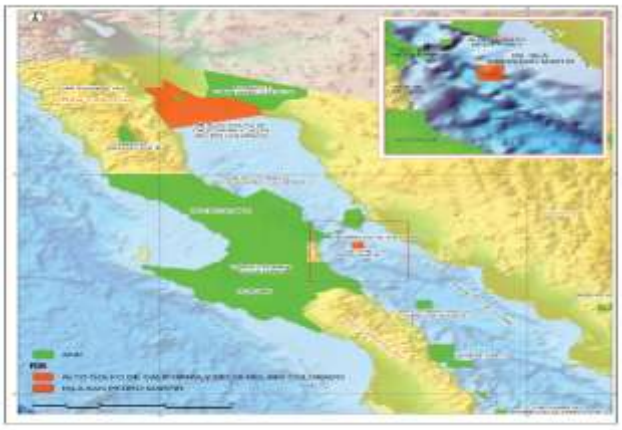
Establishing the Network of Marine Protected Areas

In 2006, as part of the environmental agenda of the North American Free Trade Agreement (NAFTA) signed by Canada, the United States and Mexico, the Commission for Environmental Cooperation (CEC) started the program "Baja to Bering" (B2B) aimed at establishing and operating the North American Marine Protected Areas Network (NAMPAN). From this process, a national strategy resulted that concluded with the formation of the northwest Mexico marine areas network.

The Northwest Mexico Marine Areas Network retook the experiences from the pilot project of score carding from NAMPAN. The objective of the project is to evaluate the present conditions of the marine protected areas in the region, and to assess the conservation conditions of the natural resources of these areas through a monitoring system that incorporates a series of questions and considers specific environmental impacts that systematically allows the determination of the present state and trends of three important groups of resources: water, habitat and life forms.

NAMPAN identifies seven ecological marine regions within the B2B corridor. Two of these, the Southern California Pacific Region and the Gulf of California Region, include seawaters within the Mexican territory. More than 80% of the Southern California Pacific Region is located within Mexican waters and the totality of the Gulf of California Region corresponds to Mexico.

Reports on present conditions and trends have been finished for five marine protected areas belonging to the two regions located in Mexico, and they were completed applying the same evaluation methodology used in the reports within the B2B corridor corresponding to the Marine Protected Areas of the United States and Canada, in compliance with the score card criteria approved by the CCA. In the case of the Gulf of California Region, the report on present conditions for the biosphere reserves Alto Golfo de California – Delta del Río Colorado and Isla San Pedro Mártir has been completed (see map). The latter reserve was updated in 2011 and Alto Golfo de California – Delta del Río Colorado will be updated this year[9].



9 Commission for Environmental Cooperation 2008, Towards Reporting on Vital Signs: A Guideline to Conducting Ecological Score carding at Marine Protected Areas.

8) COASTAL WATER POLLUTION AND MARINE BIODIVERSITY AT THE CROSS RIVER ESTUARY, OF THE NIGER DELTA REGION OF NIGERIA

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Introduction

Nigeria's coastline borders the Atlantic Ocean at the Gulf of Guinea covering a distance of 853km. With a depth of between 0 – 20m, her maritime area is 46,500 km^2 while her exclusive economic zone is 210,900 km^2 (World Resources Institute, 1990). At the point where rivers Niger and Benue merge with the Atlantic Ocean, the coastline is interrupted by a series of estuaries, which constitute the numerous oil rich swamps of the Niger delta (Ajao et al., 1996). One of the estuaries (the Cross River estuary) is located further east, near Nigeria's maritime boundary with Cameroon. Five major rivers discharge into the Cross River estuary, namely Cross River, Great Kwa, Akpayafe, Mbo and Calabar rivers (Ofor, 2002).

The Cross River estuary lies between longitudes $8^0 00^I$ E and $8^0 40^I$ E, and between latitudes $4^0 30^I$ N, $5^0 15^I$ N of the equator (Ekwu and Sikoki, 2006). It is said to be harbouring not just oil, but one of the richest areas of coastal fisheries in Nigeria, producing the world's richest quality of shrimps (Moses, 1999). However, Ekong et al. (2011:41) comment that "in Nigeria, the Niger Delta region (including the Cross River estuary) is one of the most abused environments." Asuquo et al. (1998) report that the Cross River estuary is undergoing negative ecological transformation both in water quality and species abundance due to oil pollution activities.

Eka and Udotong (2003) assess the effects of the 1998 Mobil (40,000 barrels) oil spill into the coastal waters of Akwa Ibom / Cross River States of Nigeria, and confirm reduction in biodiversity, outbreak of unidentifiable infections, known respiratory diseases, and social conflicts in the affected coastal communities. Udom (2008) reports that between 1982 – 1992, Shell oil spills at 27 different locations amounted to about 1,626,000 gallons. Ita (1993) reports on water pollution through local fishing practices that hinge on the use of pesticides (e.g. Actellic, Alamon, Aldrex, DDT, Gammalin 20, Fenthion, Nogos, Ultracide, Igran and Risane). Tijani (2006) highlights several safety issues associated with pesticide use in Nigeria. However, oil spills and pesticides are not the only sources of water pollution along the Cross River estuary. There are no accurate studies that document the different types of water pollution, the polluters involved, the ecological or biodiversity effects of such pollution, and the measures of mitigation required in the Cross River estuary.

This study is exploratory, appraising the different anthropogenic sources of up-stream and downstream water pollution activities that have negative impacts on marine biodiversity in the Cross River estuary. The purpose is to determine other range of studies that may be required to comprehensively determine the toxicity levels of pollutants, their marine biodiversity effects, and appropriate short and long term interventions needed as measures of mitigation.

Study area and methods

The study was carried out in one downstream urban town (Calabar, capital city of Cross River State of Nigeria), two upstream urban towns in Cross River State (Ikom and Itigidi), and three up-stream rural communities (Adiabaw Ikoneto, Uyanga and Akwa Ibami) that all have anthropogenic impacts on the Cross River estuary. Participatory rural appraisal (PRA) techniques comprising coastal transect studies, focus group discussions and interviews were used to facilitate the study.

Results

Whereas down-stream water pollution is characterised by petroleum activities (e.g. oil spills and gas flaring), up-stream findings reveal industrial effluents, sewage effluents, untreated waste water discharge into the estuary (due to the absence of treatment technologies), exposed landfills that are usually drained by storm water run-off, domestic effluents and automobile waste (e.g. engine oil and other lubricants).

For the rural communities, findings reveal continuous use (till present day) of assorted pesticides for fishing and agricultural purposes (i.e. fertilizers for soil fertility and gammalin 20 for cocoa production). The most dominant of the pesticides used for killing of fish is Gammalin 20. It was also discovered that the rubber factories at Uyanga and Adiabaw all discharge their effluents to the Calabar River. Logging and timber transportation by water, and mining effluents also originate from the rural communities of the study. Findings further reveal that though water pollution laws exists on paper, they are hardly enforced, culminating in widespread dumping of assorted waste products (including electronics), and discharge of harmful substances by businesses (i.e. pharmaceutical establishments) into water bodies.

Discussion and Conclusion

The study appraises coastal water pollution and its marine biodiversity impacts at the Cross River estuary along the Niger delta region of Nigeria. The study upholds that there is inadequate scientific research on the downstream and upstream forces driving perennial human-induced water pollution at the Cross River estuary. The downstream sector is dominated by powerful stakeholders (e.g. oil companies) who seem to have their way with gas flaring and different types of oil spills. Mannion (1999) estimates that globally, over 3.6 million tonnes of oil is annually spilt in different ways into the sea, comprising shipping accidents involving oil tankers, natural seepages from sea-beds, off-shore seepages from drilling and oil exploration, as well as deliberate discharge into the sea for ecological terrorism purposes. Accurate estimates of oil spills in the Cross River estuary in particular, and the Niger delta region in general remain unknown.

The study also upholds that upstream polluters as highlighted in the findings are not being held accountable for their actions, culminating in business as usual, and environmental offenders pointing accusing fingers only at others (e.g. oil companies). On the strength of the above downstream and upstream causes of coastal water pollution, the Cross River estuary constitutes a major source of the release of toxic substances into the Atlantic Ocean with serious negative consequences on marine biodiversity. This exploratory study provides preliminary facts upon which detailed scientific investigations could be launched on the extent to how the elements of the above upstream and downstream forces annually contribute towards coastal water pollution at the Cross River estuary.

Individual researchers neither have the resources to undertake major scientific investigations (as indicated above) nor possess what it takes (in terms of power relations) to confront the oil industry in the Niger delta. Scientific research activities are vital for informing the articulation of policies and programmes capable of addressing coastal pollution activities in the Niger delta region as a whole. Scientific findings could influence society-wide (or stakeholder-wide) anti-pollution laws at local, state and federal levels. It could facilitate the articulation of appropriate institutional and programme mechanisms for the enforcement of the above laws. The study strongly recommends that scientific research activities should be catalyzed in the Cross River estuary in particular and the Niger delta in general for the purpose of designing society-wide measures of protecting marine biodiversity in the region.

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9) DEVELOPING A MARINE NATURE RESERVE FOR BIODIVERSITY CONSERVATION AND FISHERIES MANAGEMENT IN THE ISLE OF MAN, BRITISH ISLES

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The Process for establishing the Isle of Man's First Marine Nature Reserve

The Isle of Man is a self-governing Crown Dependency of the UK in the Irish Sea, British Isles. The island has a diverse coastline and a territorial sea, which extends out to 12 nautical miles from shore.

In October 2008, the Wildlife and Conservation Division of the Department of Environment, Food and Agriculture started a process to identify the Isle of Man's first Marine Nature Reserve (MNR). The process was designed to be inclusive and collaborative, involving key marine stakeholders and the general public in the identification of a suitable site. Throughout the process, meetings were held around the Isle of Man to inform people of the project and to gather views on the requirements for marine protected areas (MPAs) and to collate local knowledge of the marine environment. The process also included many opportunities for marine stakeholders and the wider public to learn about marine conservation and sustainable marine resource use and also about the implementation and function of marine protected areas for biodiversity conservation, fisheries management and wider community benefits.

The OSPAR guidelines for the identification and selection of marine protected areas in the OSPAR Maritime Area were used to assess marine sites around the Isle of Man. A list of 22 candidate sites was drawn up using the guidelines, highlighting the number and diversity of Manx marine sites suitable for protection as marine protected areas. These sites ranged from diverse rocky reef sites to areas important for basking sharks.

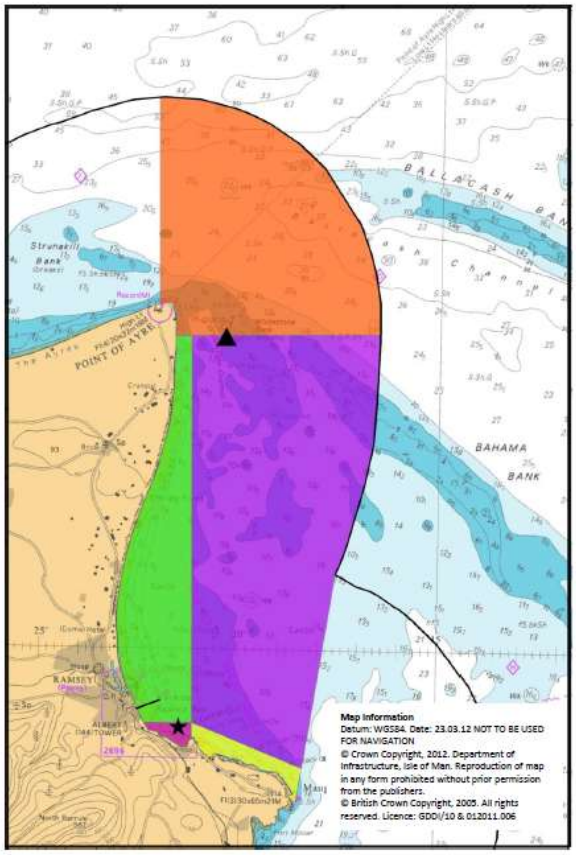
In 2010, the Manx Fish Producers' Organisation (MFPO), which represents most commercial scallop fishers in the Isle of Man put forward a proposal for establishing the Marine Nature Reserve in Ramsey Bay. Ramsey Bay was one of the sites identified as a candidate Marine Nature Reserve on the basis of the presence of priority habitats such as maerl beds and eelgrass meadows. The Bay had been closed to scallop fishing in 2009 as a temporary emergency measure at the request of the fishing industry. The proposal from the MFPO to permanently close part of Ramsey Bay was investigated further and the decision was taken to pursue the site for designation as the Isle of Man's first Marine Nature Reserve.

Additional data gathering and public consultation followed this proposal. The site was extended to include another candidate site, the horse mussel reef and associated habitats of the Ballacash Channel. Additional surveys carried out in the area during summer 2011 produced the baseline for future monitoring, including dive surveys by volunteer Seasearch divers, boat-based habitat characterisation to enable EUNIS biotope categorisation and detailed analysis of grab samples.

In October 2011, the Ramsey Marine Nature Reserve was designated with the support of the Manx Fish Producers' Organisation and the wider community. The MNR came into immediate affect and the by-laws received final approval by Tynwald, the Parliament of the Isle of Man in January 2012.

Description of the Ramsey Marine Nature Reserve

Ramsey Marine Nature Reserve covers a total area of 94.4km^2 to the north-west of the Isle of Man. Much of the inner area of Ramsey Bay is shallow, with depths of less than 20 metres. The deepest areas of up to 40 metres are found in the Ballacash Channel. The whole area of the MNR is protected from aggregate extraction, dumping of dredged material, gill-netting, long-lining and littering. Construction can only take place in the area with permission from the Department of Environment, Food and Agriculture. Within the boundaries of the Marine Nature Reserve there are five management zones (see Figure 1).



Name of Zone	Location	Area (km^2)	% of Manx waters	Permitted	Not Permitted
All Coloured Zones	Ramsey Bay and the Ballacash Channel	94.4	2.36	Boating, diving, swimming, snorkelling, kayaking, rock-pooling and a wide range of other activities.	Gill-netting, long-lining, aggregate extraction, dumping of dredged material, littering, construction (unless licensed by DEFA)
Conservation Zone	Inner Ramsey Bay	13.9	0.35	Potting, Angling	Trawling, Dredging, Other extraction of scallops and queenies
Horse Mussel Zone	Point of Ayre to Ballacash Channel	31	0.78	Angling	Potting, Trawling, Dredging, other extraction of scallops and queenies
Fisheries Zone	Outer Ramsey Bay	47.4	1.18	Potting and Angling. Restricted Trawling, Dredging and scallop diving under MFPO and DEFA control	Trawling and dredging not authorised by MFPO and DEFA.
Eelgrass Zone	Southern corner of Ramsey Bay (Port Lewaigue to Ballure)	0.5	0.01	Taking of razorshells and lugworms is permitted from 1 October to 31 March in the intertidal only. Keep pots.	Potting, Trawling, Dredging, Angling, any other extraction of living resources. Extraction of lugworm and razorshells is prohibited 1 April to 30 September.
Rocky Coast Zone	Narrow strip from Gob ny Rona to Maughold Head	1.6	0.04	Potting, Angling	Trawling, Dredging, Other extraction of scallops and queenies

Figure 1: A map of Ramsey Marine Nature Reserve and a summary of management within the zones.

The Fisheries Management Zone of 47.4km^2 is currently closed to all scallop fishing, but will be leased to the Manx Fish Producers' Organisation for them to manage sustainably based on scientific information, with the condition that they maintain the ecological integrity of the site.

The Horse Mussel Zone covers 31km^2 and is protected from all trawling, dredging and potting. The zone protects an extensive horse mussel reef. The Conservation Zone covers 13.9km^2 and is protected from all trawling and dredging but potting is permitted. Habitats protected within the Conservation Zone include maerl beds and kelp forests (see Figure 2). The Eelgrass Zone is the most highly protected zone within the MNR. The eelgrass and rocky shore habitats with the zone are protected from all removal or destruction of plants and animals except seasonal collection of razorshells and lugworm for bait. This special permission will be reviewed in 2014. The Rocky Shore Zone is protected from trawling and dredging as a voluntary measure agreed by commercial fishers.

Lessons Learned

An initial attempt to designate a Marine Nature Reserve in the Isle of Man in 1992 ended in failure, which many attributed to the lack of consultation and stakeholder involvement. This new process acknowledged the vital importance of community understanding and support for marine protected areas. Significant time was invested in building public awareness of marine conservation issues and also in collecting views and information from marine users and the wider public.

The turning point in the designation process was the offer from the Manx Fish Producers' Organisation to establish Ramsey Bay as a Marine Nature Reserve. This decision was influenced by the fishers' acceptance that an MNR was going to be established and that they had an opportunity to influence the selection of a suitable site to ensure maximum fisheries benefits. Compared to other countries beginning the process of MPA designation, the Isle of Man had a head start. The Port Erin Closed Area was established off the south of the Isle of Man in 1989 and has gradually been accepted as a vital tool in supporting sustainable scallop fisheries in the Isle of Man. Although resisted by fishers initially, in the last 5 years, the Port Erin Closed Area has become widely supported and acknowledged as important in enhancing scallop fishing grounds by supplying young scallops. This support led to the establishment of a second Fisheries Closed Area in Douglas Bay in 2009 and also the establishment of 2 further Closed Areas as potential ranching areas for scallops to be managed by Manx fishers. Manx fishers therefore did not require convincing of the value of closed areas for scallop fisheries enhancement and realise the opportunity of combining a Fisheries Closed Area with an MNR.

Conclusions

Ramsey Marine Nature Reserve provides a good example of a marine protected area that has been designated for conservation and fisheries management objectives with the support of the fishing industry. The protection of over 94km^2 of seabed makes an important contribution to Aichi targets, promoting sustainable fisheries in Manx waters and protecting nearly 2.4% of the Manx Territorial Sea. The Ramsey Marine Nature Reserve also protects a mosaic of important marine habitats that play a vital role in the Manx marine ecosystem and can act as important carbon sinks, including horse mussel reefs, eelgrass meadows, maerl beds and kelp forests. Some of these habitats are in good condition, but others are degraded and are expected to recover rapidly in the absence of damaging activities. Anecdotal evidence from the initial closure of Ramsey Bay to scallop dredging indicates that there have already been significant improvements in the health of benthic habitats, and that some species such as flatfish have become larger and more abundant. The baseline surveys carried out in 2011 will allow us to quantify these changes on an annual basis.

The Ramsey Marine Nature Reserve has great potential to bring diverse benefits to biodiversity, fisheries management, tourism, recreation and education. The designation has been actively supported by local commercial fishers and has wide

public support, built through an extensive stakeholder consultation and engagement process. Community participation in monitoring, education and other aspects of the MNR management will be a vital part of this project as it develops into the future.

10) THE MANGROVE FOREST IN THE FONSECA GULF: MORE THAN A FRONTIER BETWEEN LAND AND SEA, A SOURCE OF LIFE AND BENEFITS FOR PEOPLE

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Mangroves are coastal forests with plants and animals adapted to live in the border zone between land and sea, where fresh water from rivers and salt water from the ocean mix. Mangroves are also called "salty forests" because of the close interaction between mangroves and sea water.

Mangrove forests provide support and shelter for a great amount of living things creating a web of life.

Despite their apparent simplicity, mangrove forests are some of the most productive ecosystems in the planet as they provide welfare for people and stability for adjacent ecosystems.

Goods and services provided to people and nature by mangroves	**Importance for people**
a. Food for humans and animals. b. Biodiversity c. Climate regulation, erosion control, water quality. d. Buffer area for hurricanes and other climate events. e. Recreation and culture.	✓ Approximately one million people live and receive benefits from the mangrove forests in the Fonseca Gulf. ✓ Mangrove forests provide goods for the local market: fish, seafood, wood and salt. ✓ They generate high income because these mangroves host a thriving shrimp industry. ✓ Mangroves are key reproduction areas for many commercial species such as shrimp, fish, clams, crabs, lobsters and many other organisms. ✓ Mangroves contribute to local climate stability by fixing high amounts of carbon. ✓ Mangroves stabilize coastlines avoiding marine water to erode land and penetrate underground freshwater layers. ✓ Mangrove forests catch and filter high amounts of sediment and contaminants from mainland. ✓ Salty forests work as natural barriers against tsunamis, storms, hurricanes and tropical storms. ✓ Mangroves are places for recreational activities such as fishing, birding and kayaking.

