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In this Issue...

Editorial - page 1

Oil spills and ocean ills
by Harlan Cohen

New Publications and Reports - page 2

New Projects - page 4

Ocean portal collaboration
Vattenfall wave energy
Total Foundation marine invasive alien species
French agency for marine protected areas

Climate Change Mitigation and Adaptation - page 6

Overlooking 70% of our planet: Neglecting the ocean in climate change discussions
Coastal carbon: mitigating climate change by conserving coastal ecosystems
Wet carbon
IUCN Working Group on Climate Change and Coral Reefs

Conserving Threatened Species - page 12

Business as unusual: Aiming to save whales on the edge of survival
Biodiversity offsets: Can the same concept be applied to the sea?

Energy and Industry - page 15

Yemen LNG
Offshore wind farms: transforming biodiversity risks into opportunities
Offshore energy rigs and farms: their role as reefs
International maritime policies and IUCN: a pathway to conservation

Marine Protected Areas - page 19

Chagos Islands Marine Reserve: A lease of life for the Indian Ocean and coral reefs
Global Ocean Biodiversity Initiative: Protecting the high seas
Outstanding Ocean Heritage: Helping countries protect the best marine places on Earth
Moving the Needle Ocean Protection: Highlighting protection progress at a global level in relation to CBD Goals

Managing Marine Invasive Species - page 24

Invasive Alien Species: Addressing a growing threat to the marine environment

Fisheries and Aquaculture - page 25

Following the fish: Small-scale migratory fishing in West Africa

Ocean Governance - page 26

Rapid decline in world fish stocks: Global legislators call for joint action

Arctic - page 28

Advancing Ecosystem-based Management in the Arctic marine environment

Members & Commissions - page 29

Oyster reefs are a critically imperiled marine habitat
Reaching out for oceans: Europe's biggest nautical spectacle

Expeditions - page 31

Unique data collected on Indian Ocean seamounts
Tara-IUCN expedition: How are coral reefs coping with climate change?
Ocean hope at Mission Blue: A collaboration experiment

Underwater Photographer of the Year - page 35

Upcoming Events - page 35

Global Marine Programme Staff - page 36

Editorial

Oil spills and ocean ills



The Gulf of Mexico oil spill is only the most recent example of human hubris that has allowed activities that despoil the oceans through overexploitation, pollution, lack of planning and foolish decision-making. As terrestrials we view the oceans as vast, immense, unchanging and unchangeable. We know little of the oceans, only recently learning of cold-water coral reefs, hydrothermal vents, chemosynthetic archaea and other – to us – new and exotic species and forms of life. But the ecosystems they inhabit are not new or exotic to these organisms. They are fundamental blocks in the web of life on our planet. The oceans cover 71% of the Earth's surface and contain some 90% of the Earth's biome and as much as 98% of the Earth's biomass. We terrestrial beings must recognize that all life on Earth – terrestrial, marine, atmospheric; complex and simple – depends on healthy oceans for wellbeing.

I remember a Long Island beach visit spoiled by an appalling glob of oil that stuck on my toes. A glob like that would smother a small organism. As harmful as oil spills are, the effects of global warming is even more menacing. Carbon dioxide is acidifying ocean waters, interfering with the ability of a range of marine organisms to fix calcium carbonate. Molluscs, corals and phytoplankton are at grave risk. Greenhouse gas emissions are melting polar ice and warming ocean waters, thus raising sea levels. Runoff from poor development practices is causing marine nutrient overload leading to eutrophication in some marine areas. Ocean noise interferes with fish and mammals' ability to communicate and forage. Destructive fishing practices have removed many of the larger ocean fish and top predators that regulate ocean ecosystems.

But all is not lost. There are practical and concrete steps that we can take to mitigate some threats. Worldwide initiatives by IUCN and its members and partners, highlighted in this newsletter, are leading to better ocean protection and management. Significant advances are sought in areas such as marine-based climate change mitigation and adaptation; sustainable management of fisheries; creation of marine protected areas; ocean governance; and improved coastal living.

Sharp and concrete reductions in greenhouse gases emissions are urgently needed through the UN Framework Convention on Climate Change. IUCN has provided concrete examples of marine-based climate change mitigation and adaptation strategies to help coastal communities to value and protect critical ecosystems, including coral reefs and mangroves.

Better fisheries management can preserve biodiversity and nature for future generations. No fishing should be

allowed where there are no conservation and management arrangements. Fishing should be subject to prior assessment and careful management by States with full and transparent reporting to include catch and effort statistics by fishery and fleet; total catch of target, non-target and discarded species and information on effect and techniques of catch. IUCN works with stakeholders from the conservation and fishing communities to find common ground to promote sustainable fisheries, including in the drafting of new agreements.

Prior assessment of human activities likely to have the potential for significant adverse impacts can allow for better understanding of natural marine processes and human impacts on them. Marine scientific research must be encouraged. The Regular Process of global assessment of the state of the marine environment, including socio-economic aspects, represents a way forward. In preparation for a meeting at the United Nations later this year, IUCN urged governments to support this Process. IUCN will remain focused on the need for prior assessment and its importance to ecosystem-based management and conservation of the marine environment..

Marine protected areas, including marine reserves closed to extractive activities, can protect representative areas for nature and science. Though agreed at the World Summit on Sustainable Development in Johannesburg in 2002 and endorsed by the United Nations General Assembly to support the establishment of representative networks of marine protected areas by 2012, little has been done. Through the World Commission on Protected Areas, IUCN connects marine experts across all regions and oceans to accelerate progress through sharing of expertise and information and creating strong personal support and coaching initiatives. Through the Global Ocean Biodiversity Initiative, IUCN connects science and data to identify ecologically significant areas beyond national jurisdiction that are suitable for – and should be – protected.