Environmental Integration and Mangroves

In order to establish a regional cooperation framework in Central America, the presidents of the Central American countries signed in 1989 a Charter Agreement to create the Central American Commission on Environment and Development (CCAD), which is the environmental branch of the Central American Integration System (SICA). To date, eight countries are members of SICA: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama and the Dominican Republic.

In 2007, the presidents of Honduras, Nicaragua and El Salvador decreed the Fonseca Gulf as a "priority area for safety, peace and sustainable development", as stated in the "Managua Declaration" of 2007, and instructed CCAD to design and implement the "Mangrove Corridor" Project, financed by the Spanish Agency for International Development Cooperation (AECID) through the Spain-SICA Fund.
This initiative seeks to build a common understanding of the environmental problems and solutions of the Fonseca Gulf between El Salvador, Honduras and Nicaragua and to implement activities to better manage natural resources from a trinational perspective.

The Fonseca Gulf: A Priority Area

Mangrove forests are found throughout the Central American Pacific Coast, but their distribution is considered more abundant in the area ranging from Jiquilisco Bay in El Salvador, through Honduras, to Jiquilillo Beach in Nicaragua, encompassing the entire Fonseca Gulf.

A recent study, sponsored by the "Mangrove Corridor" Project, showed the Fonseca Gulf has 89,854 ha (898 km2) of mangrove forest coverage, distributed as follows: Honduras: 38,593 ha, Nicaragua: 26,318 ha and El Salvador: 24,943 ha.

Some scientists estimate mangrove forests reach an approximate annual economic value of $USD 10,000/ha/year; surpassing coral reef, continental ecosystems and deep sea. If we consider this value as a parameter for the Fonseca Gulf mangrove forests, we find that this area produces a total of $USD 882 million dollars per year. In any case, this amount is moderate if compared with the 200,000 to 900,000 $/ha/year estimated as a more accurate value for the multiple goods and services provided by mangrove forests.

Mangroves and Climate Change

As all plants with leaves, mangrove trees absorb carbon dioxide (CO_2) from the atmosphere and use it for their growth; as such they help to reduce CO_2 concentration. In this process, mangrove forests are more efficient than other tropical forests and that is why they are considered very efficient "carbon sinks". It is also estimated that mangrove trees accumulate, at under water level, up to five times more CO_2 than above the ground, therefore, they must be considered essential in the efforts against climate change.

11) TOWARDS SUSTAINABLE FISHERIES: IMPLEMENTATION OF CO-MANAGEMENT AND FISHERIES RECOVERY SITES

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Background

Through sharing responsibility over resources with direct users, fishers can define and enact sustainable use measures and responsible management of fishing resources. The MAR Fund Community Fisheries Program supports the design, establishment, management and monitoring of co-management mechanisms for fisheries resources by organized groups of fishers.

The idea is to support precisely this local approach through encouraging active participation of organized groups of fisher men and women in fisheries management across the four countries of the Mesoamerican Reef (MAR) region. This can be achieved through arrangements between organized community groups of fishers and local authorities and/or protected area administrators in the MAR region. The goal is to promote ecosystem-based management of fisheries, including the establishment of fisheries recovery sites, also known as community marine reserves or no-take zones, which have demonstrated important results in the recovery of biodiversity inside and outside these areas, along with an increase in fishing production10.

To establish the baseline information for the design of this program, MAR Fund, jointly with TNC and WWF, organized and co-financed the initial informative/training workshops on fisheries co-management and use of community marine reserves for marine conservation in each of the four countries in the region. The workshops were facilitated by the Mexican non-governmental organization (NGO) COBI. This NGO has many years of experience on community marine reserves, mainly in the Gulf of California, Mexico, and has worked in Puerto Morelos National Park (PNAPM, Spanish acronym) to promote the use of fisheries recovery sites as a fisheries management tool that contributes to strengthening the current conservation efforts in PNAPM.

The Central American Commission on Environment and Development (CCAD, Spanish acronym) on MAR Fund's Board of Directors supports this initiative and others in Central America to promote the sustainable use of resources through the involvement of fishing communities.

On-going Pilot Projects

Arrecife de Puerto Morelos National Park, Mexico

In 2010, through the collaborative work between the National Commission of Natural Protected Areas (CONANP, Spanish acronym), the Puerto Morelos Fishing Cooperative and COBI, the fishers of Puerto Morelos

10 Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) 2008. La ciencia de las reservas marinas. Segunda edición, versión para Latinoamérica. 22 pp

decided to cede 3,527ha of their fishing concession inside the PNAPM to establish fisheries recovery sites. The creation of these sites gives full protection to approximately 36% of the park's surface.

To evaluate the conservation impacts of the fisheries recovery sites, the fishing cooperative designated nine of their members to form a biological monitoring team. This team has been trained by COBI's marine biologist and dive masters to conduct scientific biological monitoring inside and outside their marine reserves. The close collaboration of fishers in the evaluation of the conservation impact of these sites has promoted ownership of the initiative.

The analysis of the monitoring data confirms a change in fish density in the monitoring sites after the monitoring conducted in 2010. Presently, COBI and external consultants are adapting and improving the monitoring methodology to have more consistent and robust data to evaluate the contribution of marine reserves to the recovery of fish populations and marine ecosystems.

Figure 1: Biological monitoring team

In order to restore the full stream of ecosystem goods and services provided by coral reefs along the coast of Quintana Roo, COBI and 33 institutions have joined Alianza Kanan Kay, a multi-sector initiative working towards the common objective of establishing an effective network of fisheries recovery sites that protects 20% of the territorial waters off Quintana Roo by 2015 to allow the recuperation of artisanal fisheries.

Cuero y Salado Wildlife Refuge (RVSBCS, Spanish acronym), Honduras

The three fishing communities of the Cuero y Salado Wildlife Refuge organized themselves to create the Association of Fishers of Salado Barra, Boca Cerrada and La Rosita (APROCUS). The APROCUS is recognized at the central government level, and signed an agreement with Fundación Cuero y Salado (FUCSA, Spanish acronym), the foundation that administrates the refuge, for the co-management of a fishing territory of 1,847 ha, which includes four fisheries recovery sites with a diameter of one kilometer each. The fisheries recovery sites cover a total area of 314 ha equal to 17% of the co-management area.

This agreement, the first ever in Honduras, allowed the APROCUS to design the management plan for the fishing territory jointly with FUCSA. With external technical assistance, a training program for the members of APROCUS was implemented including the following topics: environmental education, economic alternative activities, natural resources protection and conservation techniques, and fisheries regulation enforcement. Currently MAR Fund is discussing follow up that will be provided to APROCUS as part of the Community Fisheries Program, so that they can begin the implementation of their action plan.

Punta de Manabique Wildlife Refuge (RVSPM, Spanish acronym), Guatemala

Another project is under development with communities in RVSPM, Izabal, Guatemala. A co-management area and three fisheries recovery sites with a total area of 345 ha have been proposed in La Graciosa Bay by the four fishing communities involved in this initiative: La Graciosa, Santa Isabel, Punta Gruesa and Puerto Barrios.

They include important reproductive sites for snappers, small groupers, mackerels, and other species within the bay.

Figure 2: Fishers of La Graciosa bay, Port Honduras Marine Reserve (PHMR), Belize

The draft co-management agreement was prepared jointly by the fishing communities with support from consultants and was submitted to the National Council of Protected Areas (CONAP, Spanish acronym) of Guatemala. CONAP is now evaluating the proposal.

The Port Honduras Marine Reserve protects 40,469 ha. One percent of the area is a Preservation Zone, meaning no entry or activity is allowed, and 4% is a Conservation Zone, where only recreational/fly-fishing and snorkeling is allowed. The Toledo Institute for Development and Environment (TIDE), the NGO that administrates the area, has the objective of increasing the no-take zones.

Fisheries in Belize are managed as open access fisheries. Around the world, open access fisheries are proven to be vulnerable to overfishing – a threat to the health of fisheries and the livelihoods of fishers. TIDE is now implementing a rights-based management regime for fisheries in Port Honduras Marine Reserve called "Managed Access" along with a network of partners including the Government of Belize, Environmental Defense Fund, and Wildlife Conservation Society of Belize. PHMR is the first site to transition from open access fishing to rights-based management in Belize and will be an important test case as Belize implements Managed Access in the entire marine reserve system.

Managed Access is a special license given only to traditional fishers of the area who meet a certain criteria. For example, they must have history of using the reserve, must live and have evidence of selling their products in Belize and must submit their catch data. These are the main criteria for getting a managed access license. Managed Access is just one step towards managing fisheries and the 'no take zones or fisheries recovery sites' serve as nursery grounds for the general use zone of the reserve where managed access fishers have a license to fish.

12) EXPLORING INNOVATIVE MODELS OF PARTICIPATORY MPA GOVERNANCE IN ECUADOR TO ACHIEVE AICHI TARGETS OF MPA COVERAGE (11), ECOSYSTEM SERVICE MAINTENANCE (14) AND SUSTAINABLE FISHERIES (6)

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The Galapagos Marine Reserve, established in 1998, represents a major contribution to global marine conservation, enabling Ecuador to fulfill Aichi Target 11. However, until recently, the marine ecosystems of mainland Ecuador have had almost no protection on paper and even less in practice (Terán *et al*., 2006). Though trends are poorly documented, the paucity of MPAs combined with ineffective control of fisheries and coastal development has led to degradation of coastal and marine ecosystems, upon which the livelihoods of many poor and marginalized communities depend. Determined action will be needed to achieve Aichi targets 6 and 14. Since 2005, Ecuador has begun to take such action, creating seven new coastal-marine MPAs with a total of 238,350 ha, with more in the pipeline. However, creation of MPAs needed to be accompanied by new systems of governance to enable MPA management to become more effective. Top-down approaches have proven ineffective and it is likely that participatory approaches could prove more effective, in line with international experience (e.g. Green *et al*., 2011). Furthermore, Ecuador's 2008 Constitution and recent laws affirm the right of Ecuadorian citizens to participate in crafting government policy and in the management of protected areas. This paper examines Ecuador's recent experiments with participatory governance and assesses the extent to which communities have been empowered to ensure the maintenance of ecosystems and sustainability of small-scale fisheries upon which they depend.

The Ecuadorian legal framework provides mechanisms for participation in MPA governance, but only guarantees, at best, a consultative role in decision-making (Table I). In many cases lack of preferential access rights and inability to directly influence resource use rules have discouraged stakeholder participation. The central government has shown openness to experiment with new systems for participation and new approaches to resource access rights (Fundación Futuro Latinoamericano, 2011) yet there is ambivalence about real empowerment of coastal communities (Gravez *et al.* in press).

Table I: Participation levels in MPAs of Ecuador, using Borrini-Feyerabend (2007) levels

Levels of participation in governance	**No. of Areas**	**Area (ha)**
Inform and/or consult about management decisions	8	363,000

Seek consensus, also through benefit sharing	8	268,000
Negotiate (involve in decision making) & develop specific agreements	1 (GMR)	14,000,000
Recognize full private or customary rights & assist in management	42 (mangrove)	50,000

The longest established participatory governance model is that of the Galapagos Marine Reserve, with a two-tier decision-making mechanism, established by a special law for Galapagos. This system has been successful in excluding industrial fishing, managing some but not all areas of conflict between stakeholders and park manager, institutionalizing dialogue, increasing acceptability of No-Take Zones to fishers (by negotiating formal consensus on their location), high degree of compliance with consensus-based quotas for lobster, agreements to close depleted fisheries, controlling fishing fleet capacity, building inter-institutional cooperation and building capacity and expectations for participation in development (Fundación Futuro Latinoamericano, 2011). On the other hand, despite the cross-scale nature of the governance mechanism and its social resilience over the last decade, the system has been unable to cope with external driving forces, in particular from the international markets for high value products, such as sea cucumber and shark fins, leading to notorious conflicts (INGALA, 2007; Defeo *et al*., 2009; Castrejon, 2012).

In mainland mangrove habitat the central government has since 2000 been innovative in defining a new legal framework for community-based management through agreements for (non-timber) use and custody, in effect concessions. So far, there are over 40 such concessions, under which responsibility for management is delegated to local communities or fishing organizations. Many have been successful in restoring populations of crabs and molluscs, empowering the concession holders, and producing higher catch shares, albeit with unevenly distributed benefits (Beilt, 2011; Coello *et al*., 2008). The success has not only led to replication of the model but also built confidence in the ability of communities to manage resources.

Extension of such approaches to fully marine ecosystems has been more tentative, but the grassroots protagonism in the 2008 creation and planning of the 54,000 ha Galera-San Francisco Marine Reserve (GSFMR) is breaking new ground in Ecuador. The management plan, currently awaiting government approval, gives local communities preferential access to marine resources, establishes a two-tier participatory governance system and prescribes a zoning scheme with substantial no-take zones and community-managed zones, all proposed by the communities themselves. There is anecdotal evidence that the participatory governance initiative has already brought marked social benefits in terms of local communities' organization, leadership skills, technical knowledge and self-esteem[11] (*S. Luna, pers. obs.*).

While the mangrove concessions and GSFMR are pushing ahead with new participatory approaches, the purely consultative management committee at another protected area, Machalilla National Park, has been functioning

11 http://www.youtube.com/user/Vocesmanejo (Testimonies of stakeholders in the participatory management of MPA in Ecuador.

poorly (*V. Gravez, pers. obs.*) and the government's proposed reforms to the special law for Galapagos include pulling stakeholders back to a purely consultative role. This ambivalence about taking definitive legal steps to empower local communities to participate in MPA decision-making stems in part from constraints in the Constitution itself and in part from concerns about whether participatory governance can indeed deliver effective conservation. Nevertheless, a workshop in March 2012 reaffirmed the Ministry of Environment's commitment to develop effective, participatory approaches. An important conclusion was that, rather than prescribe a mechanism for all MPAs, the government needs to provide a framework and guidelines, within which each MPA can develop a participatory governance system appropriate to its social and ecological context and to its stage of development in terms of the capacities of, and relations between communities and institutions. We endorse this approach of enabling diverse governance models to evolve and suggest that in pursuing it the government take into account the following recommendations:

- **Increase local management capacities:** All actors should take advantage of recent laws to increase local administrative and technical capacities.
- **Participatory decision making:** The Ministry should concentrate on setting the policies and approving management plans to which all decisions must adhere, then provide the community with substantial decision-making autonomy within that framework. The Ministry would nevertheless retain ultimate power to intervene or over-rule decisions, if there is evidence that management is ineffective.
- **Institutionalize participation**: Ensure that the rights and responsibilities of local stakeholders and the mechanisms for their participation are formalised and documented and their implementation monitored.
- **Two-way accountability:** Use formal agreements and improved communication to strengthen accountability of communities to Ministry of Environment and vice versa.
- **Restructure incentives:** Recognize that the strongest incentives for responsible management of marine resources are (i) exclusive or preferential access rights to resources within the MPA and (ii) the knowledge that they are the ones taking the decisions that will determine the viability of the ecosystems on which their livelihoods depend.
- **Improve coordination between institutions with common jurisdictions:** Ensure effective coordination and cooperation between institutions with jurisdiction in MPAs - Navy, environmental, tourism and fisheries authorities, local governments. This is not only for efficiency but also to ensure that the communities' relationship with government as a whole is clearly established and consistent across sectors.

In conclusion, we consider that by adopting this approach to developing participatory governance of its expanding network of MPAs, Ecuador can advance rapidly towards the Aichi targets.

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13) REMOVING INVASIVE ALIEN VERTEBRATES FROM ISLANDS HELPS CBD PARTIES TO MEET AICHI BIODIVERSITY TARGETS FOR PREVENTING EXTINCTIONS

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Although islands make up less than 5% of the earth's land area, 80% of known species extinctions since ~1600 have taken place on islands and 40% of IUCN Red List Critically Endangered species currently inhabit them (IUCN 2011, Ricketts et al. 2005). Invasive alien vertebrates (IAV) have been a primary cause of insular extinctions and recognized as a key risk to todays threatened species (Alcover et al. 1998, Atkinson 1989, Blackburn et al. 2004, Clavero and Garcia Berthou 2005).

Removing invasive alien vertebrates from islands is a proven strategy to protect biodiversity and prevent extinctions of threatened species (Aguirre-Munoz et al. 2008). By removing the most damaging invasive vertebrates from islands—goats, pigs, rabbits, feral cats and rodents— Parties to the CBD have significant potential to help achieve the 2020 targets set forth in the strategic plan, including:

- *Target 5*: loss, degradation and fragmentation of natural habitats is at least halved.
- *Target 9*: invasive alien species are identified, prioritized and controlled or eradicated, and measures to control introduction pathways in place.
- *Target 12*: extinction and decline of threatened species is prevented and their status improved.

There have been more than 700 successful eradications of invasive vertebrates worldwide (Keitt et al. 2011), and practitioners are undertaking removals from increasingly larger, more remote and more technically challenging islands each year (Howald et al. 2010), with the global pace of invasive species removal increasing (Phillips 2010). Importantly, greater collaborative outcomes are being sought to share resources and expertise, such as the 2011 joint expeditions to remove rodents from Palmyra Atoll, Henderson Island and Phoenix Islands.

By eradicating IAV from islands, remarkable recoveries of endangered species can occur (Howald et al. 2007). Following removal of feral cats from Natividad Island, the black-vented shearwater (*Puffinus opisthomelas)* showed dramatically reduced mortality (Keitt and Tershy 2003) and this species was subsequently down-listed by the IUCN from vulnerable to near threatened. Following the removal of pacific rats from Table Island, New Caledonia, the vulnerable fairy tern (*Sterna nereis)* recently nested there for the first time (Birdlife International 2011). In the Galapagos Archipelago, the removal of goats from 12 islands totaling 719,410 ha (Carrion et al. 2011), in combination with removal of other noxious invasives, will remove a key threat to this unique ecosystems, and provide important recovery benefit for threatened species like the Galapagos rail (*Laterallus spilonotus)* (Donlan et al. 2007).

Efforts to eradicate IAV should be directed to islands and archipelagos that offer the greatest biodiversity benefits at the lowest cost, including consideration of the number of threatened species, scope and severity of

IAV threats, island and human population size. Island Conservation, BirdLife International and the University of California, Santa Cruz Coastal Conservation Action Laboratory (CCAL) have built a database of insular breeding populations of IUCN Critically Endangered and Endangered mammals, amphibians, reptiles and birds of the world, using resources such as the IUCN Red List, the UNEP Global Island Database, and the Global Invasive Species Database. Figure 1 shows an example from this world first database.

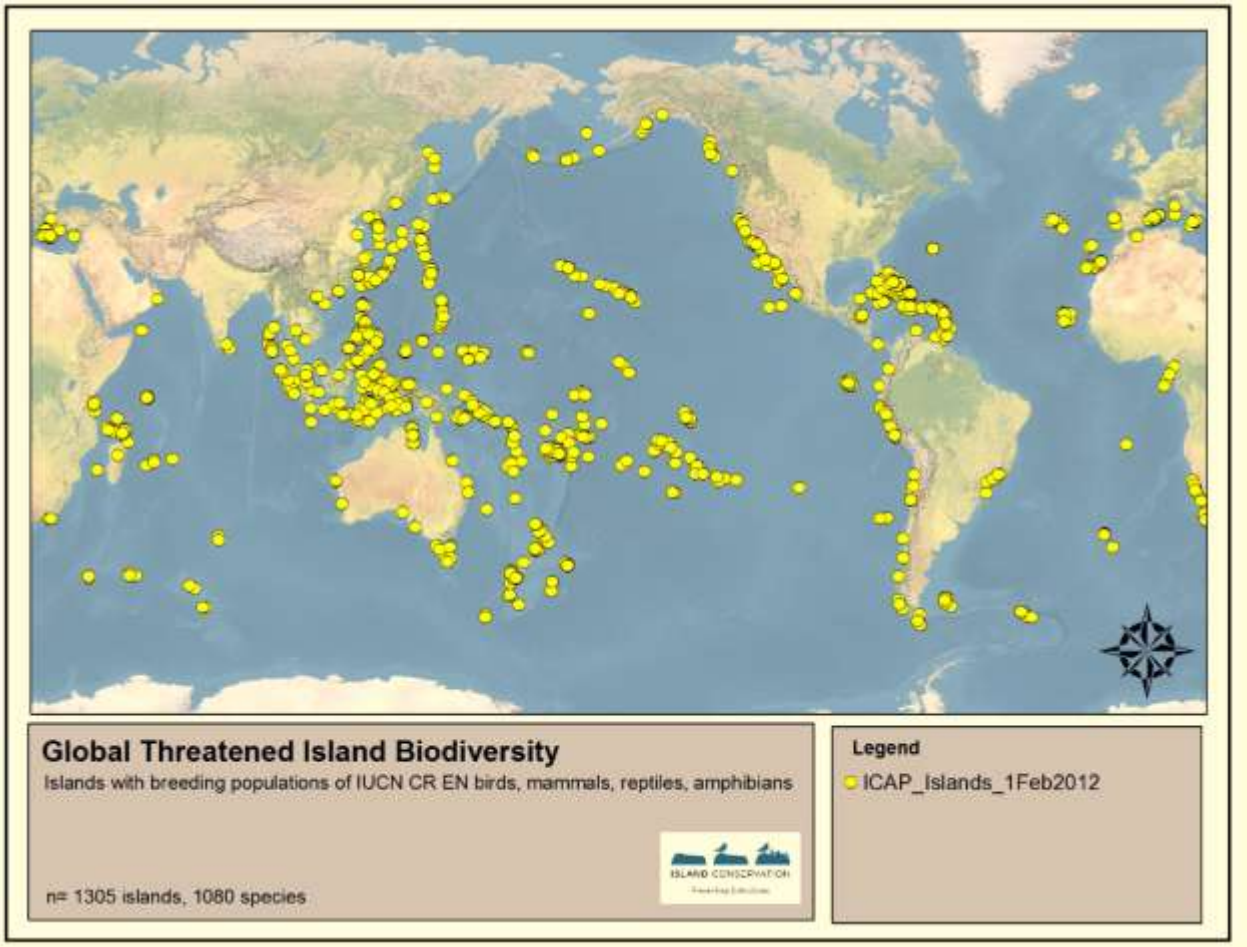

Figure 1: Islands of the Southwest pacific with breeding populations of IUCN Red List Critically Endangered and Endangered birds, amphibians, reptiles and mammals.

Achieving the Aichi targets requires removing the threat of IAV to island species on a global scale. A global, coordinated and collaborative effort, fully endorsed by the Parties to CBD will inspire the global community to action. Funding by global mechanisms such as the GEF, multi-lateral and aid agencies and large private donors will be critical to transform policy into action. To prevent extinctions on islands we must catalyze the financial capital and engage a global network of partners to implement island IAV eradications on national and archipelago scales.

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14) ICRI EAST ASIA ACTIVITIES

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The Initial Peak and Trough of ICRI's East Asia Regional Activities

The International Coral Reef Initiative (ICRI) is an informal partnership that brings together governments, international organizations, scientific entities and non-governmental organizations committed to reversing the global degradation of coral reefs and related ecosystems, such as mangrove forests and seagrass meadows, by promoting the conservation and sustainable use of these resources for future generations.

One of the recommendations that came out of ICRI's inaugural workshop held in Dumaguete City, Philippines in 1995 was for each region of the world to meet and prepare action agendas for coral reefs, based on their specific circumstances. Consequently, between 1995 and 1997, several regional workshops were held throughout the world. This regional focus, however, gradually faded in favor of General Meetings held once or twice annually and convening participants from all over the world. In the East Asia region, the first regional workshop held in Bali, Indonesia in 1996 was followed by a second regional workshop in Okinawa, Japan, the following year. A third regional workshop was then held in Cebu, Philippines in 2001. There was however limited continuity of the discussion and policies developed after these workshops, and the ICRI regional focus remained dormant for close to a decade.

During that time, it became apparent that the marine habitats of the region - recognized as the global center of diversity for the flora and fauna of coral reefs and related ecosystems – were increasingly under pressure from land and sea-based human activities resulting in the degradation and destruction of coral reefs and related ecosystems. The need to revive ICRI's regional focus in East Asia became more and more pressing.

The Revival of Regional Activities in East Asia: Strengthening Marine Protected Area (MPA) Networks

To revitalize ICRI's regional approach and to enhance conservation of coral reefs and related ecosystems in the East Asian region, three consecutive ICRI East Asia Regional Workshops were held in 2008 (Tokyo, Japan), 2009 (Hoi An City, Vietnam) and 2010 (Phuket, Thailand). The workshops focused on MPA networks to assist East Asian countries' efforts in achieving the 2012 global target on MPA networks set by the World Summit on Sustainable Development (WSSD) and the Conference of the Parties to the Convention on Biological Diversity (CBD). At the 2008 workshop, participants discussed priority actions for the next two years and compiled the *Provisional Plan 2009–2010*, a document listing a series of key actions to support national efforts and regional cooperation in developing MPA networks in the region. Key actions included the following: upgrading the regional MPA database; implementing the regional MPA status and gap analysis; mapping coral reef and related ecosystem habitats; identifying MPA management effectiveness systems and criteria for MPA networks appropriate for the region; and considering a suitable regional support mechanism.

A working group was formed to implement these actions from 2009 to 2010. The results of activities and discussions held in regional workshops were compiled into an *ICRI East Asia Regional Strategy on MPA Networks 2010*. The Regional Strategy is not a comprehensive strategy on MPA networks, but strongly reflects interests and discussions held by participants in regional workshops, which aimed to:

(i) create a regional mechanism for cooperation and coordination;

(ii) follow up on the Provisional Plan 2009-2010; and

(iii) reflect priority recommendations to regional and national policies.

In response to the suggested actions listed in the Regional Strategy, a follow-up workshop was held in Siem Reap, Cambodia in 2011, and another workshop is due to be held in Jeju, Korea in 2012. It is envisaged that, through these workshops and related activities, efforts on MPA networks are enhanced and regional collaboration strengthened among ICRI partners in East Asia.

This regional activity is particularly relevant to Target 10 (minimizing anthropogenic pressures on coral reefs) of the CBD Aichi Biodiversity Targets. It also addresses Target 6 (sustainable fishery) and Target 11 (protected areas).

15) CARIBBEAN REGIONAL RESPONSE TO LIONFISH INVASION

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Lionfish Invasion in the Caribbean: The Extent of the Problem

In the last decade, the invasion of lionfish (*Pterois sp*.) has spread across the Wider Caribbean Sea, threatening the health of temperate and tropical Atlantic reefs and hence the social and economic welfare of coastal communities that depend on them. The lionfish invasion is a serious issue because it can not only affect the structure and function of coral reefs and associated ecosystems, such as mangroves, seagrasses and estuaries; it can also disrupt the food web and in turn affect the recovery of species of concern such as the Nassau grouper, Warsaw grouper, and speckled hind. Combined with other major reef stressors such as land-based pollution, overfishing and climate change, the stress posed by the lionfish could have profound and unexpected impacts on coral reefs and associated ecosystems.

Although complete eradication of lionfish from the Atlantic is unlikely, coordinated and strategic actions at local, national and regional levels are critical to address the lionfish invasion and mitigate its impacts. These efforts are invaluable for supporting other conservation initiatives such as management of marine protected areas and fisheries stock rebuilding.

Joining Forces Against the Intruder: The Regional Lionfish Committee

Created under the auspices of the International Coral Reef Initiative (ICRI), the Ad Hoc Committee on the Caribbean Regional Response to Lionfish Invasion (now known as Regional Lionfish Committee, RLC) was established in November 2010 at ICRI's 25th General Meeting in Apia, Samoa. Key stakeholders including Mexico, the United States of America, France and the United Nations Environment Programme (UNEP) Caribbean Environment Programme Secretariat to the Protocol on Specially Protected Areas and Wildlife (SPAW-RAC) are leading this work.

As shown here, the RLC has been a catalyst for regional collaboration since its inception, among resource managers involved in the development of local and regional lionfish control strategies.

Taking aim at the Lionfish: Projects underway

Since its creation, the RLC has undertaken a number of tasks, some of which are still on-going:

- Releasing a Host Secretariat Advisory on the Lionfish Invasion in the Wider Caribbean (in July 2011) in three languages. The Advisory called attention to the lionfish invasion and its threats to coral resources of the Caribbean region and urged implementation of local control measures and engagement in a regional response.
- Compiling a list of contacts for practitioners, decision-makers and scientists involved in lionfish invasion control on a list-server (activated in mid 2011). Used to exchange the latest lionfish information, the list-server now counts more than 170 members from the entire Caribbean region.

- Facilitating local workshops to encourage governments and organizations working on this issue to share best management practices.
- Supporting the creation and publication of a best practices manual entitled: *Strategies and Practices for Invasive Lionfish Control: A guide for managers.*
- Promoting regional training workshops to facilitate dissemination of the lionfish control manual, including hands-on training underwater.
- Contributing to the development of a lionfish web portal to facilitate regional communication, convey current and credible scientific information, and provide access to best management practices and manager training tools. A launch is planned for the end of this year.
- Assisting in the development of a lionfish regional control strategy to identify and guide collaborative responses, with a release planned for late 2012.

Developing the Invasive Lionfish Control Manual

Recognizing the urgency of the lionfish invasion and the need to develop clear recommendations for local control, a special workshop was organized by an international team including ICRI, the Reef Environmental Education Foundation (REEF), the U.S. National Oceanic and Atmospheric Administration (NOAA) and SPAW-RAC and held in August 2010 in Cancun, Mexico. With 47 participants representing over 25 organizations from 20 countries and territories of the Wider Caribbean, this workshop identified many of the best strategies for addressing the lionfish invasion.

A writing workshop was held in Miami in April 2011, with representatives from the University of the West Indies in Jamaica, NOAA, REEF, SPAW-RAC, Simon Fraser University, the Mexican National Commission for Natural Protected Areas (CONANP), and the Centre for Agriculture and Biosciences International (CABI). Chapter authors were assigned and outlines developed. The manual will contain many of the tools and best practices needed to control, manage, and research lionfish.

The Manual, entitled *Strategies and Practices for Invasive Lionfish Control: A guide for managers* was formally presented at the 64th Annual Meeting of the Gulf and Caribbean Fisheries Institute (GCFI), 31 October- 4 November 2011, and a side event was held at the 4th International Marine Ecosystem Management Symposium in Guadeloupe 5-8 December 2011. It is being published and will soon be available for distribution; a version in Spanish will also be available.

Regional training workshops

The National Fish and Wildlife Foundation (NFWF) provided funding for holding three regional training workshops to facilitate dissemination of the lionfish control manual, including hands-on training underwater. The first regional lionfish collecting and handling workshop of the series was convened during the 64th meeting of GCFI in Mexico, November 2011. It attracted more than 20 participants from a dozen Caribbean countries. The two remaining workshops are scheduled for 2012 in the Bahamas and Florida.

Lionfish web portal

A lionfish web portal is being developed to provide current and reliable information on the lionfish invasion, including status, reporting, management techniques, sample control plans, and legislation, all widely accessible to managers and decision makers. It is also intended to allow web-based training on lionfish control strategies to coastal managers across the Wider Caribbean Region (WCR).

Lionfish Regional Response Plan for the Wider Caribbean

A workshop will be conducted with government representatives of affected Caribbean countries to substantively review a draft Lionfish Regional Control Strategy and develop a vision on regional elements of the response strategy. The lionfish control manual will be used as a basis to develop this plan, which will build on existing local strategies developed for the Bahamas, Bonaire, Cuba, and Mexico.

About ICRI

The International Coral Reef Initiative (ICRI) is an informal partnership of like-minded governments and organizations seeking to build and sustain the capacity of countries and regions to achieve effective management and sustainable use of coral reefs and related environments. Founded by eight governments (Australia, France, Japan, Jamaica, the Philippines, Sweden, the United Kingdom, and the United States of America), the establishment of ICRI was announced at the First Conference of the Parties (COP) to the Convention on Biological Diversity in December 1994, and at the high level segment of the U.N. Commission on Sustainable Development (CSD). The Initiative is currently co-chaired by the governments of Australia and Belize. For more information about ICRI visit www.icriforum.org and/or www.icriforum.org/lionfish

16) IDENTIFICATION OF PRIORITY CONSERVATION AREAS FOR MARINE BIODIVERSITY IN VENEZUELA: THE FIRST STEP TOWARDS THE EXPANSION OF THE NATIONAL MARINE PROTECTED AREAS NETWORK

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Introduction

Venezuela's system of marine protected areas (MPA) comprises a set of 21 areas under a special administration regime (ABRAE). This administrative figure includes national parks, natural monuments, wildlife refuges and wildlife reserves. Considering strictly the marine area, only 5470 km² (0.6%) of the territorial sea and the EEZ are covered. Most of these ABRAE were established more than 30 years ago, and many of them without any scientific data to support their delineated boundaries. Inside the coastal national parks and wildlife refuges, the main coastal ecosystems, like coral reef, seagrass beds and mangrove forests are in general well represented. However, the actual configuration of the MPA doesn't cover open sea areas and many of the oceanic islands, where important biodiversity features exist (Miloslavich et al., 2003).

Since 2000, Venezuela has implemented a large scale project for off-shore gas exploitation. Oil and gas exploitation represent a major threat to marine biodiversity, considering the potential impacts derived from this activity at each of the different stages on a major exploitation program (Burke & Maiden, 2004; Halpern et al, 2008).With most of the prospected areas located on the continental shelf, Petróleos de Venezuela (PDVSA), the Venezuelan national oil industry, is planning exploration and exploitation of the offshore resources in more than 25% of the ~580.000 km^2 of territorial sea and EEZ.

Methodology

In order to establish a set of conservation strategies, we used an eco-regional planning methodology (Groves et al, 2000) to select a portfolio of marine and coastal priority conservation areas that includes marine populations and ecosystems characterized by a high health status with a minimal conservation cost. After selecting 43 conservation targets in an eco-regional configuration, their conservation status was evaluated and the major threats identified. The conservation goals – how much of the cover area of each conservation target in each eco-region must be included in the proposed conservation areas-- were established between 30% and 100%. The approach to assess the health status, vulnerability, and rarity of the conservation target was through consultation with a large group of local and national experts.

We also identified, evaluated and mapped the major threats to marine biodiversity such as river input to the sea, coastal development, maritime routes, ports and marinas, dredging areas, aquaculture farms, coastal agricultural areas, mangrove deforestation areas, oil industry complexes and artisanal and industrial fishery areas. The

extension and intensity of the threats to the marine and coastal areas were calculated by modeling secondary information from official sources and satellite and cartographic resources.

We combined threats and conservation targets into MARXAN (Possingham et al, 2000), a pseudo- optimization algorithm that selects conservation units constrained to a parametrized boundary length of the areas, the penalty costs for non selection of targets, and the clustering of the units. In the ecosystem based model (EBM), we included three socio-cultural objects related to the local indigenous communities (i.e. important sites for traditional hunting and fishing, water sources and agriculture), as one of the integral components of the proposed solution. These objects, immersed in the natural environment of the Gulf of Paria and the Orinoco Delta, not only represent relevant environmental services provided by the ecosystems, but are also key elements within the economic and cultural structures of the indigenous communities.

Results and Discussion

The analysis produced a portfolio of 20 priority conservation areas (PCA), adding 44,000 km². These represent 37.8% of the marine areas above 200m depth in the Caribbean basin, and 7 areas in the Gulf of Paria/Atlantic Front, which cover more than 10.000 km² (figure 1).

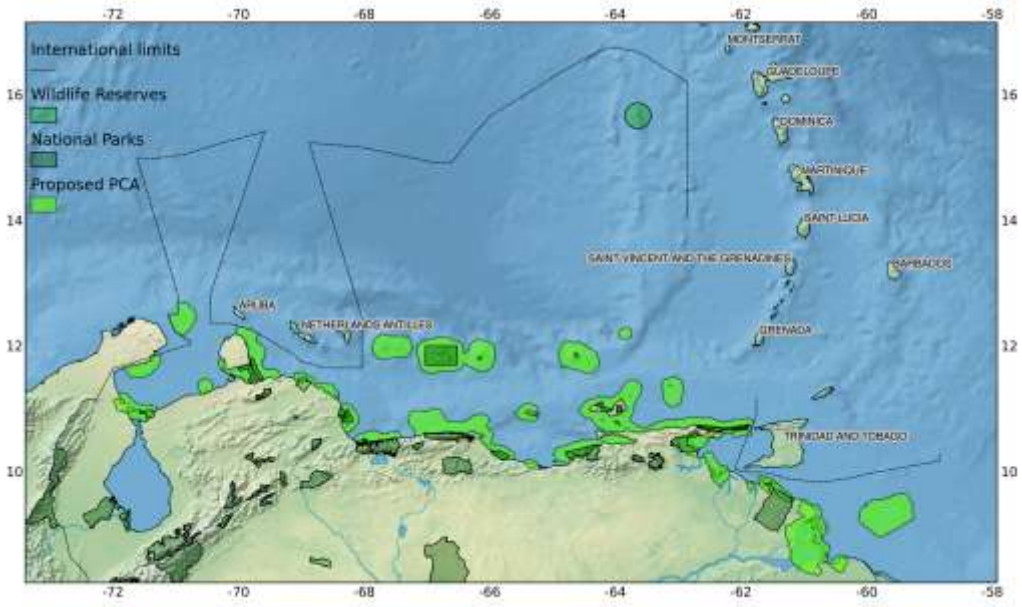

Figure 1: Proposed priority conservation areas (PCA) for the Venezuelan Caribbean Basin and Atlantic Front

For each of the proposed PCAs, we developed a technical information sheet as a tool for the decision-making process, containing the description of the area, the conservation targets included, and a complete set of conservation strategies. These strategies were organized according to major threats, including the expected impacts on the conservation targets, as well as the measures to be implemented to avoid or mitigate those impacts. We also indicate a series of best environmental practices for the oil industry.

The EBM and the eco-regional planning process provide an effective tool for integrating information on the conservation status, considering not only the importance of marine conservation objects, but the impact of

conservation initiatives. This project represents the first integrated evaluation of the conservation of marine biodiversity in Venezuela's Caribbean and Atlantic Front, and provides a set of conservation strategies, along with the specific sites where those actions should be put into action for optimal results. To date, many of the proposed recommendations are being implemented by oil investors, as well as by Venezuela's Ministry of the Environment in the process of authorizing the occupation and affectation of specific offshore exploitation blocks. The resulting portfolio of PCAs is the base for a formal project to expand the national network of MPAs. This project, developed by the Ministry of the Popular Power for the Environment and partially funded by the Global Environmental Fund (GEF), plans to create an integrated MPA system and extend this network to 10% of Venezuela's marine territory, following the international compromises and guidelines to which the country has agreed.

The proposed portfolio suggested by this study represents a conciliation between the conservation of marine biodiversity, the ecosystem services this biodiversity provides, the socio-cultural structuring elements of the indigenous populations, and the long vocation of an oil-producing country.

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17) ANDAMAN AND NICOBAR ISLANDS: A GLANCE ON PROTECTED AREAS NETWORK, FLORAL DOCUMENTATION AND CONSERVATION

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Introduction

The Andaman and Nicobar Archipelago consists of about 350 islands/islets that lie between latitudes 6° – 14° N and longitudes 92° – 94° E and occupies an area of about 8244 km^2. The terrain of Andaman Islands (part of Indo-Burma Biodiversity Hotspot) that has been formed from the fragments of a continental land mass is in contrast to the Nicobar Islands (part of Sundaland Biodiversity Hotspot), which were formed due to volcanic activity. The Saddle Peak (720 m) and Mt. Thullier (670 m) are the only two highest peaks in the Andaman and the Nicobar group of islands respectively. The coastline is highly indented and several creeks enter into the islands from the bays. The rich natural vegetation of these islands, with 86% of forest cover, can be broadly classified as tropical evergreen. The islands support luxuriant mangrove vegetation.