Results of recent intergovernmental meetings related to oceans governance have been disappointing. While recognizing the need that all States must agree to move forward for better management, too many meetings seem to snag on political issues that are extraneous to the health of the world's ocean. A constructive approach building on all three pillars of sustainable development – social, economic and environmental – would recognize that humans are part of – and dependent upon – healthy oceans.

Harlan Cohen
Advisor on Ocean Governance
IUCN Multilateral Office

New Publications and Reports

All the following publications can be downloaded from: www.iucn.org/marine



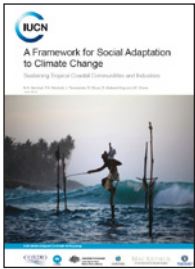
Greening blue energy: identifying and managing the biodiversity risks and opportunities of offshore renewable energy

The Greening Blue Energy project aims to facilitate well-balanced and science-based discussions on the impacts on the marine environment from offshore renewable energy developments. This publication provides a synthesis of current knowledge on the potential biodiversity impacts of offshore wind energy on the marine environment. It is based on scientific evidence and experiences from offshore renewable energy development and other relevant sectors.



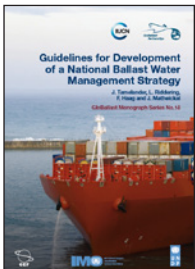
Mediterranean pelagic habitat: oceanographic and biological processes, an overview

The Mediterranean Sea is a highly variable and dynamic environment, with high biologic diversity. However, human activities have a large impact on this environment and sometimes lead to permanent ecosystem shifts. A broad-based dynamic conservation approach is needed to preserve essential ecological processes and services and protect economic and cultural resources for future generations. This publication aims to apply a process approach to habitat conservation, seeking to ensure that pelagic marine species, as well as the dynamic pelagic habitats upon which they depend, are considered when Marine Protected Areas are set up.



A Framework for social adaptation to climate change - Sustaining tropical coastal communities & industries

The estimated 500 million people who depend on coral reefs worldwide regularly contend with change. Whether it is the shifting demands of a global marketplace, political upheaval at the national level, shortage of local supplies such as fuel, or fickle weather, the resilience of reef-dependent people is often put to the test. Despite this hard-earned resilience, coastal communities and reef-based industries are going to be challenged like never before as climate change exerts a multi-faceted influence.



Guidelines for development of a national ballast water management strategy

GloBallast Monograph Series No. 18

This manual has been prepared through collaboration between the GEF-UNDP-IMO GloBallast Partnerships Programme and the International Union for Conservation of Nature (IUCN) Global Marine Programme. It responds to requests from countries for assistance in strengthening and developing national regulatory frameworks related to marine Invasive Alien Species (IAS) in particular with respect to the transfer of potentially harmful aquatic organisms and pathogens in ships' ballast water and sediments.



Risks from maritime traffic to biodiversity in the Mediterranean Sea - Identification of issues and possible responses

This document is the result of discussions among a large number of experts on maritime issues in the Mediterranean Sea and draws on the conclusions of a workshop held in Istanbul in September 2007.



Aquaculture: Responsible practices and certification

This book belongs to a collection of *Guides for the sustainable development of Mediterranean aquaculture*. The first volume in the series dealt with *Interactions between aquaculture and the environment* and the second with *Aquaculture site selection and site management*. This third volume is devoted to *Aquaculture responsible practices and certification* with a view to sustainability within the Mediterranean region. This book is the result of a two-day workshop held in Hammamet, Tunisia, organized by IUCN. A second workshop was held in Rome to consolidate the debate and discussions.



Towards a better governance of the Mediterranean / Vers une meilleure gouvernance de la Méditerranée

Report of the IUCN's Group of Experts, 2007-2008

This publication summarizes the content of consultations held by IUCN's Group of Experts, which focused on governance of the Mediterranean Sea. It presents an inventory of zones under national jurisdiction, issues concerning biodiversity on the high seas, and the existing legal framework.



Global Ocean Biodiversity Initiative brochure - Working towards high seas conservation

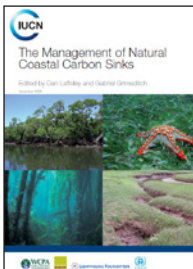
This is a project description brochure for the Global Ocean Biodiversity Initiative (GOBI). GOBI is an international partnership advancing the scientific basis for conserving biological diversity in the deep seas and open oceans.



Ocean acidification: The facts

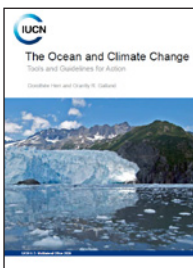
Available in English, Spanish, Chinese and Arabic.

This introductory guide is written especially for policy advisers and decision makers worldwide and is a wake-up call about the double impact on our seas of climate change and ocean acidification caused by increasing atmospheric carbon dioxide levels.



The management of natural coastal carbon sinks

This report focuses on the management of natural coastal carbon sinks. The production of the report has been stimulated by an apparent lack of recognition and focus on coastal marine ecosystems to complement activities already well advanced on land to address the best practice management of carbon sinks. This report provides the essential evidence needed to motivate discussions and initiatives on how such coastal ecosystems should be incorporated into international and national emission reduction strategies, national greenhouse gas inventories and, potentially, carbon revenues schemes.



The ocean and climate change: Tools and guidelines for action

The purpose of this report is to engage, inform and guide decision makers with regard to the development and implementation of marine and coastal climate change strategies and programmes.