Phytodiversity and Endemism

The very insular nature of the islands and the physical isolation between them and the bordering mainland over millions of years has facilitated in the evolution of a rare and unique flora. The flora comprises 2428 taxa of Angiosperms, 8 taxa of Gymnosperms, 142 taxa of Pteridophytes and 76 taxa of Bryophytes (Pandey & Diwakar, 2008). The Botanical Survey of India is also bringing out a comprehensive flora of Andaman and Nicobar Islands in series. Nearly 323 species of angiosperms are endemic to the islands. Four genera, namely, *Sphyranthera* Hook.f., *Nicobariodendron* Vasudeva Rao & Chakrab., *Pubistylus* Thoth. and *Pseudodiplospora* Deb are endemic. A number of arboreal species are endemic to these islands, for example, *Pterocarpus dalbergioides* Roxb. ex DC. and *Lagerstroemia hypoleuca* Kurz (known for timber value). Besides, six species of Pteridophytes and eight species of Bryophytes are endemic to these islands. About 112 species are considered threatened.

The flora of Andaman group of islands is distinctly different from that of the Nicobars by the exclusive occurrence of genera such as, *Pterocarpus* Jacq. and *Dipterocarpus* C.F. Gaertn. Likewise, genera such as *Otanthera* Blume, *Astronia* Blume, *Cyrtandra* J.R. Forst. & G. Forst., *Stemonurus* Blume, *Bentinckia* Berry ex Roxb., *Rhopaloblaste* Scheffer and *Spathoglottis* Blume and many more species that occur in the Nicobar Islands are totally absent in the Andaman Islands. The flora of Andaman Islands shows more affinity with Northeast India, Myanmar and Thailand, whereas Nicobar Islands exhibit high floristic similarity with Malaysia in the east and Indonesia in the south.

Aborigines and their Traditional Plant Knowledge

Thirty-eight of the 350 islands are inhabited. There are six aboriginal groups, viz., Great Andamanese, Onges, Jarawas, Sentinelese, Nicobarese and Shompens, of which the first four are Negrito hunter-gatherers inhabiting

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some of the Andaman Islands while the last two are of Mongoloid race and live in Nicobar Islands. Plants are widely used in day to day sustenance by all groups. Tubers/bulbs of *Dioscorea glabra* Roxb., *D. pentaphylla* L., *Tacca leontopetaloides* (L.) Kuntze and ripe fruits of *Pandanus andamanensium* Kurz and *P. tectorius* Parkinson ex Du Roi constitute the staple food resources of the tribal population. Three wild nutmeg taxa (*Myristica andamanica* Hook.f., *Knema andamanica* (Warb.) W.J. de Wilde subsp. *andamanica* and *K. andamanica* subsp. *nicobarica* (Warb.) W.J. de Wilde) are found in these islands and their use may be further explored. There are also six forms of wild betel leaf plants in these islands which are chewed by the tribals.

These islands are well-known for medicinal plants. The native tribes widely use 289 species for treating various ailments. *Orophea katschallica* Kurz, *Alpinia manii* Baker and *Etlingera fenzlii* (Kurz) Skornick. & M. Sabu have been used as honey bee repellant consistently by different tribes. However, there is also uniqueness in certain treatments, for instance, the leaf decoction of *Ardisia oxyphylla* Wall. ex A. DC. administered orally to boost fertility by the Nicobarese; similarly, the external application of bark and leaf paste of *Knema andamanica* (Warb.) W.J. de Wilde for wounds and cuts is exclusive to Jarawas. Leaf paste of *Piper betel* is applied over chest as relief/remedy for cough and cold.

Conservation Strategies and Role of Botanical Survey of India

Natural calamities such as cyclone, tsunami and forest fire besides anthropogenic activities such as over-exploitation of bio-resources, conversion of forest area into agriculture lands and introduction of exotic species have ultimately resulted in the loss of natural pristine habitats. There are nine National Parks in Andaman and Nicobar Islands that occupy an area of 1153.94 km^2 and constitute 13.99% of the total geographical area of the Union Territory. Seven of them are found in Andaman Islands and two in Nicobar Islands. There are 96 Wildlife Sanctuaries occupying an area of 389.39 km^2, which cover 4.72% of the total geographic area, of which 92 are in Andaman Islands and 4 in Nicobar Islands. Great Nicobar is the only Biosphere Reserve that covers an area of about 885 km^2 (Sinha, 1999). Botanical Survey of India has completed the survey and documentation of the floras of Great Nicobar Biosphere Reserve, 6 National Parks and 6 Wildlife Sanctuaries. The establishment of North Andaman Biosphere Reserve is under active consideration of the Government of India for habitat conservation in the centres of speciation.

The Botanical Survey of India has successfully grown and propagated economically important endemic species such as Myristica andamanica Hook.f., Knema andamanica (Warb.) W.J. de Wilde and Vanilla andamanica Rolfe in its Botanic Garden at Dhanikhari. Similarly, the local Forest Department has also been concentrating on in situ conservation of rattans, palms and tree ferns. The Botanical Survey of India has also helped in establishing a Botanical Garden at Kalpong Hydroelectric project site. Intensive field surveys with special emphasis on traditionally cultivated/domesticated wild relatives of plant species by the local, socio-economically valuable and endemic and threatened species would certainly help in bring in a comprehensive flora of the region that would certainly assist in designing the conservation strategies for this phytogeographically unique region.

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18) AN OVERVIEW ON THE STATUS OF NATURAL HABITATS, DIVERSITY AND SUSTAINABLE UTILIZATION OF PLANT RESOURCES IN LAKSHADWEEP

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Introduction

The Laccadives, rechristened as Lakshadweep in 1973, is the smallest Union territory of India. This archipelago consists of 36 islands, 12 atolls, 3 reefs and 5 submerged sand banks in the Arabian Sea between latitudes 8° N to 12° 30' N and longitudes 71° E to 74° E. The islands have a total geographic area of about 32 km^2 and the lagoons enclosed by the atolls cover an area of about 4200 km^2. Only 10 islands are inhabited. Bangaram is the only island, formerly uninhabited, but now used as a tourist resort only. Cheriyam is another proposed island for the development of tourism. All the islands align in north-south direction except Androth, the largest island devoid of lagoon is in the East-West. These islands are similar in floristic composition due to prevalence of similar type of soil, climate and rainfall in all these islands.

Diversity of Native and Exotic Plants and their Ecological Importance

Most of the islands are covered only with coconut plantations. The low species diversity in the islands may be due to the calcareous nature of soil. Also the main source of water is rain, which sieves down quickly due to the high porosity of the soil. Hence, plants with roots long enough to reach water can only survive. The lagoon side or western side of islands is dominated by littoral species like *Clerodendrum inerme* (L.) Gaertn., *Ipomoea pes-caprae* (L.) R. Br., *Launaea sarmentosa* (Willd.) Sch.Bip. ex Kuntze, *Pemphis acidula* J.R. Forst., *Scaevola taccada* (Gaertn.) Roxb., *Spinifex littoreus* (Burm.f.) Merr. and *Suriana maritima* L. while eastern shore is dominated by *Cordia subcordata* Lam. and *Guettarda speciosa* L. The middle portion of the islands is dominated by coconut trees. Other species include *Artocarpus altilis* (Parkinson ex F.A. Zorn) Fosberg, *Colubrina asiatica* (L.) Brongn., *Dodonaea viscosa* Jacq., *Hernandia nymphaeifolia* (C. Presl) Kubitzki, *Hibiscus tiliaceus* L., *Morinda citrifolia* L., *Pisonia grandis* R. Br., *Tacca leontopetaloides* (L.) Kuntze and *Thespesia populnea* Sol. ex Corrêa.

Minicoy, the second biggest island among the islands of Lakshadweep has vegetation, characterized by the presence of some rare plant species such as *Lepturus repens* (J.R. Forst.) R. Br., *Pancratium zeylanicum* L. and *Thuarea involuta* (G. Forst.) R. Br. ex Sm. confined to the coastal areas. The island also supports mangrove species, such as *Ceriops tagal* (Perr.) C.B. Rob., *Bruguiera parviflora* Wight and *Avicennia officinalis* L.. Besides, the Lakshadweep Forest Department has successfully introduced eumangrove species, such as, *Ceriops tagal* (Perr.) C.B. Rob. and *Bruguiera parviflora* Wight along the coast of Kalpeni Island. *Cassytha filiformis* L., a slender parasitic twiner, seems to be a potential threat to the coastal plant species, namely, *Dodonaea viscosa* Jacq. and *Terminalia catappa* L. *Mikania micrantha* Kunth, a tropical American species that spreads gregariously on fences and agricultural crops in Androth, is a menace to the agro-ecosystem. Shallow reefs are dominated by algal elements and sea-weeds. The two sea grass species, viz., *Thalassia hemprichii* (Ehrenb. ex Solms) Asch. and *Syringodium isoetifolium* (Asch.) Dandy, help in preventing soil erosion and accumulation of beach sediments.

The presence of 343 species of angiosperms belonging to 258 genera under 85 families within a land area of 32 km^2 is a significant feature of Lakshadweep Islands (Reddy & Roy, 2011). There are also 5 pteridophytes. The Botanical Survey of India has completed the floristic survey of the islands and is bringing out a comprehensive Flora of the Lakshadweep Islands; the estimated total number of angiosperms would be around 400 species. Majority of the plants that are found in these islands are naturalized exotics which co-exist with island species without posing any threat to them (Rao & Ellis, 1995). Some of them are: *Adenostemma lavenia* (L.) Kuntze, *Ageratum conyzoides* (L.) L., *Argemone mexicana* L., *Bidens biternata* (Lour.) Merr. & Sherff, *Eclipta prostrata* (L.) L., *Lindernia crustacea* (L.) F. Muell., *Sophora tomentosa* L., *Suriana maritima* L., *Synedrella nodiflora* (L.) Gaertn., *Wedelia chinensis* (Osbeck) Merr. and *Tridax procumbens* L.

Utilisation of Bio-resources

The main source of income of islanders comes from coconut and its products like oil, copra and coir, in addition to fish. Other crops, like chilies, bananas, tapioca and sugarcane, are also cultivated in small scale (Radhakrishnan & al., 1998). Cattle fish bones, cowries, chunks, tortoise shells and ornamental corals and rarely ambergris are collected by the islanders and marketed in the islands as well as the mainland. The local people traditionally use some of the plant species as food, fuel and medicine. Some of the ethnobotanically important plant species are *Areca catechu* L. (fresh juice of tender fruits used as eye drops to cure eye injury), *Argemone mexicana* L. (plant juice is applied externally to cure wounds from nails and other iron materials, *Calotropis gigantea* (L.) Dryand (leaf juice mixed with olive oil is slightly warmed and applied over the scrotum to cure hydrocele), *Clerodendrum inerme* (L.) Gaertn. (boiled leaves are made into a paste and applied externally to cure numbness and pain) and *Tournefortia argentea* L.f. (roots are strong repellant to snakes; root powder is insect repellent and medicated oil prepared with leaves using coconut oil as base to heal pimples). The wood of *Calophyllum inophyllum* L., *Cocos nucifera* L., *Cordia subcordata* Lam., *Guettarda speciosa* L., *Pemphis acidula* J.R. Forst., *Hernandia nymphaefolia* (J. Presl) Kubitzki and *Suriana maritima* L. (are used for making boats, buoys, furniture, stakes, brush handles and fuel).

Threats and Conservation Strategies

Lakshadweep Islands are vulnerable to various natural and man-made hazards; they are subjected to storms, cyclones, tsunami waves and heavy rains (Radhakrishnan, 2001). Coastal erosion is another serious problem in the islands. Hence, necessary disaster management efforts should be undertaken in these islands. The littoral plants protect the islands by checking the onslaught on strong winds and by preventing soil erosion. Since the land area is less due to increasing human population the dependence on the vegetation for fuel and firewood and other developmental activities posing a serious threat on the vegetation.

Developmental activities, like construction of buildings, roads, have deteriorated the ecosystems. Until recently the coral sands were being unearthed, corals being collected, and trees being felled. Thus urgent concerted efforts should be undertaken to conserve this comparatively pristine and fragile ecosystem. There is only one protected area, viz., Pitti (Bird Island) Wild Life Sanctuary (0.01 km^2), and islands such as Androth, Kalpeni and Minicoy may be declared as protected areas as they have comparatively good patches of forests with species diversity. Degraded areas should be reclaimed with suitable native species. Nowadays, large numbers of tourists are attracted to Lakshadweep Islands and hence careful monitoring is required to reduce the negative impacts to

the natural habitats. 'Ecotourism' is an effective method to create environmental awareness among tourists and islanders to protect and conserve the environment as well as improve the well-being of local people.

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19) SEABIRD DATA AS A TOOL FOR IDENTIFYING ECOLOGICALLY OR BIOLOGICALLY SIGNIFICANT MARINE AREAS (EBSAS)

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Important Bird Areas as Areas Meeting the EBSA Criteria

For decades, BirdLife International has worked to identify "Important Bird Areas" (IBAs) in terrestrial environments and use them to help inform conservation planning exercises. This process is under way in marine ecosystems as well and is described in BirdLife's *Marine IBA Toolkit* (BirdLife International, 2010). This toolkit can be extremely useful for describing areas meeting the EBSA criteria (BirdLife International, 2009), for the following reasons:

- **Rigorous approach:** The toolkit is a rigorous, data-driven, globally applicable framework that could be adapted for many other taxa in addition to birds.
- **Data are widely available:** Seabirds are readily observed, identified, and surveyed. As a result, bird data are often the most abundant or even the only available data for some open-ocean ecosystems.
- **Birds are indicators of diversity and productivity:** The presence of diverse and abundant seabirds is a strong indicator of the presence of other taxa, such as the seabirds' prey and predators that compete with seabirds. In addition, seabirds tend to congregate in highly productive areas and habitats, such as around islands, seamounts, and upwellings (Lascelles et al; 2012). Diversity and productivity are among the seven criteria for identifying EBSAs.
- **Focus on rare species:** The EBSA and IBA criteria both relate to areas important to unique, rare, and vulnerable species. Seabirds are now the most threatened group of birds (Croxall et al; 2012).
- **Migration indicates connectivity:** Many seabirds are highly migratory and therefore will benefit from EBSAs that encompass a sequence of healthy ecosystems along migration routes. Seabird tracking data could be used to assess connectivity between sites.
- **Seabirds are widely represented across ecosystems:** The global distribution of seabirds makes them useful for identifying a network of areas that meets the EBSA criteria and should represent a wide variety of marine ecosystems.

Steps in the Marine IBA Process

The marine IBA toolkit follows six steps for defining a set of consistent and comparable sites that meet the IBA criteria (figure 1). These sites can be used to describe areas meeting the EBSA criteria.

Step 1 - Identify priority species

Species may be considered for priority status on the basis of the following:

- Threatened species, e.g. those on the IUCN Red List
- Species listed as priorities in conservation agreements (i.e. EU Bird's Directive, Agreement on the Conservation of Albatrosses and Petrels, Convention on Migratory Species)

Step 2 - Gather data

Data gathering is usually focused around a combination of four major sources:

- At-sea surveys, such as those freely available through the Ocean Bio-geographic Information System (OBIS), the Royal Navy Bird watching Society and the Australian Antarctic Division.
- Satellite tracking data, such as that held in the Global Procellariiform Tracking Database (figure 2), and collected through the Tagging of Pelagic Predators project.
- Land-based counts of breeding populations or migratory seabirds.
- Literature reviews and expert opinion.

Step 3 - Determine primary and supplementary data layers

The process should identify the highest-quality, least-biased data possible as the primary support for candidate IBAs, with other data as a supplement. The toolkit designates high-quality data as primary and lower-quality data as secondary. Examples of these two types are as follows:

- Primary: Large tracking datasets, systematic at-sea survey data, land-based counts collected over multiple years
- Supplementary: Small tracking datasets , by catch data, at-sea distribution data from fishing boats or ad-hoc surveys, habitat suitability models

Step 4 - Identify candidate IBAs

Candidate IBAs are identified using multiple data layers. The strongest case for an IBA can be made when two primary data layers overlap to indicate a specific area, and the next strongest is when one primary layer and one supplementary layer overlap. A case can sometimes be made for an IBA based only on a single, high-quality primary layer, for example large satellite tracking datasets. BirdLife has developed a repeatable process for determining when this might be the case.

Step 5 - Apply IBA criteria to candidate sites

To qualify as an IBA, a candidate site must meet one or more of the following criteria:

- The site is known or thought regularly to hold significant numbers of a globally threatened species, or other species of global conservation concern. The site qualifies if it is known, estimated or thought to hold a population of a species categorized by the IUCN Red List as Critically Endangered, Endangered or Vulnerable
- A site may qualify on any one or more of the four criteria listed below:
  i). Site known or thought to hold, on a regular basis, ≥ 1% of a biogeographic population of a congregatory waterbird species.
  ii). Site known or thought to hold, on a regular basis, ≥ 1% of the global population of a congregatory seabird or terrestrial species.
  iii). Site known or thought to hold, on a regular basis, ≥ 20,000 waterbirds or ≥ 10,000 pairs of seabirds of one or more species.
  iv). Site known or thought to exceed thresholds set for migratory species at bottleneck sites.

Step 6 - Define boundaries

Extensive experience from defining IBAs in the terrestrial environment suggests that an IBA should be:

- different in character, habitat, or ornithological importance from surrounding areas;
- an area that can be managed in some way for conservation;
- an area which provides the requirements of the trigger species (i.e. those for which the site qualifies) while present, alone or in combination with networks of other sites.
- in the marine environment IBA boundaries could be defined based on a range of oceanographic variables and/or lines of latitude and longitude.

Submissions to EBSA Regional Workshops

In response to the CBD Secretariat call for submission of relevant scientific data to the EBSA regional workshops, BirdLife has been compiling all available seabird data for the regions in questions to submit a list of IBAs for consideration within the EBSA process. These IBAs have formed an important input to describing sites that meet the EBSA criteria at the workshops to date. So far, over 100 IBAs have been used to inform the scientific basis for EBSAs agreed at the workshops, while many others could be used as the EBSA process continues to develop in these and other regions.