Coral reef resilience assessment of the Pemba Channel Conservation Area, Tanzania

This report outlines results of an IUCN assessment of the resilience to climate change of Pemba's coral reefs. The coral reefs of Pemba, Tanzania, are among the most diverse in East Africa. However, they are extremely vulnerable to climate change. Thirteen reef sites on western Pemba covering a range of reef habitats were surveyed using a recently developed resilience assessment methodology, covering coral and algal community, herbivorous fish populations and specific resilience indicators.

New Projects

Ocean portal collaboration

IUCN is a collaborator on the new Smithsonian Ocean Portal, an online site devoted to the awareness, understanding and stewardship of the world's oceans. The Ocean Portal was officially launched 2nd June, 2010 for World Ocean Day and has more than 20 collaborators.¹ In the next few months, IUCN will be working to promote marine conservation on both the IUCN website and the Ocean Portal. Upcoming projects include articles on the Red List process, particularly highlighting the threatened and endangered organisms in the Gulf of Mexico. We have also been asked to provide guest bloggers from the commissions, and encourage interested experts to participate. Finally, we will ramp up our communications efforts internally and externally with a focus on directing traffic both to our websites and the Portal directly.

For more information, please contact Vivian Lam (vivianlam.iucn@gmail.com).

¹ This includes ARKive, BBC Earth, Census of Marine Life, Centers for Ocean Sciences Education Excellence Network, Consortium for Ocean Leadership, EarthEcho International, Encyclopedia of Life, Japan Agency for Marine-Earth Science and Technology, MarViva, Monterey Bay Aquarium, Monterey Bay Aquarium Research Institute, National Geographic Society, National Marine Educators Association, National Oceanic and Atmospheric Administration, New England Aquarium, Ocean Conservancy, Oceana, Save Our Seas, Scripps Institution of Oceanography at UC San Diego, SeaWeb, The Pew Charitable Trusts, Woods Hole Oceanographic Institution and the World Heritage Marine Programme.



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Vattenfall wave energy

Wave energy has enormous promise, with potential generation capacity variously estimated at between 8,000 and 80,000 terawatt hours per year: enough to cover 42-421% of global electricity demand. Several countries including Argentina, Australia, China, Germany, India, UK and USA, are already developing projects to harvest this offshore renewable energy resource. Apart from the energy produced, it is important to understand the local effects to biodiversity these installations may have.

March 2010 saw the launch of a new IUCN project in partnership with the Swedish energy company, Vattenfall AB, which will review available science in order to predict the environmental effects caused by the installation of wave farms in the marine environment.

IUCN's wave energy project with Vattenfall aims to produce a user-friendly scientific overview of the potential for wave energy devices to function as artificial reefs and Fish Aggregation Devices, but also as de facto fishery no-take zones and Marine Protected Areas. Furthermore, the overview aims to contribute to well-balanced science-based discussions and considerations on the impacts on the marine environment of wave farms at political, conservation community, private business and local stakeholder levels, and to identify research gaps within these subjects. The report is due for release in September 2010.



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French agency for marine protected areas

Agence des aires marines protégées

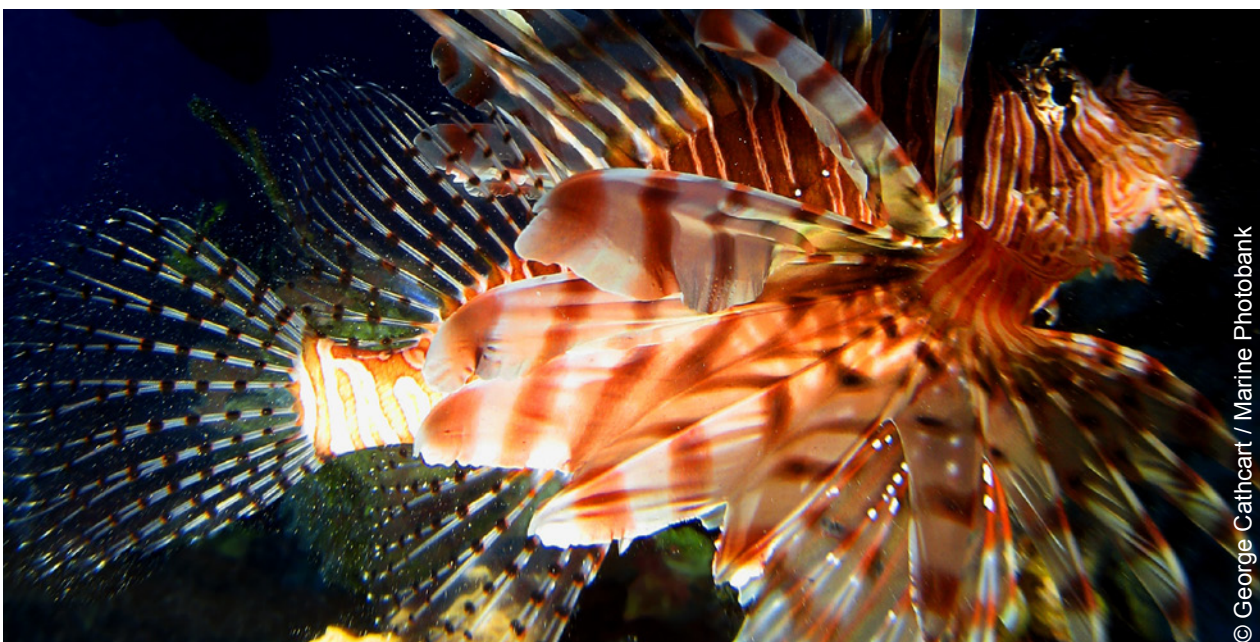
IUCN signed a partnership agreement with the French agency for marine protected areas (Agence des aires marines protégées) in September 2009. In 2009-2010, the Agency supported IUCN activities to improve Mediterranean governance, especially on the high seas. In particular, work was undertaken to identify the importance of submarine canyons and seamounts to the entire Mediterranean region, with a focus on the canyons of the Gulf of Lion. A workshop in Istanbul in January 2010 also addressed the legal and governance issues related to the conservation of these canyons.