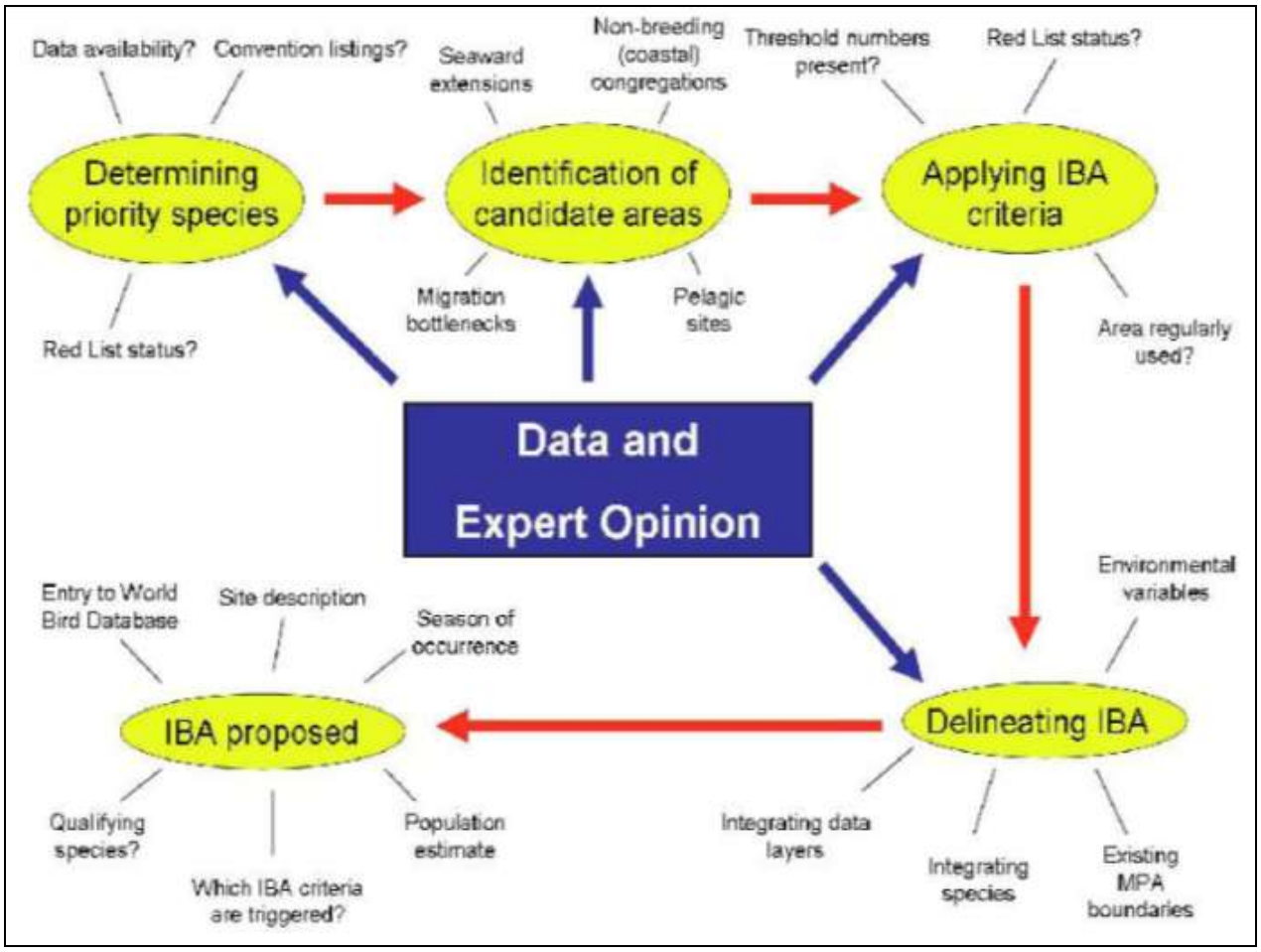

Figure 1: Flow chart showing how data and expert opinion form a central part of marine IBA identification and can be used to inform each step of the process. Source: BirdLife International (2010)

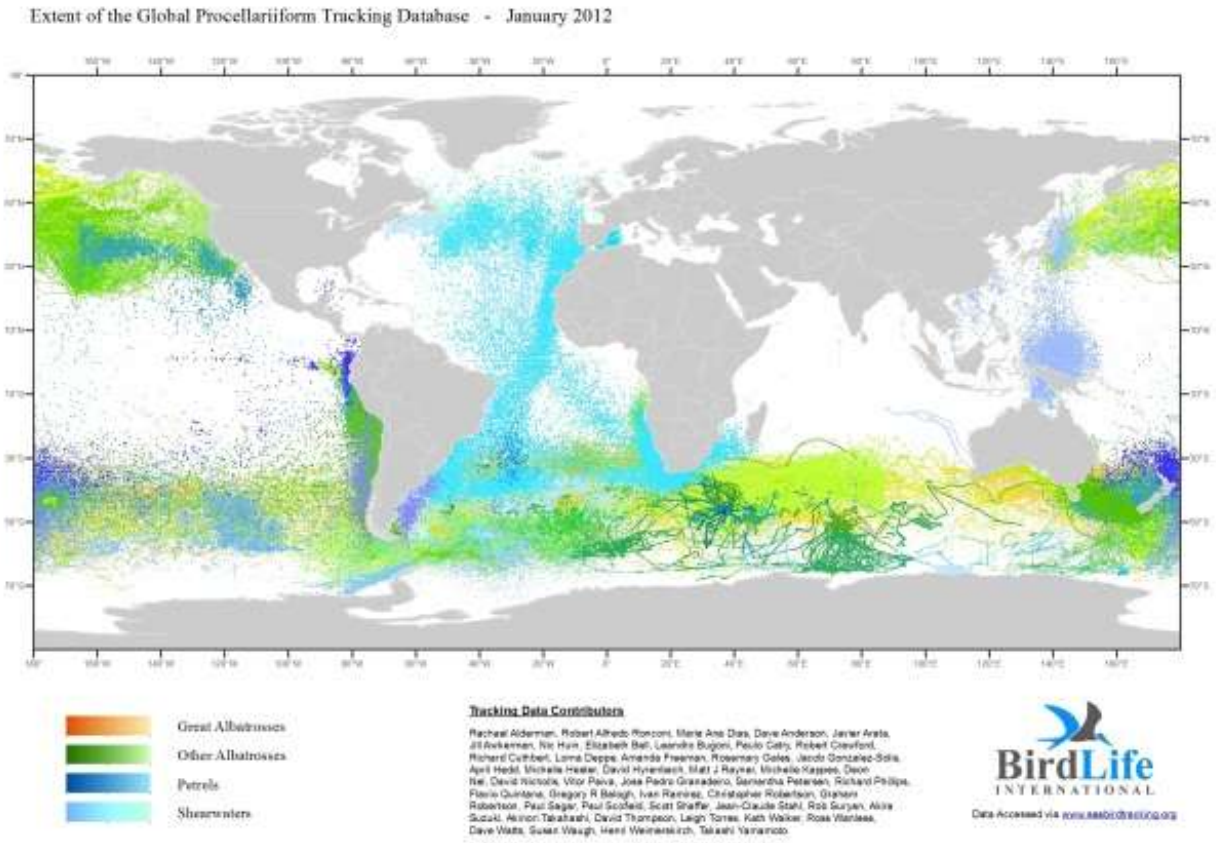

Figure 2: Map of tracking data held in the BirdLife International Global Procellariform Tracking Database. NOT FOR DUPLICATION. Source: www.seabirdtracking.org

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20) THE MICRONESIA CHALLENGE: A REGIONAL COMMITMENT BUILT ON LOCAL AND TRADITIONAL STEWARDSHIP

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Due to geographic isolation and proximity to the Coral Triangle, Micronesia's islands contain highly diverse marine and terrestrial resources. Yet the features that make these islands exceptional also make them especially vulnerable to environmental threats, such as deforestation, unsustainable fishing practices, invasive species, and climate change. In 2006, to ensure a healthy future for their island communities through sustainable management of their natural resources, the Chief Executives of the Federated States of Micronesia, Republic of the Marshall Islands, Republic of Palau, U.S. Territory of Guam and the U.S. Commonwealth of the Northern Mariana Islands launched the Micronesia Challenge (MC), the first large-scale regional conservation commitment. With a goal to effectively conserve at least 30% of near-shore marine resources and 20% of terrestrial resources across Micronesia by 2020, the MC encompasses 6.7 million km^2 of ocean, and will help protect 4% of the global total reef area and over 480 coral species. Although the initiative built on decades of foundational work by Micronesian communities and organizations to raise awareness, strengthen capacity and implement conservation activities in their home islands, it resulted from the realization that Micronesians must work together at the regional level to confront global threats, in a rapidly changing world. In the past five years, the MC has provided an effective regional framework for coordination, capacity-building, marketing and sustainable finance, leveraging greater resources directed toward national, state, municipal, and community level policy, planning, establishment/strengthening of protected areas, implementation of management actions, revitalizing some of the pre-existing marine and terrestrial tenure controls and monitoring and measuring progress.

The MC island jurisdictions not only expand on its commitment to preserving its marine and terrestrial environments (Target 11), but as well as the following which are in line with the 2020 targets of the strategic plan.

- Sustaining its unique islands' biodiversity (Targets 11, 14 and 15);
- Ensuring a healthy future for its island people (Target 14);
- Protecting its island cultures (Target 18);
- Guarding the foundations of its future development, its pristine island environment (Target 14 and 15);
- Sustaining the livelihoods of its island communities (Target 14 and 15); and
- Contributing to the global targets of the Millennium Development Goals, Johannesburg Plan of Implementation for the World Summit on Sustainable Development, the Mauritius Strategy for Small Island Developing States and the relevant Programmes of Work of the Convention on Biological Diversity

Reference

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21) MINIMIZING THE IMPACT OF CLIMATE CHANGE ON VULNERABLE NORTHERN EUROPEAN COASTAL LANDSCAPES: ANALYSIS OF THE ECOSYSTEM SERVICES OF ALTERNATIVE LAND MANAGEMENT SCENARIOS (AICHI TARGET NO. 10)

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The reclaimed coastal lowlands of the North Sea and the Baltic Sea with the estuaries of the rivers Rhine, Scheldt, Maas, Ems, Weser, Elbe, Warnow, Peene, Oder, and the coastal peatlands in their hinterland are extremely vulnerable to changes in terrestrial water cycles, rising sea levels and increasing storm surges (IPCC 2007). Therefore, almost the entire mainland is protected by sea dikes and other man-made and natural barriers. Higher rainfalls are predicted in winter for north-west European coastal regions (BACC Author Team 2008, Jacob et al. 2008). On the contrary, lower rainfalls and increasing temperatures are expected during summer (UBA 2007, BACC Author Team 2008). This may reduce groundwater reservoirs in summer and – with sea level rise – increase the risk of salt water intrusion in unconfined coastal aquifers.

Peatland and Reed fens

Peat formation in wet marshes and fens is one of the most efficient natural processes capable of sequestering carbon dioxide from the atmosphere (Hussein et al. 2004). Reed fens dominated the flood-prone regions of the Wadden Sea coast (approx. 40.000 km²) before dike building started in medieval times. Likewise, river floodplains in north-east Germany were dominated by reed fens. In recent centuries, reclamation and drainage of reed fens for dairy farming favoured peat mineralisation, leading to substantial declines in land elevation, thus releasing stored CO_2 and increasing vulnerability to catastrophic floods. The degradation of drained coastal peat reservoirs may even increase with expected rise of summer temperatures, with strong repercussions on the European CO_2 balance (Strack et al. 2008).

Collaborative research project COMTESS

The collaborative research project COMTESS (Sustainable Coastal Land Management: Trade-offs in Ecosystem Services), funded by the German Federal Ministry of Education and Research, will perform an inter- and transdisciplinary investigation of four possible land management scenarios to react to changing hydrology due to climate change: **(1) Water management**: Construction of second coastal defense lines within the hinterland instead of heightening the primary sea wall and formation of freshwater polders enclosed by the primary and secondary dike line. Primary aims of this scenario are to restrict flooding to the polder area in case of limited breaches, to increase freshwater retention for use in dry periods, to prevent subsurface salt water intrusion, and to use reeds for green energy. **(2) Carbon sequestration**: Similar to the first scenario but polders will be extensively covered with reed fens to yield active peat formation. **(3) Trend**: Dairy farming and grassland as usual. **(4) Stakeholder-based**: The three project-led scenarios will be submitted to the evaluation of stakeholders of each case study region to explore stakeholder land use preferences.

COMTESS will quantify and evaluate the performance of multiple ecosystem functions and services (ESF / ESS) in each scenario in socio-economic and ecological terms.

Indicators of Ecosystem Services

Water retention

Hydrological modeling based on field surveys will quantify groundwater levels and freshwater retention provided by the different land management scenarios for the period 2010-2100. Based on simulated water provision, COMTESS will model ecosystem services provided by the vegetation.

Vegetation

The vegetation plays a pivotal role in the provisioning of coastal ESS. Net primary productivity and standing biomass of plant communities and their trait composition (e.g. palatability, leaf nitrogen content) indicate the

amount of food or green energy production. Different plant communities exhibit saturated or unsaturated species diversity, depending on the size of the community species pool, the environmental conditions and their variability in space and time (Kirmer et al. 2008). Biodiversity will be indicated both by local species diversity relative to the size of the community species pool (Ozinga et al. 2005) and functional diversity, the variation of species level traits on multiple environmental gradients.

Breeding and resting birds

Birds are a highly suitable keystone group to assess impacts of habitat change on diversity as they are particularly vulnerable to the loss of sites on which they traditionally rely for part of their annual life cycle (wintering, migratory fuelling, and breeding). Coastal areas are of crucial importance for large numbers of bird species of all functional groups (from waterfowl and waders to meadow birds, songbirds and birds of prey), e.g. an estimated 11 million waterbirds use coastal sites along the Wadden Sea to refuel on their annual migration (Van Eerden et al. 2005). But coastal sites are also important breeding sites for many threatened meadow and reed birds which currently face rapid population declines most likely related to clashes between traditional breeding habitat requirements of the birds and agricultural land use practices of the recent decades (Beintema et al. 1997, Kleijn et al. 2001, Newton 2004). Therefore, COMTESS will model the occurrence of breeding and resting birds for each scenario based on vegetation and land use information.

Combining these scientific findings, together with stakeholders we will develop concrete action- and decision-oriented suggestions on local and regional levels to promote sustainable management of vulnerable coastal landscapes in response to expected climate change. Based on this extensive research programme, COMTESS will contribute both scientifically and practically to the design of an evidence-based management of multifunctional coastal landscapes.

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22) EL MAGNÍFICO TIBURÓN, BALANCE DE LOS MARES

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Abstracto
Este póster es parte del esfuerzo de comunicación regional centroamericano sobre tiburones, con el objetivo de sensibilizar e informar a la población en general sobre los dos principales problemas que enfrenta el tiburón en Centroamérica: Aleteo y Captura de Neonatos, de manera que esta concientización facilite y estimule a las autoridades a legislar adecuadamente este recurso en cada uno de los países que conforman la región; que se haga un uso racional y equilibrado de este recurso con una pesquería sostenible y apoyar la conservación del grupo de especies.

Este instrumento será apoyado progresivamente con otros medios, como cuñas radiales, publicaciones virtuales en redes sociales y sitios web de las instituciones involucradas; así como con otras acciones con estudiantes universitarios e instituciones con objetivos compartidos que se vayan involucrando.

Objetivos del Programa Regional de USAID
Este póster y los esfuerzos de comunicación asociados, contribuyen al logro del objetivo general del Programa Regional de USAID para el Manejo de Recursos Acuáticos y Alternativas Económicas, de fortalecer la gestión de los recursos marino-costeros de Centroamérica para reducir las amenazas vinculadas con prácticas insostenibles de pesca y desarrollo costero, apoyando la conservación de la biodiversidad y mejorando los medios de vida de las poblaciones costeras y en general de la región.

Asimismo se persigue el logro de los objetivos específicos de: promover y fortalecer el monitoreo e implementación efectivos de las políticas y legislación de los recursos marino-costeros, con énfasis en el cumplimiento y; fomentar mecanismos e incentivos de manejo basados en derechos de acceso y con enfoque orientado al mercado, para la conservación y utilización sostenible de los recursos marino-costeros, con énfasis en la gestión basada en ecosistemas.

El Programa se enfoca en el manejo y la protección de cinco especies de importancia comercial: langosta espinosa, caracol reina, mero de Nassau, pargos y concha negra de manglar y dos grupos de especies amenazadas: tortugas y tiburones.

Alianzas Interinstitucionales
Para alcanzar sus objetivos e implementar las distintas acciones, el Programa cuenta con el apoyo, contribución y coordinación de socios estratégicos integrantes del Sistema de la Integración Centroamericana (SICA) como lo son: la Organización del Sector Pesquero y Acuícola del Istmo Centroamericano (OSPESCA) - instancia regional en materia pesquera - y la Comisión Centroamericana de Ambiente y Desarrollo (CCAD) - instancia regional en materia de medio ambiente.

También se han establecido alianzas con instituciones de los gobiernos, cooperantes, proyectos complementarios, ONGs, comunidades y actores locales, que trabajan en el tema marino-costero a nivel centroamericano, para coordinar e implementar actividades en los ámbitos local, nacional y regional, lo cual le permite al Programa Regional de USAID, aunar esfuerzos y recursos para optimizar la implementación en este caso de los esfuerzos de comunicación en términos económicos, de tiempo y permanencia.

Público Objetivo
El mensaje transmitido por medio del póster está dirigido al público en general en todos los países de la región centroamericana.

Alcance Geográfico

El esfuerzo de comunicación se realizará a nivel regional, nacional y local en los sitios transfronterizos de acción del Programa Regional de USAID que son: Golfo de Honduras: Belice, Guatemala y Honduras; Costa de Misquitos: Honduras y Nicaragua; Cahuita-Bocas del Toro: Costa Rica y Panamá en el Caribe centroamericano y Golfo de Fonseca: El Salvador, Honduras y Nicaragua en el Océano Pacífico.

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23) EIA HAWAI`I HE MOKU HE KANAKA: ADAPTIVE MANGEMENT FOR OUR ISLANDS

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Background

Eia Hawai`i He Moku He Kanaka (Here is Hawai'i, an island, a man).

Ka Pae `Āina o Hawai`i (Hawaiian Archipelago) is made up of 137 islands, reefs and shoals, stretching 1,523 miles southeast to northwest consisting approximately of a total land area of 6,425 square miles. Kanaka Maoli, the indigenous people of Ka Pae `Āina o Hawai`i, represent approximately 20% of the total population of 1.2 million. From time immemorial, Kanaka Maoli have lived in harmonious self-sufficiency with our sacred environment and with our distinct and sophisticated language, culture, and religion.

Our genealogical chant- Eia Hawai`i He Moku He Kanaka, connect us to our `āina (land) which is our ancestor and we are here as the main stewards of our land and our biological and cultural diversity. Our rights, cultures, indigenous knowledge, livelihoods are based on the relationship we have with every aspect of our honua, our world. When our `āina and our resources disappear or experience change, due to climate change, we suffer the worst impacts.

Climate Change in Hawai`i

The climate in Ka Pae `Āina o Hawai`i is definitely changing and some of the impacts include increased air temperature, decreased rainfall and stream flow, increased rain intensity, sea level rise, an increase in sea surface temperatures, and the acidification of our ocean (Fletcher 2010). Scientists predict that these impacts to Hawai`i's land and its many vital resources will continue to intensify. The Hawai`i State Legislature declared that "climate change poses a serious threat to the economic well-being, public health, natural resources, and the environment in Hawai`i" and identified the following industries as those that would definitely be at risk: tourism, agriculture, recreation, commercial fishing, and forestry (Haw. Sess. Laws 2007).

Sea-Level Rise

Sea-level rise is slowly but surely affecting the population in Ka Pae `Āina o Hawai`i. It is expected that sea-level will rise one foot by 2050 and three feet by the end of the century (Codiga and Wager 2011). Rising sea-levels have many impacts that affect indigenous cultural practices, flood wetlands and other low-lying lands, intensify erosion of beaches and other coastal areas, and increase the salinity of rivers, bays, and groundwater tables.

Kanaka maoli families are feeling the impact of sea-level rise on cultural practices. On the western side of the island of Kaua`i, at Pu`olo Point, kanaka maoli continue the traditional practice of producing pa`akai (salt) as taught to do so by kupuna (ancestors). This is the last place in all of Ka Pae `Āina o Hawai`i that continues this tradition.

Pa`akai is a vital part of indigenous culture and livelihood. Each summer, families would consistently harvest about fifty five gallon buckets worth of pa`akai. In 2011, the puna (wells) overflowed, the rains intensified and the water never subsided. We were not able to access the pa`akai producing `āina therefore, there was no harvest in 2011. In my lifetime I've never seen this happen.

Water

Mōhala i ka wai ka maka o ka pua (Unfolded by the water are the faces of the flowers.) Flowers thrive where there is water, as thriving people are found where living conditions are good (Pukui 1983). This `ōlelo no`eau (wise saying) of our elders makes it clear that water is important to the healthy livelihood of our people. On our islands, it is critical to have our streams flow from the wao akua (region of the gods/spirits) to the wao kanaka (region of the people) and continue on to the moana nui (vast ocean). This provided fresh water for our biodiversity, for our people, and every part of our ecosystem.

It is recognized and consistent with scientific observations that the risks of climate change impacts on our water resources include a decrease in rainfall, a decrease in the flows of our streams, and an increase in air temperatures (Wallsgrove and Penn 2012).

Adaptive Management and Policies

"Adaptive capacity is the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences." (IPCC 2007)

In a recent publication of the Center for Island Climate Adaptation and Policy titled "Water Resources and Climate Change Adaptation in Hawai'i: Adaptive Tools in the Current Law and Policy Framework" the authors refer to four characteristics of adaptive management. These essential characteristics are (1) forward-looking, (2) flexible, (3) integrated, and (4) iterative (Wallsgrove and Penn 2012).

Effective policy-making in the face of uncertainty requires adaptive management and planning that clearly allows for flexibility to accommodate new data, perceptions, vulnerability assessments (Codiga and Wager 2011) and the traditional knowledge of indigenous peoples.