In 2010-2011, the Agency will continue to support IUCN's work related to the protection and management of submarine canyons in the Mediterranean. In particular, IUCN will convene a panel composed of Mediterranean submarine canyon experts. The main objective of this panel will be to prepare a summary document on the current knowledge related to Mediterranean canyons (their functioning and importance for biodiversity), which will be published by IUCN. IUCN will also organize and coordinate a workshop in September 2010 on submarine canyon knowledge and governance for conservation purposes. Results will be presented at various workshops and meetings, including at the Conference of the Parties to the Convention on Biological Diversity (October 2010), the Forum of IUCN Mediterranean Members (December 2010) and meetings of the General Fisheries Commission for the Mediterranean and the Mediterranean Action Plan for the Barcelona Convention in 2010 and 2011.

Total Foundation marine invasive alien species

The project *Building consensus for addressing marine invasive alien species: Filling critical awareness and capacity gaps*, developed by IUCN in collaboration with the World Maritime University and Globallast, was initiated in 2010 with support from the Total Foundation. This two-year initiative aims to support efforts to reduce risks of marine invasive alien species (IAS) spread by creating and enhancing access to marine IAS information and training products.

Activities include taking stock of existing materials available for awareness raising and capacity building in relation to marine IAS, and creation of a searchable database, which will also be used to analyze thematic, geographic and language coverage of marine IAS awareness raising and capacity building materials. Critical gaps will be filled through preparation of new materials. Awareness and capacity to address marine IAS among maritime administrators will be enhanced through development of a Professional Development Course at the World Maritime University.



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Climate Change Mitigation and Adaptation



© Dr. Sarah Frias-Torres / Marine Photobank

Overlooking 70% of our planet Neglecting the ocean in climate change discussions

Climate change is severely and rapidly impacting species, ecosystems and people around the globe. As both international and national mitigation and adaptation strategies are being discussed, the impacts of climate change and ocean acidification, as well as the ocean's role in mitigation and adaptation strategies, have largely been overlooked.

IUCN is actively engaged in current climate change discussions to inform and guide decision makers with regard to marine and coastal climate change issues and nature-based solutions. IUCN has provided, notably through its report *The ocean and climate change – Tools and guidelines for action*, relevant science-based action recommendations for the development and implementation of international and national climate change plans and strategies.

Ecosystem-based Adaptation

Ecosystem-based adaptation (EbA) is one of IUCN's priority issues under the United Nations Framework Convention on Climate Change (UNFCCC). EbA integrates the use of biodiversity and ecosystem services into an overall strategy to adapt to the adverse impacts of climate change.

Discussions under the UNFCCC Ad hoc Working Group on Long-Term Co-operative Action (AWG-LCA) have recognized the role of sustainable management of natural resources as an adaptation action that builds resilience of socio-economic and ecological systems. IUCN elaborates on how such adaptation actions could be implemented through the sustainable management, conservation, and restoration of marine

- Also in this section**
- 8 Coastal carbon: mitigating climate change by conserving coastal ecosystems**
 - 10 Wet Carbon**
 - 11 IUCN Working Group on Climate Change and Coral Reefs**

and coastal ecosystems and their resources. Coastal ecosystems play an important role in shoreline stabilization and reducing erosion, and provide a range of additional services such as supporting fisheries and tourism.

Building socio-ecological resilience

By making coastal ecosystems more resilient to climate change impacts, Marine Protected Areas (MPA) can help supply livelihoods and food on which people depend under the current and future changing climate. MPAs are important EbA tools. Management and governance of coastal ecosystems, or *natural infrastructure*, should be improved, both through strengthening legal protection of coastal ecosystem processes and

enhancing implementation. Incentive schemes can support governments as well as the private sector and communities in implementing EbA. Mainstreaming EbA into poverty reduction and development strategies as well as sectoral plans and management strategies (e.g. fisheries, coastal development, other land-based activities and sources of pollution) strengthens implementation and helps build resilience across several stakeholder groups.

IUCN's report *A Framework for social adaptation to climate change: Sustaining tropical coastal communities and industries* offers additional guidelines to assess the vulnerability of coastal communities and provides economic and social tools to build resilience and avoid the worst impacts of climate change (see *IUCN Working Group on Climate Change and Coral Reefs* on page 11).

Coastal ecosystems as coastal carbon sinks

The international climate change community is putting considerable focus on the role of forests in climate change mitigation. IUCN is also looking at the role of salt marshes, mangroves and sea grass meadows as natural coastal carbon sinks and is currently developing adequate management and policy incentives

(see *Coastal carbon: Mitigating climate change by conserving coastal ecosystems* on page 8 and *Wet Carbon* on page 10).

The other CO₂ problem

Ocean acidification is a direct consequence of increased human induced carbon dioxide (CO₂) concentrations in the atmosphere. The ocean absorbs 25% of total human emissions to the atmosphere each year. Uptake of CO₂ by the ocean currently moderates or partially buffers the rate of climate change. By absorbing CO₂ from the atmosphere, the ocean slows the anthropogenic greenhouse effect. However, ocean acidification harms various forms of marine life and therefore puts at risk ocean-related benefits to society. Present ocean acidity change is unprecedented in magnitude, the rate of change exceeding what is known to have occurred over at least the last 25 million years. This is jeopardizing ocean systems' ability to adapt to changes in CO₂ that would naturally occur over millennia. Changes in ocean pH levels will persist as long as concentrations of atmospheric CO₂ continue to rise.

IUCN highlights that emission reduction targets will need to be kept under revision in the light of emerging scientific findings regarding emission

trajectories, rates of climate change, and planetary tipping points. IUCN also supports the European Project on Ocean Acidification (EPOCA), a collaboration between top European research groups aimed at filling gaps in our understanding of the effects and implications of ocean acidification, and plays an important role in communicating results from this cutting edge research across the globe. In 2009, EPOCA released *Ocean acidification: The facts. A special introductory guide for policy advisers and decision makers* and a follow-up guide is currently in preparation. IUCN works towards the permanent inclusion of ocean acidification in national and international policy strategies and frameworks such as the United Nation Framework Convention on Climate Change (UNFCCC).

Ocean acidification must be recognized as a serious global challenge of unprecedented scale and importance that requires immediate action.

IUCN Climate Change Position Papers are available here: <http://www.iucn.org/unfccc/resources/documents/>

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Coastal carbon

Mitigating climate change by conserving coastal ecosystems

Coastal ecosystems - mangroves, salt marshes, seagrass meadows and kelp forests - are of interest for efforts to tackle climate change. There is increasing evidence of their role in binding carbon dioxide in biomass and, in particular, sediment, at higher rates per unit area than terrestrial ecosystems. However, if not well managed, this valuable service may be reduced, and loss of coastal ecosystems could release carbon dioxide to the atmosphere, accelerating rather than buffering climate change and ocean acidification.

Tidal salt marshes occur mostly in temperate climates. Vegetated by grasses, the living biomass is relatively low compared to terrestrial forests, but the soils can store 210g of carbon per square meter per year ($m^{-2}yr^{-1}$), a rate up to a hundred times that of tropical forests. This means that tidal salt marshes make up 1-2% of the overall carbon sink in the USA. They are also often important bird areas and offer opportunities for tourism.

Mangroves are spread along tropical and subtropical shores, although their present extent, c 160,000 km² worldwide, is believed to be less than 50% of the original cover. Mangroves sequester carbon dioxide through growth of trees and other plants, with c 10% of the biomass buried in sediment in the long term. The intricate root framework of mangroves also traps and buries floating organic material. Mangroves also provide a range of other services. They constitute an important spawning ground, nursery and habitat for many fish and prawn species, and thus support both commercial and subsistence fisheries. Many natural resource dependent and poor communities also rely on mangroves for wood, medicinal plants and other products. By dissipating wave energy they can support shoreline stability and reduce damage from storms.

Seagrasses are a group of flowering plants adapted to growth under water. Seagrass meadows are found in shallow waters of all continents (except Antarctica). While the living biomass of seagrass, the leaves and

roots, have a relatively high turnover, lasting from 2 weeks to 5 years, rhizomes (underground, mainly horizontal stems) can last millennia. The actual long-term rate of carbon sequestration varies between areas and species, but is believed to be on average approximately half that of mangroves and salt marshes. Seagrasses are also important fish nurseries, often occurring in association with coral reefs and mangroves. They also provide feeding habitat for vulnerable species such as dugongs and green turtles.

Kelp forests are assemblages of large algae growing in shallow water on hard/rocky bottoms. Occurring mainly in temperate and high latitude areas, kelp forests are particularly well developed e.g. along the western coast of the USA as well as North East Asia. Kelps grow fast, averaging 2 to 4% increase a day, with a biomass turnover as high as ten times a year. However, they do not accrete sediment like mangroves or salt marshes do and thus have a lower long-term carbon dioxide storage capacity.

Status and Trends

Coastal habitats, including salt marshes, mangroves and seagrass meadows, are presently being lost at an estimated annual rate of 2-7% - four times quicker than rainforests. There are many reasons for this. For example, much mangrove has been lost through conversion for aquaculture and overharvesting of wood. Similarly, many salt marshes have been drained for agriculture or cattle grazing. Seagrasses and kelps are sensitive to nutrient and sediment pollution and some forms of destructive fishing.

This ecosystem degradation does not only reduce the capacity of these ecosystems to sequester carbon dioxide, but may also cause significant release of carbon dioxide buried in organic sediment. Recent estimates suggest that ongoing degradation of tidal wetlands in the Sacramento-San Joaquin Delta region of California causes emissions representing 2.5% of California's total annual emissions. Climate change is likely to pose a further threat, e.g. through erosion



and degradation of shorelines as a result of sea level rise. This means that management of coastal ecosystems must not only reduce degradation and loss while also seeing to the needs of people that depend on them, but also address the increasing threats associated with climate change. Nature-based mitigation and coastal ecosystem-based adaptation can offer important solutions.

Role of coastal ecosystems neglected

As described above, healthy and productive coastal ecosystems such as mangroves, seagrasses or tidal salt marshes act as natural carbon sinks. Through management and restoration, these natural coastal carbon sinks can be enhanced and emissions, caused by habitat loss and degradation, reduced. This means that they can play a vital role in mitigating the effects of climate change. In addition, there are co-benefits to protecting and sustainably managing our coastal and marine ecosystems. For example, coastal habitats act as buffers against storm surges and provide livelihoods and a food resource for millions of people. However, the role of our coastal and marine ecosystems has thus far been largely ignored in climate change mitigation discussions.

What's next?