In order to safeguard our `āina, our people, our biodiversity, our cultural practices, public health and safety, climate change adaptation and planning is necessary both now and in the future. We have the traditional knowledge of our kupuna that have and continue to guide our adaptive ways. We have various tool kits available that provide a wide range of policy tools to effectively address the issues to confront climate change. We call on our leadership at all levels to take bold steps forward to adopt and implement adaptive management and policy tools supported by the best-available science and traditional knowledge.

Center for Island Climate Adaptation and Policy

The Center for Island Climate Adaptation and Policy ("ICAP") facilitates a sustainable, climate-conscious future for Hawai`i, the Pacific, and global island communities. ICAP produces innovative, interdisciplinary research and real-world solutions for island decision-makers in the public and private sectors. As a focal point for University of Hawai`i climate expertise, the Center serves as a two-way conduit between the University and island communities to catalyze climate change adaptation and resilience. ICAP is a University of Hawai`i Sea Grant Center for Excellence in partnership with the University of Hawai`i William S. Richardson School of Law, the School of Ocean and Earth Science and Technology ("SOEST"), the Hawai`inuiākea School of Hawaiian Knowledge, and the College of Arts and Sciences. For more information visit http://islandclimate.org

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24) DIVERSITY OF MARINE INVERTEBRATES IN THE INTERTIDAL REGIONS OF ISLANDS/REEFS IN THE MARINE NATIONAL PARK & SANCTUARY OF THE GULF OF KACHCHH IN INDIA (SOUTH ASIA)

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Introduction

The Gulf of Kachchh is situated in the western region of India. A chain of 42 islands rich with coral reefs and mangroves are clustered in the southern Gulf. These reefs and mangroves provide a uniquely productive habitat for a diverse and colourful variety of life forms. The Gulf of Kachchh is a shallow water basin about 60mt deep at the mouth, sloping up to a depth of less than 20mt at the head.

The Gujarat Ecological Education and Research (GEER) Foundation, Gandhinagar is an autonomous institution of the forest department of the Government of Gujarat, India engaged in the activities of ecological education and research. The GEER Foundation is working on Integrated Coastal Zone Management Project (ICZMP) sponsored by World Bank. ICZMP have different research components such as flora and fauna (terrestrial (coastal) and marine Avifauna, Reptiles, Mammals, invertebrates) and coral transplantation. Coastal area as well as 42 Islands of Gulf of Kachchh is the study area for the Marine Invertebrates of which, in this initial phase 4 Island reefs and 2 submerged reefs were surveyed i.e. Chank, Noru, Bhaidar and Khara-MithaChusna Island and Paga and Boriya Reef.

Study Area

The Gulf of Kachchh Marine National Park and Sanctuary (MNP&S) was established by a set of State Notifications during the period 1980 to 1982 in an area of 457.92 km2 along the southern Gulf of Kachchh ($22^0$15’ to $23^0$40’N and $68^0$20’ to $70^0$40’E). Designated first as a Sanctuary in 1980, certain areas covering the Islands and inter-tidal zones were declared as National Park areas during the same year. The MNP&S supports considerable species diversity of flora and fauna, which include mangroves, algae, seagrasses, molluscs, sponges, crustaceans, hard corals and soft corals, fishes, turtles, sea snakes and marine mammals such as dolphins, porpoise and the rare and endangered species sea cow (*Dugong dugon)*.Whales also recorded through stranding (dead) records.

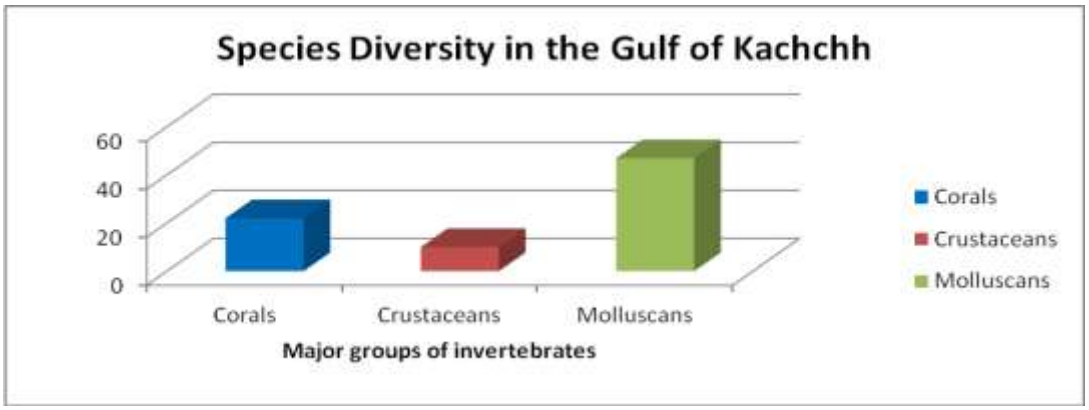
Figure 1: Study Area [Chank, Bhaidar, Noru, Khara-MithaChusna Island and PagaandBoriaReef**]**

Methodology

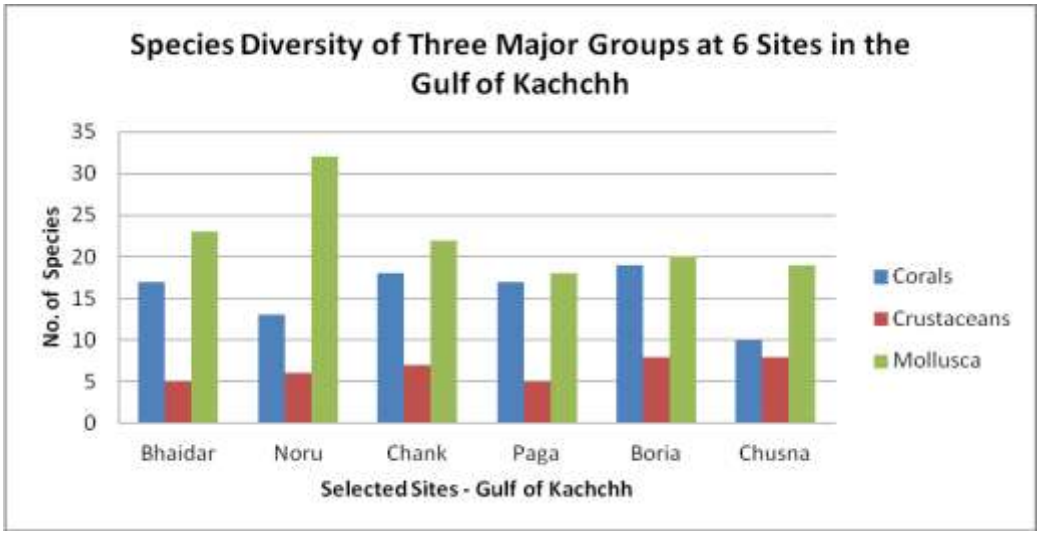
Survey of the intertidal area was done through line transects for species inventory and abundance of Marine invertebrates. Number of transect were laid on the basis of the area of intertidal zone of the island of reef.

Results

A total of 79 species of three major groups (Coral, Crustaceans and Mollusca) of marine invertebrates recorded at six sites in the Gulf of Kachchh. Out of 79 species, Corals were recorded 22 species whereas 10 species of crustacean and 47 species of Mollusca.



The term coral refers to coelenterates (phylum- Cnidaria) secreting a massive calcareous skeleton. Total 22 species of hard corals were recorded from six locations, of which eight species viz. *Montiporavenosa, Pseudosidestreatayami, Goniopora minor, Poriteslutea, Faviaspeciosa, Faviafavus, Parycyathusstokesi and Turbinariapeltata* were found on all the six locations. Whereas, *Montiporamonastriata, Gonioporateniudens, Goniastreapectinata*and*Tubastreaaurea* were confined to any single location.



The majority of crustaceans on coral reefs are known as decapods (ten legs). Shrimps, lobsters and crabs are all prominent members of this group. In the class Crustacea total 10 species were recorded of which *Portunuspelagicus* and *Pilumnusvespertilio* were recorded from all the six locations. *Panuliruspolyphagus* was recorded only from Chank.

Mollusca (sea shells and their relatives) comprise one of the largest divisions of the animal kingdom. The two main divisions of shells are easily identified, Gastropods have single solid shell, this frequently coiled in some fashion and Bivalves have two parts to their shell. Whereas in Cephalopods the shell is absent or modified as internal skeletal for e.g. Sepia or popularly known as cuttle fish. *Cerithidea cingulate, Turbo brunneus* and

Turbo intercostalis were the abundant species of mollusca amongst recorded 47 species on all the six intertidal areas. 35 species of Gastropoda, 11 species of Bivalve and one species of Cephalopoda were recorded. 12 species were recorded from all the six sites whereas, only 10 species were confined to any single location.

Discussion

Mollusca is found to be the most dominant group occurring in all the six intertidal sites with species diversity of 47 species. Maximum diversity was observed at Noru with 51invertebrate species belonging to three major groups followed by Boria having diversity of 47 species. Khara – MeethaChusna showed lowest diversity of 37 species.

The data represent only six sites of the western gulf cluster of the Gulf of Kachchh (GoK) and is not a representative of the entire intertidal areas of GoK. Hence, to prepare a baseline data on biodiversity, major intertidal areas of the Gulf will be surveyed during the Integrated Coastal Zone Management project period i.e. coming three years. The data will be compared with the earlier biodiversity studies of the Gulf of Kachchh.

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25) PROGRESS TOWARDS AICHI BIODIVERSITY TARGET 11 IN MARINE AREAS BEYOND NATIONAL JURISDICTION: THE SARGASSO SEA AS A CASE STUDY

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Background

Under Aichi Biodiversity Target 11, by 2020 at least 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, should be conserved through ecologically representative and well connected systems of protected areas. This target applies to the open ocean and deep ocean just as it does to coastal areas, however these habitats occur largely in the high seas where there are no mechanisms for comprehensive management or conservation. Such areas make up 64% of the world's oceans. The need for greater protection of high seas areas has been recognised for more than a decade and some progress has been made, primarily through existing regional bodies. In 2006, Parties to the Convention on Biological Diversity (CBD) called for criteria for identifying ecologically or biologically significant areas (EBSAs) in need of protection in open ocean waters and deep sea habitats and then, in 2010, requested a series of workshops to identify EBSAs through the application of these criteria, a process which is ongoing.

The Sargasso Sea as a Case Study For High Seas Protection

The Sargasso Sea, defined by the currents of the North Atlantic gyre, is a fundamentally important part of the ocean that plays a key role in global oxygen production and carbon sequestration. Home to an iconic pelagic ecosystem of floating *Sargassum* seaweed, it hosts a diverse community of associated organisms and provides essential habitat for key life stages of a wide range of species, many of which are endangered or threatened. Two seamount chains are home to fragile endemic communities. Human activities have impacted both pelagic and benthic ecosystems, however.

The Sargasso Sea and the EBSA Criteria

Uniqueness or rarity - HIGH

The two species of floating *Sargassum* are the only complex seaweeds without an attached benthic stage. In the Sargasso Sea, the extent and thickness of the *Sargassum* mats attract a great density and diversity of associated organisms, distinguishing this ecosystem from other drift algal habitats. From surface to seabed, the Sargasso Sea is home to numerous endemic species that are, by definition, rare.

Special importance for life history stages of species - HIGH

American and European eels migrate to the Sargasso Sea to spawn (Schmidt 1922). Sargassum anglerfish and oceanic flying fish lay their eggs on the *Sargassum* (Coston-Clements et al 1991). A number of other fish species also spawn in the Sargasso Sea. The *Sargassum* mats and their associated communities are an essential nursery habitat and feeding area for many species of fish (Coston-Clements et al 1991) and four species of turtles (Carr 1987). The Sargasso Sea is a critical area for organisms migrating through the North Atlantic, including large pelagic fishes and sharks (Block et al 2001, Campana et al 2010), leatherback turtles (Hays et al 2004), and humpback whales (Stone et al 1987). A variety of seabirds also feed in the Sargasso Sea (www.seabirdtracking.org).

Importance for threatened, endangered or declining species and/or habitats - HIGH
Many of the species utilising the Sargasso Sea appear on the IUCN Red List of endangered species and/or under CITES. Important examples include European and American eels, porbeagle sharks and Kemp's Ridley, hawksbill, loggerhead and green turtles. Some 30 cetacean species live in or migrate through the Sargasso Sea. Several species of endangered or threatened tuna and sharks also migrate through the area, as do leatherback turtles. The rare Seamount habitats are home to a variety of endemic species with very limited distribution that are thus at high risk of extinction.

Vulnerability, fragility, sensitivity, or slow recovery - HIGH
The Corner Rise and New England seamount chains support fragile coral and sponge communities with dependent commensal species (Cho 2008), along with populations of vulnerable deep-water fish species which have been heavily exploited.

Biological productivity - HIGH
The Sargasso Sea has a high net annual primary production rate that matches levels found in some of the most productive regions in the global ocean (Steinberg et al 2001), and the area plays a key role in global oxygen production and ocean sequestration of carbon (Ullman et al 2009).

Biological diversity - HIGH
The floating *Sargassum* community hosts 10 endemic species, ~145 species of invertebrates and over 100 species of fishes (Coston-Clements et al 1991). The mid-water fish community includes a suite of sub-tropical endemics (Porteiro 2005), and the New England and Corner Sea Rise seamount chains are home to over 670 species, including numerous endemics and specialised commensal species (Cho 2008).

Naturalness - SOME
Unfortunately, the Sargasso Sea is no longer in a natural state. Fishing has had significant impacts on many fish populations and trawling has caused extensive destruction of seamount fauna (Waller et al 2007), although numerous seamounts are now closed to fishing. Floating plastic particles have reached concentrations in excess of 100,000 pieces km^{-2} in some places (Law et al 2010). The ecological and biological functionality of the Sargasso Sea ecosystem remain intact, however.

Achieving Protection
The Sargasso Sea, like most of the high seas, does not fall under any of the existing Regional Seas Conventions, and it is anticipated that the route to protection may require a combination of several sectoral and multi-lateral actions, using the United Nations Convention on the Law of the Sea (UNCLOS) as a framework. Several international regulatory and management bodies have mandates relevant to conservation of the high seas in the Atlantic, including the International Maritime Organisation (IMO), International Commission for the Conservation of Atlantic Tunas (ICCAT), International Seabed Authority (ISA) and Northwest Atlantic Fisheries Organisation (NWAFO).

The Sargasso Sea Alliance is an international initiative to enhance protection of the Sargasso Sea. Led by the Government of Bermuda, partners include the International Union for Conservation of Nature (IUCN), Woods Hole Oceanographic Institution (WHOI), Mission Blue/Sylvia Earle Foundation, Marine Conservation Institute (MCI), Bermuda Underwater Exploration Institute (BUEI), Bermuda Institute of Ocean Sciences (BIOS), WWF International and Atlantic Conservation Partnership, Bermuda. A 4,151,565km^2 focal area has been identified based on oceanographic, bathymetric and ecological features (Figure 1), and represents 36% of the high seas in the central North Atlantic (15°N to 40°N). Protection for this portion of the Sargasso Sea would be a significant step towards achieving Aichi Biodiversity Target 11, and the process presently underway provides a model for further efforts.

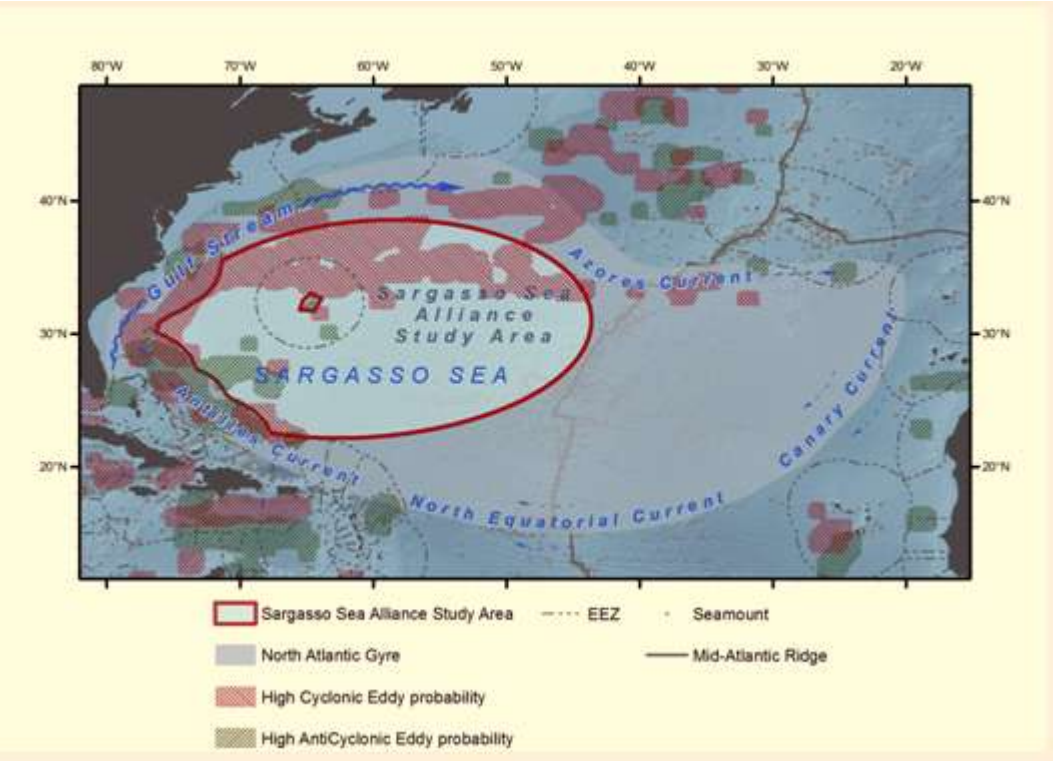

Figure 1: Map of the Sargasso Sea Alliance focal area as submitted at the EBSA workshop, including some of the major features that influenced overall boundary definition and location.

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26) HIGH SEAS MARINE PROTECTED AREAS IN THE NORTH-EAST ATLANTIC: THE OSPAR COMMISSION APPROACH

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Background

OSPAR is the mechanism by which fifteen Governments of the western coasts and catchments of Europe, together with the European Union, cooperate to protect the marine environment of the North-East Atlantic. In terms of geography, the OSPAR Convention area covers all waters of the Atlantic and Arctic Ocean north of 36° N latitude and 42° W longitude (north of 59° N, 44° W) and 51° E longitude, except the Mediterranean Sea and the Baltic Sea.

The OSPAR maritime area encompasses vast areas in the Wider Atlantic (OSPAR Region V) and the Arctic Waters (OSPAR Region I) that are beyond the jurisdiction of coastal states, approximately constituting 40 % of the OSPAR Convention area. These areas host extensive open-ocean and deep sea areas between the Svalbard archipelago and Iceland, and along the Mid-Atlantic Ridge (MAR) between Iceland and Portugal Azores with abyssal plains to the east and west of the Ridge.

In 2003, Ministers of OSPAR Contracting Parties committed to establish an ecologically coherent network of well-managed marine protected areas (MPAs) by 2010, which included a clear remit to identify and designate MPAs in areas beyond national jurisdiction (ABNJ).

High Seas Marine Protected Areas Designation Process

The designation of an MPA in ABNJ in the North-East Atlantic requires collective agreement and action by the OSPAR Commission. Any proposal for an OSPAR MPA in ABNJ prepared by either a Contracting Party or an Observer Organization needs to be agreed to by consensus.

In 2003, a map of the OSPAR maritime area was prepared by the German Federal Agency for Nature Conservation (BfN) as a spatial planning tool indicating those areas that do not fall under the jurisdiction of any Contracting Party and that therefore would be considered ABNJ. At that time, ABNJ was determined by the boundaries of the Exclusive Economic Zones (EEZ) of Contracting Parties at 200 nautical miles from the shoreline. Other possible delimitations of Contracting Party EEZs were not taken into account.