The role of coastal ecosystems presents opportunities in the emerging global carbon market, but work is still required to bring this topic fully into the decision-making arena. A way forward is to develop a finance mechanism that incentivizes policy and management measures that enhance carbon sequestration and avoid emissions through degradation. Existing international frameworks including UNFCCC, REDD+ and the global carbon market need to be fully explored and utilized. Through further work, additional tools and mechanisms more specific to or appropriate for coastal ecosystems can be developed.

IUCN's role

IUCN is currently involved in several projects to generate better knowledge of the carbon storage potential of coastal ecosystems (e.g. plant and soil carbon deposits and sequestration rates) and identify the



© Nicolas Bourquin

total release of carbon dioxide from the conversion of those ecosystems as well as the magnitude of carbon stores at risk from ongoing human activities and sea-level rise. Additional research focuses on estimating the coastal carbon restoration potential, developing adequate marine and coastal carbon conservation and management approaches, and developing global and regional distribution maps.

More specifically, IUCN:

- Published *The management of coastal carbon sinks* report in 2009, one of the first reports that synthesize scientific knowledge on the role of coastal habitats in the carbon cycle;
- Organized, together with WCPA-Marine, a series of roundtables to discuss necessary steps in the development of a comprehensive program for coastal carbon sinks policy and financial mechanisms involving NGOs, UN Agencies and multilateral funding organizations. The first roundtable was held in Washington DC (March, 2010) and the second in Paris (May, 2010); and
- Obtained 'fast-track' funds from the World Bank to initiate a research project entitled *Toward an evolving methodology and typology for assessing coastal wetlands as carbon sinks*.

IUCN will continue informing and providing recommendations on the role of coastal and marine ecosystems in climate change mitigation, raise the profile of ocean in international

climate change discussions and engage decision makers to implement blue carbon management and policy measures. Future IUCN activities include:

- Continuation of dialogues within the marine and climate change community;
- Development of Blue Carbon research in collaboration with Conservation International, other NGOs and academic institutions on advancing marine conservation through coastal marine carbon accounting;
- Engagement in a UNEP-led proposal to the GEF entitled *Blue forests targeted research project for ecosystem management*;
- Preparation of a report entitled *Natural carbon sinks in oceanic ecosystems*, due for release in 2011. This publication will focus on key features of oceanic ecosystems and provide latest evidence on carbon dioxide absorption. It will identify critical science gaps, make recommendations on the management and restoration of oceanic carbon sinks as a mitigation tool, and the policy options necessary to progress this agenda internationally; and
- Research on the potential of nature-based climate change mitigation through management and restoration of seagrass meadows.

For more information, please contact: Dorothee Herr (dorothee.herr@iucn.org) or Jerker Tamelander (jerker.tamelander@iucn.org).

Wet carbon

Since October 2008, the Danone Group, IUCN and the Ramsar Convention Secretariat are working together to the preservation and restoration of wetland ecosystems in various locations across the planet. To date, the company has decided to invest in two pilot projects in Senegal and India. A call is currently open for more wet carbon project proposals.

Wetlands as carbon sinks

In recent years, there has been a significant focus on seeking to reduce, mitigate or offset greenhouse gas emissions through projects designed to restore or maintain ecosystems, including through processes implemented under the UN Framework Convention on Climate Change (UNFCCC). Surprisingly, the importance of marine and wetlands ecosystems in the global carbon cycle has been often overlooked. Much of the attention has focused on major terrestrial carbon sinks, particularly forests.

Today, however, there is an increasing interest in the importance of the so-called *wet carbon* in the global carbon cycle. At least two recent works undertaken by IUCN, in partnership with other organizations such as UNEP and FAO¹, and one by the Ramsar Convention's Scientific & Technical Review Panel (STRP)², demonstrate that some types of wetlands (both inland and coastal wetlands) can serve as major carbon sinks, while also preserving biodiversity and delivering a wide range of ecosystem services.

1 Nellemann, C., Corcoran, E., Duarte, C. M., Valdés, L., De Young, C., Fonseca, L., Grimsditch, G. (eds). 2009. *Blue Carbon. A Rapid Response Assessment*. United Nations Environment Programme, GRID-Arendal. 78 pp, <http://www.grida.no/publications/rr/blue-carbon/>

Laffoley, D.d'A. & Grimsditch, G. (eds). 2009. *The management of natural coastal carbon sinks*. IUCN, Gland, Switzerland. 53 pp, <http://data.iucn.org/dbtw-wpd/edocs/2009-038.pdf>

2 STRP. 2009. *Briefing note on wetlands and climate change* (UNFCCC COP15, December 2009). STRP, Gland, Switzerland. 7pp, http://www.ramsar.org/pdf/strp/strp_briefing_climate_2009_e.pdf

The Danone wet carbon partnership

In October 2008, the Danone Group (a multinational company known for its yogurt and water brands), IUCN and the Ramsar Convention Secretariat signed a Memorandum of Understanding to work together to preserve and restore wetland ecosystems that are crucial to the carbon cycle, in various locations across the planet. This partnership aims to:

- develop wetland carbon methodology specifications for measuring carbon sequestration in restored mangrove ecosystems; and
- design and implement pilot wet carbon projects.

In this partnership, IUCN and the Ramsar Convention have an advisory role, providing Danone with technical advice on whether a possible pilot project is worth developing. They are assisting the company to:

- identify potential wet carbon projects;
- select projects that best meet the draft wet carbon standards and the requirements of the company; and
- for priority projects, undertake a field-based review to provide detailed technical advice to the company regarding its possible financing of the project.

In November 2009, an Expert Workshop, involving 40 participants, was

held in Gland, Switzerland to review and provide advice on further development of the Danone/IUCN/Ramsar partnership in the context of other wetland-related carbon storage and offsets initiatives and projects. The workshop report is available here: http://www.ramsar.org/pdf/DFN_report_Final.pdf

To date, the company has decided to invest in two pilot projects – the first in Senegal and another in India. These projects will be funded with the aim of providing an initial test of the wet carbon approach and derive lessons learned for further development of a new class of wet carbon investments. The project in Senegal, which started in 2009, supports a local NGO in implementing a mangrove planting campaign with rural communities. In 2010, the company is investing a second round of financing with the Senegalese NGO and is beginning a similar project with an NGO in India.

Currently, the partnership has an open call for wet carbon project proposals. To support this call, guidance for the preparation of a wet carbon Project Idea Note is available. Organizations from several countries have already expressed their interest to develop a wet carbon project for Danone.

More information is available here: <http://wetcarbon.com>
Contacts: Francis Vorhies (projects@wetcarbon.com) and Georgios Sarantakos (georgios.sarantakos@iucn.org).



IUCN Working Group on Climate Change and Coral Reefs

The 3 years since IUCN's Working Group on Climate Change and Coral Reefs (CCCR) was established have seen increased awareness of the immediate need to respond to climate change, as well as controversy around climate change science. The UNFCCC meetings in Copenhagen in December 2009 set an aspirational 2 °C target for average global temperature rise above pre-industrial levels. However, many questions remain regarding how such a target can be reached. More importantly, whether reached or not this will in itself entail a significant source of vulnerability for coral reefs.

Coral reefs support at least 500 million people through the goods and services they provide. They are also one of the first ecosystems with global distribution to show a wide-ranging response to climate change. Study of how reefs respond and adapt to climate change and how we through management can influence these processes is of importance for securing coral reefs that also in the future can support human populations. This can also provide valuable lessons that can be applied to other ecosystems.

Resilience provides a framework for understanding and managing the interactions between coral reefs and the human societies that depend on them, and the increasing threats associated with climate change. Since 2006 CCCR has made significant progress in understanding and measuring reef resilience. This included undertaking field research, developing and applying a resilience assessment protocol, and building capacity through workshops, printed materials and film (see <http://www.iucn.org/cccr/publications/>). In its present phase (2010-2012) CCCR will build on these activities to focus on using science to develop adaptation actions – in ecosystem management and in social and economic development.

This will include improving our understanding of ecosystem resilience through refining and extending the resilience assessment method and analyses. For example, a CORDIO



research project focusing on the core region of marine biodiversity in the Western Indian Ocean, supported by the Western Indian Ocean Marine Science Association (WIOMSA) Marine and Coastal Science for Management (MASMA) program, is implementing the CCCR resilience assessment method to understand how vulnerable this region is to climate change. IUCN is also working through partnerships with foundations, scientific bodies, and governments to undertake multi-disciplinary coral reef conservation research, such as through Tara Ocean Expeditions (see the *Tara-IUCN expedition* article on page 33).

Significant effort will be placed on social resilience, and how this can support climate adaptation and sustainable development. The publication *A Framework for social adaptation to climate change – Sustaining tropical coastal communities and industries* (Marshall *et al.*, 2010) establishes a vision for how to assess the many factors that confer resilience to communities and individuals. This will be elaborated further into an assessment protocol for practitioners and guidance to support adaptation development initiatives. A project entitled *Adapting to climate variability: Coping with short-term climate variability through seasonal prediction and building social resilience* was initiated in 2010 to implement this framework, by CORDIO, IUCN and other CCCR partners, with financial support from WIOMSA/MASMA.

Further, an IUCN project supported by Kuoni focuses on the climate vulnerability of reef based tourism.

Results from a survey of tourists and tour operators conducted in the Egyptian Red Sea region have been summarized in the report *Preparing for climate change in the Red Sea*. This illustrates how the industry often misperceives its clients' environmental sensitivity, putting its own business at risk. Practices that enhance industry resilience will be further developed.

To support broader-scale management planning, approaches for applying reef resilience data in Marine Spatial Planning analyses have been under development through a project initiated in 2009, supported by UNEP and involving other CCCR partners. This will be further enhanced in the present phase of CCCR through improving socio-ecological resilience modelling, and continuing development of approaches and, eventually, modules and manuals, for spatial planning – an essential part of making resilience science a foundation for conservation and ecosystem management.

Through close collaboration with the Resilience Practitioners Network hosted by TNC, CCCR tools, approaches and experiences can reach a global target audience, and also benefit from the input of the intended end users. Through this network and other partnerships CCCR will also continue facilitating outreach and dialogue through seminars in association with major conservation and climate change meetings, culminating at the 2012 IUCN World Conservation Congress on Jeju Island, Korea.

Conserving Threatened Species



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Also in this section

14 Biodiversity offsets: Can the same concept be applied to the sea?

Business as Unusual

Aiming to save whales on the edge of survival

A collaboration between the oil and gas consortium Sakhalin Energy Investment Company (Sakhalin Energy) and IUCN represents a valuable contribution to the conservation of the critically endangered western gray whale population. However, although the population is slowly growing, it remains on the edge of survival. Significant threats remain and an international strategy is needed.

Since 2004, Sakhalin Energy has joined forces with IUCN to minimize potential risks from the company's operations to the western gray whale population. In October 2006, at the request of Sakhalin Energy, IUCN convened a scientific panel (the Western Gray Whale Advisory Panel – WGWAP) to advise the company on its efforts to minimize and mitigate the impact of energy development activities on gray whales in the vicinity of Sakhalin Island, Russia.

According to the most recent estimates, the population of western gray whales is growing. The population size in 2009 (excluding calves) was about 134 (90% Bayesian confidence interval (CI): 120-142), of which 33 (CI: 29-38) were reproductively mature females. The population is projected to continue to increase with high probability if there is no additional human-caused mortality. However, the additional death of just one mature female per year could send the population towards extinction.