The process for identifying potential MPAs within ABNJ was triggered in 2006, when the World Wide Fund for Nature (WWF) submitted a formal nomination for an MPA on the Mid-Atlantic Ridge, including the Charlie-Gibbs Fracture Zone. At the same time, a scientific process has been initiated under the Chairmanship of Germany with a view to identify other potential MPAs in ABNJ of the North-East Atlantic. Resulting proposals were then subject to detailed scrutiny both in terms of the scientific justification for such a designation, as well as the legal aspects. These were twofold: firstly to set the extent of OSPAR's mandate regarding the establishment and management of selected areas beyond national jurisdiction as MPAs; and secondly to consider the submissions made by some Contracting Parties to the Commission on the Limits of the Continental Shelf (CLCS) under UNCLOS Article 76, which eventually affect the delineation of the proposed MPAs.

The breakthrough came with the decision by OSPAR Ministers at their meeting in Bergen/Norway in 2010 to designate the following six MPAs in ABNJ, along with recommendations regarding their management:

- Charlie-Gibbs South Marine Protected Area,

- Mid-Atlantic Ridge north of the Azores High Seas Marine Protected Area,
- Milne Seamount Complex Marine Protected Area,
- Altair Seamount High Seas Marine Protected Area,
- Antialtair Seamount High Seas Marine Protected Area,
- Josephine Seamount Complex High Seas Marine Protected Area.

The four areas whose names contain "High Seas" are subject to a mixed jurisdiction: while the water column remains High Seas and is therefore managed collectively by the OSPAR Commission, the seabed is included in the submission by Portugal to the CLCS and therefore managed by the coastal state.

Ecological Features

The ridge structures and the seamount areas found in the OSPAR MPAs in ABNJ support high marine biological diversity, including threatened and/or declining species: e.g. orange roughy (Hoplostethus atlanticus), blue whale (Balaenoptera musculus), leatherback turtle (Dermochelys coriacea), portuguese dogfish (Centroscymnus coelolepis), gulper shark (Centrophorus granulosus), leafscale gulper shark (Centrophorus squamosus); and habitats: e.g. seamounts, deep-sea sponge aggregations, lophelia pertusa reefs, coral gardens.

The MPAs host other features of interest such as deepwater and epipelagic ecosystems, including their function for migratory species; habitats associated with ridge structures, including their function as recruitment and spawning areas benthopelagic habitats and associated communities, including commercially fished species; hard substrate habitats and associated epibenthos, including cold water corals and sponges; soft sediment habitats and associated benthos, including "coral gardens" of nonscleractinian corals and the meandering sub-polar frontal ecosystem in the case of the Charlie-Gibbs Fracture Zone.

Way Forward

Following the successful establishment of these MPAs in ABNJ, and in parallel to new designations, the OSPAR Commission is now focusing efforts on their management, through the so called "Madeira process". This process was initiated by OSPAR in 2010 by a meeting on Madeira, Portugal, with the aim to promote the sharing of conservation objectives and enhance the coordination between the relevant authorities with legal competence in the management of the North-East Atlantic, for example, but not limited to the North East Atlantic Fisheries Commission (NEAFC), the International Seabed Authority (ISA), the International Maritime Organisation (IMO), and the International Commission for the Conservation of Atlantic Tunas (ICCAT).

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27) CLIMATIC OSCILLATIONS AND CORAL REEF RESILIENCE OVER A DECADE IN ANDAMAN AND NICOBAR ISLANDS, INDIA

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Corals have been an important structural feature of reefs in shallow tropical seas since the days of the dinosaurs i.e. 100 million years ago. Coral reefs of the present type have been around for about 25 million years. These complex limestone structures provide an important habitat for a biologically diverse array of species. The environmental causes and ecological consequences of coral bleaching are major current issues in coral reef ecology and reef management worldwide. Global warming and El Niño have led to an increased frequency of coral bleaching since the 1980s. It has been well established that large sea surface temperature anomalies are the key causes of coral mass bleaching worldwide. The frequency of coral bleaching events has increased noticeably during the past two decades due to gradual increment in sea surface temperature (SST) as a result of climate change around the globe.

In India, the Andaman and Nicobar Islands have near-pristine coral reefs and the largest block of coral cover in the Indian Ocean. Mostly fringing reefs dominate, surrounding most of the 572 islands, although isolated outcrops and extensive communities growing on rocky shores and vertical granite walls also are frequently found. The area is regionally outstanding in terms of both species diversity and intact corals. A total of 433 species of coral species with an area of 2000 km^2 have been recorded to date. The mean SST analysis in Andaman Sea over a decade shows that the reef area has warmed from 28.40^0C in 1985 to 28.78^0C in 2005 i.e., at the rate of 0.19^0C per decade. The annual average maximum SST increased from 30.08^0C to 30.54^0C, i.e., at a rate of 0.23^0C per decade. The minimum SST increased at a faster rate of 0.35^0C per decade (from 27.1^0 to 27.8^0C).

Prior to 1998, there was no proper assessment of the status of the coral reefs of the Andaman and Nicobar Islands. Ravindran *et al*. (1999) reported that 90% of the massive corals and 75% of the branching corals were bleached on 3 surveyed reefs in the Andamans in July 1998. However, the mortality in this area seems to have been insignificant, or relatively local, since subsequent surveys have showed no signs of mass mortality at all in Andaman and Nicobar Islands (Muley *et al*., 2000). Turner *et al*. (2001) pointed out the significance of the Andaman Islands for global biodiversity, and the potential of these coral reefs as a source for natural seeding and re-colonization of other more degraded reefs in the region. The 1998 bleaching event had little effect in the Andaman and Nicobar, and live coral cover averaged 65% at that point of time (Muley *et al*., 2000 and Rajasurya *et al*., 2000 & 2002). However, the tsunami and earthquake that struck on 26th December 2004 caused irrevocable damage to the extent of 30% loss in several reef areas in the Andaman and Nicobar Islands due to permanent uplift of reef in North Andaman. It is observed that coral bleaching occurred when the summer SST maxima exceeded 31^0C and remained high for more than 30 days. The seawater temperature in the Andaman Sea during May 2005 was between 31 and 32^o which resulted in the localized massive beaching (ZSI, 2008). Similarly in 2010, SST of the coastal and oceanic region of Andaman and Nicobar Islands drastically increased to 31.7^o against average of 30.08^0 during the April-May 2010 due to delayed onset of southwest monsoon resulting mass bleaching of corals in this archipelago.
Surveys conducted by Zoological Survey of India in the reefs of the Andaman and Nicobar Islands revealed that the corals were extensively bleached during April and May 2010 ranging from 65% to 81% in various sites. Similar bleaching events were reported in 1998, 2002 and 2005 in this region. However, the extent of the 2010 bleaching surpasses the earlier observations. It was observed that the branching corals (*Acropora* spp.) were the worst affected due to bleaching. The predominant species were *Acropora formosa, Acropora nobilis, Acropora robusta, Acropora breuggemanni* and *Acropora grandis.* The left over live coral cover during post bleaching 2010 was recorded to be 1.09 to 9.7 % in various sites. Subsequently, the status has been improved to an average live coral coverage of 25.38 % during November 2011 (ZSI, 2011). The recovery status of corals in this archipelago shows the positive sign of reef resilience. The recruits of branching corals are seen

predominantly in various sites and the bleached massive corals could recover in various patterns. Scrutiny of data over a decade of climate change in Andaman and Nicobar Islands revealed a total of loss of 40% of live coral. The analysis of new recruit and recovery rate of corals indicated that the reefs of Andaman and Nicobar Archipelaogo will resume their normalcy within a span of two years given an undisturbed environment.

Current climate change predictions and its impact over a decade indicate that occurrence of such extreme climate-driven events will increase. Hence, it is imperative that a sustained monitoring of the reefs with standardized approach to be initiated in the wake of this bleaching event to track changes in coral reef health. Besides, it is also essential to monitor the effects of chronic stresses on reef community structure. As the threat of global warming to coral reefs increases, it would be wise to invest in a more complete network of surveys to aid in monitoring large-scale environmental stressors and their impacts on the coral reefs of Indian Seas.

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28) CONSERVATION MEASURES AND STAKEHOLDER CONFLICTS: SUSTAINABILITY OF RESOURCES IN THE GULF OF MANNAR BIOSPHERE RESERVE, SOUTHEAST INDIA

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Geography and Biodiversity

Gulf of Mannar (GOM), situated between 8°0′-9°30′N and 77°30′-79°30′E at the south-eastern coast of India, is considered one of the biodiversity hotspots, given the assemblage of coral reefs (fringing the 21 islands with an estimated area of 75.93 km^2 (SAC, 2010)) seagrass beds (available in areas between the islands and coast – total cover: 85.5 km^2 (Ramaswamy, *et al*., 2009) and mangrove habitats (confined to the shorelines of the islands). An impressive biological diversity comprising ~3600 species, including endemic species of i) a mangrove *Pemphis acidula,* and ii) a Hemichordate (*Phychodera fluva*); and flagship species such as *Dugong dugong,* 3 species of dolphins, 2 species of whales, at least 5 species of turtles and 68 species of elasmobranchs, among others, have been reported (GEF, 1999).

Fishers, Dependence for Resources and Indiscriminate Exploitation

GOM provide 20% of the marine fish catch of the state of Tamil Nadu (Venkataraman *et al.*, 2002), and involves more than 50,000 people, about 850 trawlers, 7400 small-scale fishing vessels (SFV), and 300 catamarans for fishing and allied fisheries (Gopakumar, *et al.*, 2011). About 5000 women are involved in harvesting seaweeds, ~4500 divers are collecting sea cucumbers, of which ~1000 are also involved in chank (*Turbinella pyrum*) collection (Rajagopalan, 2011). Allied fisheries resources exploited are: the chank, Button shells (*Umbonium* spp.), the spider shells (*Lambis* spp.), and shells under Strombidae, Cypraeidae, Cassididae, Cymatidae, Bursidae, Muricidae, Thaididae, and Nassaridae; lobsters (*Panulirus homarus*, *P. ornatus* and *P. versicolor*); 15 species of sea cucumbers including high value *Holothuria scabra,*; crabs (dominantly of *P. pelagicus, P. sanguinolentus, Scylla serrata* and *S. tranquebarica*); shrimps (*Penaeus semisulcatus*, *P. indicus* and *P. monodon*); ~17 important seaweeds and several such (Gopakumar, *et al.*, 2011).

A case of indiscriminate exploitation, corals had been heavily quarried for limestone, beginning in the early sixties (Pillai, 1996) and continued clandestinely until as recently as 2002. During the 1960s an estimated 3000 to 4000 turtles were caught annually in GOM and Palk Bay (Rajagopalan, 1984). 106 tons of gorgonians had been exported from 1975-1992 (Venkataraman *et al*., 2002). In addition, large numbers of sea urchins, brittle stars, sea lilies, sea anemones and ~60 species of ornamental fishes as aquarium animals are also known to be exploited (Venkataraman *et al*., 2002).

Conservation Initiatives and the Acts

To conserve the biological diversity of GOM, the 21 islands in GOM and the surrounding coral reef area (Total 560 sq km) were declared as a Marine National Park in 1986, under the Wildlife (Protection) Act, 1972. The entire Indian EEZ of GOM (10,500 sq km) – with the national park as the core area – was declared in 1989 as Gulf of Mannar Biosphere Reserve (GOMBR).

Wild Life (Protection) Act (WLPA) 1972 – prevents species – listed in its scheduled list (I) and reported from GOM (turtles, sharks, rays, seahorses, giant grouper, all corals, gorgonians, nine species of molluscs and all species of sea cucumbers) – from being harvested/traded. *The Tamil Nadu Marine Fishing Regulation Act (MFRA), 1983, 2000* – is to regulate, restrict or prohibit fishing in the marine area of the state. The regulations include prohibition of (i) fishing gear < 10mm mesh size (ii) deep sea, and mechanized fishing vessels (MFV) (8 - 15 m length, engine of 15 – 120 hp) and bottom trawling within three nautical miles from the coast, and (iii) pair trawling and purse seine fishing in the territorial waters of the state. Regulations also cover (iv) closed season for MFVs, and (vi) three-four day rule, under which MFVs are allowed to fish for three days a week, and SFVs for four days. *The Coastal Regulation Zone (CRZ) Notification, 2011,* among its objectives has i) to ensure livelihood security to the fisher and other local communities, ii) to conserve and protect the unique

marine and coastal environment, and iii) to promote sustainable development. Prohibited activities in the CRZ (from High Tide Line to 500 m to landward) include: setting up and expansion of (i) industries, (ii) fish processing units (iii) units for disposal of wastes and effluents, (iv) discharge of untreated waste and effluents.

Manifestation of Threats

The obvious signs of threats to sustenance of the GOM biodiversity are (i) depletion of resources and (ii) the degradation to coral reefs. Estimation of fishery stock sizes in GOM showed no relation between total biomass and the target fishery ($P \leq 0.000$), indicating severe depletion of valuable fisheries due to excessive demand, causing the non-target biomass to dominating the total catch (figure 1); the population structure of sea cucumbers (e.g. *Holothuria scabra*) – 13-16 cm category (2 y. o,)) at the unimodel mode – also exhibited depleted stocks reporting very low densities (3.84 ind./km^2). Status of other fishery resources concur: brachyuran crabs availability reduced from 31-42.5 ind./m^2 (Jeyabaskaran *et al.*, 1998) to 10 ind./m^2 (Venkataraman *et al*., 2002). Collection of seaweeds, shells and sea cucumbers continue in the no-take-zones, as well as pair trawling, purse-seining, use of roller nets and drag-nets in the prohibited zones, thus causing severe coral reef degradation (figure 2) with the present average live coral cover 50% less than 2008.

Addressing Problems and Ensuring Sustainability of Resources

The initiatives by the Government of India are viewed as impingement on the rights of the fishers to resource use. The issues raised by the fishers are: i) the villagers have not been involved in the development of the park/reserve management framework, ii) trawler fishing has more impact on marine resources, and call for strict implementation of the Tamil Nadu MFRA, iii) Industrial pollution, sedimentation and coastal developmental activities in the region affect the ecosystem, yet are virtually unregulated (Rajagopalan, 2011).

The following are some of the actions required to resolve the conflicts and ensure sustainability of resources:

1. The fishers must be made fully aware of and comply with the no-take-zones, which are necessary for the replenishment of the fishes and allied resources at the exploitation zones.
2. However, demarcations within the MNP for sustainable harvesting could be considered, after sufficient consultation with scientific agencies which have generated knowledge on a particular resource. For example, areas, duration, and quantities to collect sea weeds could be specified, where the fishers are educated not to disturb/harm other reef organisms.
3. Collaborative initiative between Fisheries and Forest Departments towards the strict enforcement of the MFRA, 1983 & 2000.
4. Decisions on fisheries regulations should be made and revised periodically based on sound scientific studies on monitoring of stock sizes and population structures of the resources.
5. Involving stakeholders in the consultations for decisions related to GOM resources and eco-development.
5. Enforcement of regulations under CRZ notification, 2011, wherever relevant.

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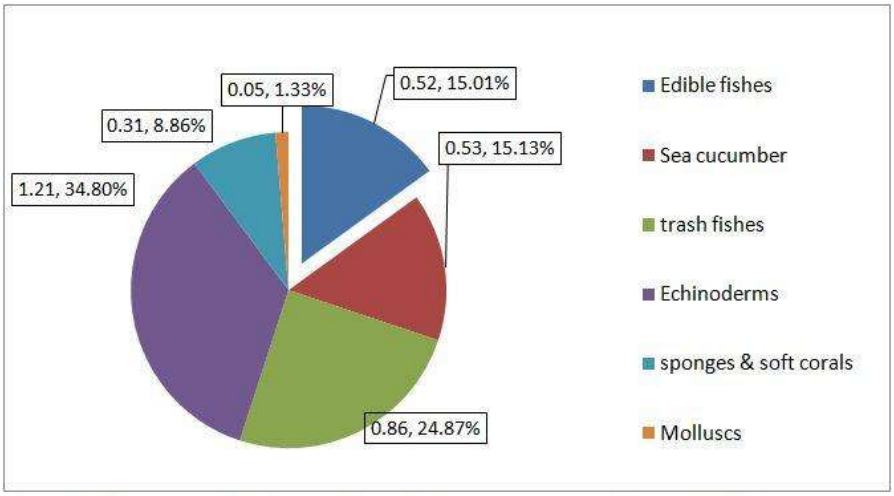

Figure 1. Pie-chart showing contribution of sorted category fishery to total fishery

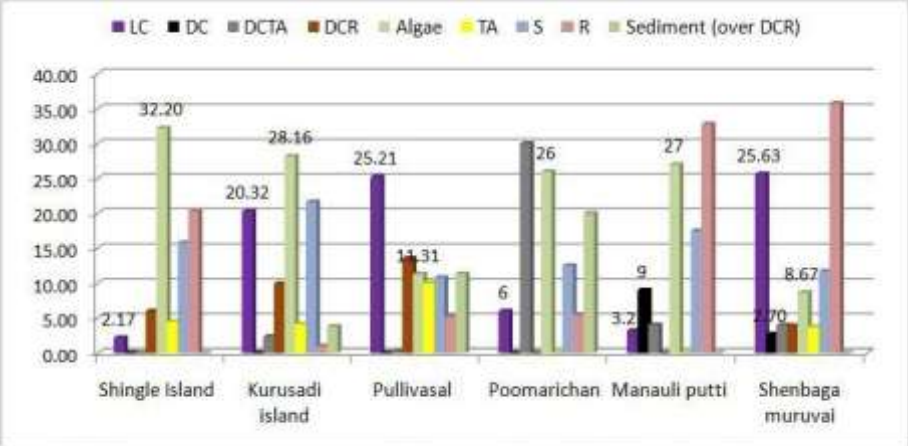

Figure 2. Percent cover values of Biophysical characters in Gulf of Mannar Islands

29) THE GLOBAL ISLAND PARTNERSHIP: INSPIRING LEADERSHIP FOR ACTION ON OCEANS, COASTS AND ISLANDS TO ACHIEVE THE AICHI BIODIVERSITY TARGETS

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The Global Island Partnership (GLISPA) assists islands in addressing one of the world's greatest challenges — to conserve and sustainably utilize invaluable island natural resources that support people, cultures and livelihoods in their island homes around the world. It is a partnership for all islands, regardless of size or political status, to take bold steps towards greater sustainability. It provides a global platform that enables islands to work together to develop solutions to common problems and to take high-level commitments and actions that address these global challenges.

A Global Opportunity

Islands are unique, diverse and vulnerable. They are important early indicators of the common challenges facing our global community. Island communities feel the impacts from natural disasters, climate change, overconsumption and other global changes more intensely, as these changes jeopardize their food, water, health and economic security. Today, many islands are demonstrating global leadership and rapid progress in addressing these challenges and inspiring others around the world.

GLISPA was formed to accelerate implementation of the PoWIB and the Convention. It supports the implementation of the Aichi Biodiversity Targets by bringing together all islands— small and large, developing and developed — to mobilize leadership, increase resources, share solutions and catalyze action on island priorities in a cost-effective and sustainable way.

Call for Island Leadership

At the Mauritius International Meeting12 in January 2005, former U.N. Secretary General Kofi Annan made an urgent call for high-level political commitment to the global challenge on islands. At the same time the programme of work on island biodiversity was being discussed within the context of the CBD. Inspired, former President Tommy E. Remengesau Jr. of Palau and President James A. Michel of Seychelles called for greater collaboration through an international partnership for island conservation and sustainable livelihoods.
GLISPA grew spontaneously based on the needs of participating governments and partners and is now recognized as: a mechanism for advancing the conservation of island biodiversity (decision IX/21, CBD COP-9); a best practice partnership by the UN Commission on Sustainable Development (UNCSD); and, a success factor in preparations for the 2012 UN Conference on Sustainable Development (Rio+20)13.

Commitment to Action

As target 11 highlights, areas of particular importance for biodiversity and ecosystem services need to be conserved through "systems of protected areas and other effective area-based conservation measures". Through GLISPA, governments, agencies and organizations have come together to conceive, launch or strengthen significant commitments towards this target (figure 1). Commitments are based on global, national, regional and/or organizational priorities and add value to existing efforts by helping countries accelerate and improve actions on the Aichi targets and the PoWIB as well as local implementation. Examples of these commitments include:

12 Mauritius International Meeting to Review the Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States, 10-14 January 2005.

13 "Synthesis report on best practices and lessons learned on the objective and themes of the United Nations Conference on Sustainable Development." United Nations General Assembly.21 January 2011. http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N11/213/65/PDF/N1121365.pdf?OpenElement

The **Caribbean Challenge Initiative** involves eight island nations and is growing - The Bahamas, Dominican Republic, Jamaica, Saint Vincent and the Grenadines, Saint Lucia, Grenada, Antigua and Barbuda as well as Saint Kitts and Nevis. Five countries have made formal commitments to protect at least 20% of the near-shore marine and coastal habitats by 2020. All eight countries are participating in a sustainable financing initiative for their national protected areas.

The **Micronesia Challenge** is a commitment by five governments – Republic of Palau, Federated States of Micronesia, Republic of the Marshall Islands, U.S. Territory of Guam and U.S. Commonwealth of the Northern Mariana Islands -- to effectively conserve at least 30% of the near-shore marine resources and 20% of the terrestrial resources across Micronesia by 2020.

The **Western Indian Ocean Coastal Challenge** is a developing Challenge led by the Republic of Seychelles. The Challenge is a regional "call to action" to address the threats posed by climate change and to ensure sustainable coastal livelihoods and marine and coastal ecosystems.

Impact

GLISPA has advanced the Aichi Biodiversity Targets and particularly target 11 through:

Inspiring Leadership for Conservation & Sustainability

- Helped inspire, recognize and support leaders in Micronesia, the Caribbean, Indonesia and the Western Indian Ocean to work with their neighbors on visionary regional island initiatives ('Challenges') for conservation and sustainability
- Assisted island leaders to advocate for ecosystem-based adaptation to be recognized internationally, in particular under the United Nations Framework Convention on Climate Change

Catalyzing Commitments to Large-Scale Action and Funding

- Assisted more than 30 countries to launch or strengthen major island commitments focused on island conservation and sustainable management of marine, coastal and/or terrestrial habitats
- Helped catalyze more than US$ 125 million in commitments for island actions

Facilitating Collaboration to Support Island Priorities

- Enhanced collaboration among political leaders, key government ministries and agencies, and non-governmental partners working on shared commitments through high level and strategic events at key global and regional meetings
- Recognized and promoted each island commitment as a beacon of inspiration and guidance to others

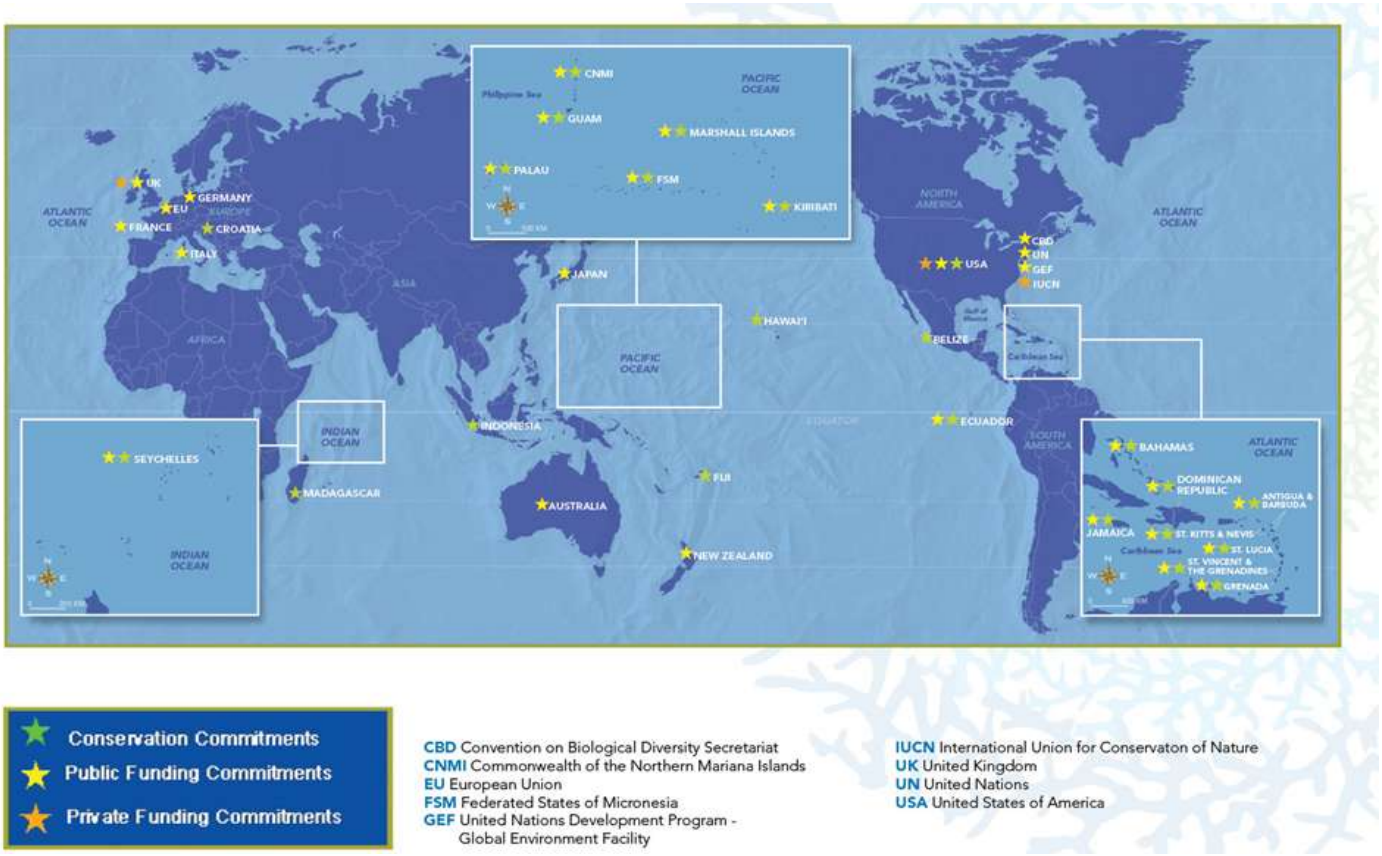

Figure 1: Global Island Partnership Commitments

30) MARINE PROTECTED AREAS NETWORK IN INDIA: PROGRESS IN ACHIEVING AICHI TARGETS

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The sea around India is part of the great Indian Ocean, and the Indian subcontinent forms a major physical division between the Arabian Sea and the Bay of Bengal of the Indian Ocean. India represents 2.5 percent of the world's landmass and supports a population of over one billion people. India is also one of 17 mega-biodiverse countries in the world, with 7.8% of the recorded species of the world, including 45,500 recorded species of plants and 91,000 recorded species of animals. India has a vast coastline of 7, 517 km, of which, 5, 423 km belong to Peninsular India and 2, 094 km to the Andaman, Nicobar, and Lakshadweep Islands, and with an EEZ of 2.02 million sq. km. This coastline also supports a huge human population, which is dependent on the rich coastal and marine resources. It is estimated that nearly 250 million people live within the swath of 50 km from the coastline of India. Therefore, the ecological services of marine and coastal ecosystems of India play a vital role in India's economic growth.

Despite the tremendous ecological and economic importance and the existence of a policy and regulatory framework, India's coastal and marine ecosystems are under threat. Numerous direct and indirect pressures arising from different types of economic development and associated activities are having adverse impacts on coastal and marine biodiversity across the country. Additionally, climate change is likely to have a growing impact on coastal and marine ecosystems, including a likely increase in extreme weather events as well as sea level rise, warming of the sea surface temperatures and ocean acidification. A rise in the sea level is likely to have significant implications on the coastal populations and agricultural productivity.

India has designated four legal categories of protected areas *viz.* National Parks, Wildlife Sanctuaries, Conservation Reserves and Community Reserves. India has created a network of PAs representing all its 10 biogeographic regions. A total of 669 protected areas have been established comprising, 102 National Parks, 515 Wildlife Sanctuaries, 48 Conservation Reserve and 4 Community Reserve, besides designating 25 wetlands as Ramsar sites.

Marine protected areas network in India has been used as a tool to manage natural marine resources for biodiversity conservation and for the well-being of people dependent on. Scientific monitoring and traditional observations confirm that depleted natural marine resources are getting restored and/or pristine ecological conditions have been sustained in well managed MPAs. In India, PAs in whole or in part that falls within swath of 500 m from the high tide line and to marine environment are included in the Marine Protected Area Network. Based on this definition, there are 18 Marine Protected Areas present in the Peninsular India and more than 100 MPAs in its Islands. Of the 18 MPAs in the peninsula, Gulf of Mannar Marine National Park, Sundarbans National Park, Gulf of Kutchch National Park, Bhitrakanika National Park, Coringa Wildlife Sanctuary, Chilika Wildlife Sanctuary have unique marine biodiversity and provide a range of services to local communities around these MPAs. These 18 MPAs cover an area of about 6158 sq.km, which is 3.85% of total area covered under the entire Protected Area Network of India or less than 0.2% of total land areas of India. However, a total of 4.97% of coastal zone of peninsular India has already been included in the existing MPAs which is almost 50% of Aichi Biodiversity Target No.11.

Total area of Andaman and Nicobar Island is 4947 sq. km, of which 1510 km2 are protected under the provision of India's Wildlife (Protection) Act, 1972. There are 105 protected areas in Andaman and Nicobar Islands, of these about 100 are MPAs. Although, these MPAs cover more than 30% of terrestrial areas of islands but still protect more than 40% of available coastal habitats of islands. The Mahatma Gandhi Marine National Park and Rani Jhansi Marine National Park are important MPAs here. In Lakshadweep group of islands, Pitti Island (0.01 sq. km) is the only island having the status as MPA.

India has also identified 12 protected areas as trans-boundary protected areas under the framework for IUCN Transboundary Protected Area programme. Among these sites, two are MPAs *viz.* Sundarbans Tiger Reserve and Gulf of Mannar Biosphere Reserve. India has also designated five UNESCO-World Heritage Natural sites and Sundarbans National Park is one among them.

India has taken several steps for achieving Aichi Biodiversity Targets especially Target No. 11 (at least 10% of coastal and marine areas are conserved in networks of protected areas) and Target No.14 (Ecosystems that provide water, health, livelihoods and well-being are restored and safeguarded). Towards achieving these two targets, 106 coastal and marine sites have been identified and prioritized as Important Coastal and Marine Areas (ICMBA). Along the west coast of India 62 ICMBAs and along the east coast of India 44 ICMBAs have been identified. These sites have also been proposed as Conservation or Communities Reserves with participation of local communities. Efforts are currently underway in securing and strengthening community participation in management of the marine protected area network in India.

31) CONSERVATION ON THE HIGH SEAS: SOUTH PACIFIC EBSA DESCRIPTIONS

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The first regional workshop, convened by the CBD Secretariat pursuant to decision X/29, to identify potential ecologically and biologically significant marine areas (EBSAs) was held November 22-25 in Fiji. In 1992, the UN Convention on Biological Diversity (CBD) formalised aspirations for conservation and sustainable use of biodiversity including equitable sharing of benefits from the use of genetic resources. Sadly, while coastal states have undertaken to deliver on this responsibility within national waters, sustainable use of living resources in the high seas has been challenging, because of various threats including unsustainable fishing, and remains a major concern for the international community. In 2002, an aspirational target was set to establish marine protected areas, including representative networks by 2012. In 2008, the Conference of the Parties to the CBD adopted seven scientific criteria to identify EBSAs to enhance conservation and management measures.

Experts from thirteen member nations the Secretariat of the Pacific Regional Environment Programme (SPREP) and nine international organisations described 26 potential EBSAs in marine areas greater than 100m deep, both within and outside of national jurisdiction in the Western South Pacific region. Important data included physical oceanography, seafloor geology, and the predicted distributions of cold water coral communities developed through the Census of Marine Life. While biological data were harder to access, the meeting did use fisheries data provided by the Secretariat of the Pacific Community, seabird breeding and foraging areas provided by BirdLife International, and species diversity from the Oceans Biogeographic Information System (OBIS). Detailed cetacean data were simply not available for this part of the Pacific (apart from good expert knowledge and historical whaling data), while large pelagic predator data were inaccessible. Workshop results will be submitted to the 16th meeting of the CBD Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), 30 April to 5 May 2012.

The workshop identified an urgent need to facilitate capacity-building in developing countries and provided a successful first step in bringing together marine experts of this region to form partnerships and networks that will continue to contribute to international efforts toward enhancing marine management and conservation in areas meeting EBSA criteria.

32) ISLAND RESTORATION THROUGH INVASIVE RAT ERADICATION IN HAIDA GWAII: BRITISH COLUMBIA SUPPORTS CANADA TO MEET AICHI BIODIVERSITY TARGETS

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The restoration of degraded island ecosystems through the eradication of invasive alien species (IAS) can support Canada and other CBD Parties to meet the Aichi Biodiversity Targets to:

- enhance ecosystem resilience and restore degraded ecosystems (Target 15)
- combat habitat loss (Target 5)
- mitigate the impacts of invasive alien species (Target 9).

While IAS eradications have occurred on more than 700 islands worldwide, relatively few have occurred in Canada. There is potential to increase conservation gains for high conservation value lands using this restoration technique in island ecosystems across Canada. A recent initiative to eradicate invasive rats and restore island ecosystems in Gwaii Haanas National Park Reserve in Haida Gwaii, British Columbia highlights the potential of this tool to support Canada's progress to meeting its international commitments to biodiversity conservation.

The Gwaii Haanas National Park Reserve and the recently gazetted adjacent National Marine Conservation Area Reserve support 1.5 million nesting seabirds (Harfenist 2003) and more unique sub-species than any other equal sized area in Canada (Golumbia et. al. 2008). Parks Canada Agency and the Haida Nation who cooperatively manage the park reserve have identified IAS as the main threat to the park reserve's ecological integrity (AMB 2007). Throughout Haida Gwaii, the effects of deer, beaver and raccoon are considered most serious and widespread while those of rats are having significant effects in more localized areas, particularly in seabird colonies (Golumbia et. al. 2008).

Rats, first introduced with the advent of maritime shipping in the late 1700s, are known to occur on at least 18 islands throughout the archipelago. Predation by rats has had significant negative impacts on populations of nesting seabirds, forest songbirds and native small mammals. The world's largest known historical breeding population of ancient murrelets *Synthliboramphus antiquus* on Langara Island, Haida Gwaii declined from an estimated 200,000 nesting pairs (Rodway 1991, Gaston 1992) to less than 20,000 pairs (Harfenist 1994) after rat introduction in 1946. Rats can also affect invertebrate populations, and as a consequence, unleash a cascade of far-reaching effects in ecosystems, such as changes to soil fertility (Fukami et al. 2006) and intertidal community structure (Kurle et. al. 2008).

SGin Xaana Sdiihltl'lxa - Night Birds Returning

In 2009, Parks Canada and the Haida Nation launched *SGin Xaana Sdiihltl'lxa* which, translated from the Haida language, means "Night Birds Returning" and refers to the ancient murrelet's habit of arriving and departing from their underground nests only at night. The program aims: *"to restore nesting seabird populations and improve the ecological integrity of island ecosystems, while building awareness and understanding among Canadians about the impacts of introduced species on Canada's natural and cultural heritage."*

Four target islands (~840ha), which once supported globally and regionally significant seabird colonies of ancient murrelets, Cassin's auklets *Ptychoramphus aleuticus*, Leach's storm petrels *Oceanodroma leucorho*a and fork-tailed storm petrels *Oceanodroma furcata* were identified as high priorities for restoration.

In 2011, Parks Canada Agency, the Haida Nation, Coastal Conservation , Island Conservation and the US – based Luckenbach Council implemented an eradication of Norway rats on two island groups (Bischof Islands

and Arichika Island, ~100 ha) to restore nesting seabird habitat and ecosystem functioning. A ground-based operation in which a brodifacoum rodenticide deployed in 400 bait stations across a 50mX50m grid was used. Within 8 weeks rat activity was no longer detected by bait uptake or remote cameras. While confirmation of eradication success will be confirmed in 2013, no rats have been detected since October 2011. Monitoring programs to gauge ecosystem recovery and to measure eradication success include use of acoustic recording units to detect nesting seabird presence, assessment of small mammal, shorebird, forest songbird and intertidal community response to rat eradication.

Building on this pilot eradication, Parks Canada Agency, the Haida Nation and its partners aim to undertake the first aerial broadcast invasive rat eradication in 2013 on larger Murchison and Faraday Islands (~740 ha). With a target implementation date of 2013, the goal of these island eradications is to restore seabird habitat and associated ecosystem processes within the Juan Perez International Bird Area and to protect adjacent rat-free Ramsay Island, which now boasts one of the largest remaining colonies of ancient murrelets in Canada, from rat invasion.

The *SGin Xaana Sdiihltl'lxa* – Night Birds Returning initiative is a part of a $90 million multi-year strategic investment by Parks Canada Agency, aimed at improving ecological integrity across 42 national parks and park reserves in Canada. It is an example of successful cross-border collaboration and cooperative management between government and First Nations which delivers tangible conservation gains for island ecosystems and supports Canada to meet its commitments to the Aichi Biodiversity Targets.

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33) THE EU's BEST INITIATIVE

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EU outermost regions (ORs) and overseas countries and territories (OCTs)14 are located around the globe, and are home to exceptional biodiversity. Situated in the Atlantic, Pacific and Indian Oceans at a range of latitudes, these entities are very rich in biodiversity and play host to more endemic species than are found on the whole of continental Europe.

In July 2008, the conference on "The European Union and its Overseas Entities: Strategies to counter Climate Change and Biodiversity Loss" was held in *La Réunion* under the French Presidency of the European Union15 and issued the "Message from Reunion Island" that states – *inter alia* – that *"There is an urgent need for EU Member States and the European Commission, together with the ORs and OCTs, to establish a voluntary scheme for the protection of species and habitats, inspired by the Natura 2000 approach. This scheme should be easily accessible, flexible, adapted to the local situation, balance conservation and development needs, as well as take into account existing mechanisms and tools. The implementation of the scheme should be based on local commitment and shared financing. "BEST"* is an EU response to the "Message from Réunion Island".

The BEST scheme aims to step up the financial means to protect biodiversity and promote the sustainable use of ecosystem services in outermost regions and overseas countries and territories, with a view to reconciling the environmental and development needs of these areas. The voluntary scheme fosters the development of solutions that maintain healthy and resilient ecosystems and reduce the pressures on biodiversity. This includes the designation and management of protected areas and the restoration of degraded ecosystems, promoting natural solutions to fight climate change, including the restoration of mangroves and the protection of coral reefs. In addition, the scheme encourages partnerships between local administrations, civil society, researchers, land-owners and the private sector. It serves to reinforce cooperation on environment and climate change issues.

Financial support provided by the European Parliament enabled the open call for proposals BEST-201116 to showcase BEST. As a result, 9 projects will be supported. Situated in the Pacific, Caribbean and Indian Ocean and Guyana, they have a wide geographical spread and include projects on the ground such as:

- the creation of protected areas in the public forests of La Réunion and Mayotte;
- the quantification of ecosystem services of marine protected areas in the Caribbean with a view to their payment;
- the development of a network of sustainable management of protected areas and concrete actions for the conservation and the recovery of endangered birds including the two more critically endangered species of French Polynesia : Tahiti with the Tahiti flycatcher *Pomarea nigra* and Fatu Hiva with the Fatu Hiva monarch *Pomarea whitneyi*;
- the tracking of *Pecaris à lèvres blanches*, an endemic indicator species in the Guyana National Parc with a view to a long term project and
- the rational management of natural areas to strengthen a coherent network of sites to meet the conservation and biodiversity challenges of New Caledonia.

In addition, a more policy-oriented project aims to provide a set of methods to evaluate ecosystem services delivered by coral reefs in French Polynesia and New Caledonia and two projects, which aim to build partnerships and awareness of biodiversity and climate change in Europe overseas for the future of BEST through targeted communications and awareness-raising events at the EU and international levels and to build

14 see http://www.iucn.org/about/union/secretariat/offices/europe/activities/overseas/

15 see http://www.reunion2008.eu/

16 see http://ec.europa.eu/environment/nature/biodiversity/comm2006/2020.htm#best

capacity and mobilize stakeholders to implement activities for the conservation and sustainable use of biodiversity in the face of increasing threats from climate change while achieving co-benefits for climate change mitigation and adaptation.

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