Gray whales fast during the winter, migrate huge distances in the spring and autumn, and depend on an annual summer feast in the waters off Sakhalin Island. Major threats across the whales' range include entrapment in set nets, entanglement in other types of fishing gear, noise in feeding areas, and exposure to spilled oil. Oil and gas develop-

ment in the whales' feeding ground may pose the most significant threat. Offshore development depends on regular seismic profiling. Seismic surveys involve powerful, persistent airgun pulses, and such underwater noise has great potential to interfere with whale foraging.

Following recommendations from the Panel, Sakhalin Energy agreed to postpone a seismic survey planned for 2009 until June 2010, because of concerns over a change in whale distribution and behaviour observed in 2008. Measures to monitor and minimize the impacts of seismic surveys have been developed collaboratively by the Panel and Sakhalin Energy over the last three years. Key features of the monitoring and mitigation plan implemented during the Sakhalin Energy seismic survey in June-July 2010 included safety buffers around the survey vessel and real-time acoustic and visual monitor-

ing to prevent exposure of whales to damaging doses of noise. “*Seismic surveys are taking place every year on the Sakhalin shelf, but this project is unique in terms of what has been invested in mitigation and monitoring*” said **Randall Reeves, chairman of the Panel**. “*We hope it will come to be regarded as a good model for other companies in Sakhalin and other parts of the world.*”

However, the Panel, IUCN and the International Whaling Commission (IWC) are extremely concerned that oil and gas activities, particularly seismic surveys, undertaken and planned by other companies in the area, without the kind of robust monitoring and mitigation effort applied to the Sakhalin Energy seismic survey, could seriously impede the whale population’s recovery.

In particular, a seismic survey planned by the Russian petroleum company Rosneft for July-September 2010 in the primary whale nursing area poses a serious threat to the population. On 19 May 2010, IUCN Director General Julia Marton-Lefèvre wrote to Prime Minister Putin imploring him to ensure that the Rosneft survey was postponed for at least a year and occurred “*as early in the open-water season as is feasi-*

ble”, i.e. before most whales have arrived in the area to feed. In June 2010, the IWC reiterated this. Representatives of 12 nations, including the UK, France, Germany and the USA, signed a joint letter to Russia, calling for Rosneft to postpone its seismic survey to protect the whales. However, Rosneft and the Russian government appear to have ignored these requests, following the all too frequent path of denial and business-as-usual.

While Sakhalin Energy’s engagement with IUCN is an extremely positive development for the conservation of this population, it is widely recognized that any comprehensive initiative must consider all significant threats. For this reason, IUCN is developing a rangewide conservation strategy for western gray whales, to consider threats not only around Sakhalin Island, but also across the entire geographic range of this population. As a first step, IUCN convened a workshop in Tokyo in September 2008 to consider various scientific issues related to the conservation of the population. The workshop agreed that the next step in the process was the development of a Rangewide Conservation Plan for western gray whales and established a steering group to oversee the drafting of the

plan. A first full draft was presented in June 2010 at the IWC Scientific Committee and Conservation Committee meetings. Both committees praised it as being exemplary for this type of action plan. It is available here: http://www.iucn.org/wgwap/rangewide_initiative/.

The Tokyo Workshop also stressed the importance of knowing more about the whales’ migration routes and wintering and summering areas, so that mitigation efforts can be appropriately designed and focused. To fill these information gaps, satellite tagging of a dozen western gray whales is planned for September 2010, using tags which should allow scientists to track the whales’ movements until they return to the summering areas in 2011. This major satellite tagging initiative is led by the International Whaling Commission, with support from IUCN, the WGWP, Sakhalin Energy and ExxonMobil.

For more information on the Western Gray Whale Conservation Initiative, please visit: <http://www.iucn.org/wgwap/>

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Biodiversity offsets

Can the same concept be applied to the sea?

We humans are naturally drawn to the sea. Those of us who don't live along it have probably gone there for vacation, while more and more of us earn our livelihoods drilling for oil off the coast or erecting massive wind and wave farms to capture energy for our ever-expanding population. Then, of course, there are the fishermen who comb the sea for ever-dwindling supplies of food. All of these activities put pressure on marine and coastal ecosystems, which must be more efficiently managed if the abundant life of the sea is to survive. Biodiversity offsetting has proven to be a valuable tool for preserving endangered species of animal on land, and the same concept can be applied to the sea.

Biodiversity Offsets

Biodiversity offsetting presents a new and important opportunity for the private sector and society to work together to conserve and manage biodiversity while engaging in sustainable development. Offsets are defined as “*measurable conservation outcomes that are the result of activities designed to compensate for significant and unavoidable impacts on biodiversity*”.

Contrary to popular opinion, biodiversity offsets do not give developers the right to run roughshod over fragile ecosystems in exchange for cash, but are seen as a last resort to be utilized only in certain circumstances.

Indeed, the process of developing biodiversity offsets is only initiated once realistic efforts and action have been undertaken to avoid, reduce, and manage the impacts associ-

ated with development. As such, it is based on the “*avoid, minimize, offset*” hierarchy established under the United Nations Convention of Biological Diversity. The ultimate objective of the process is to achieve no net loss of species community structure, habitat integrity, ecosystem functioning, and the associated social values due to unpreventable impacts associated with project development (construction and operation).

A conceptual framework and methodology exists for compensatory mitigation, i.e. using a levy on fisheries bycatch to fund conservation actions, but true offset design and methodology for project impacts on marine and coastal biodiversity is in the early stages.

The Future of Marine Biodiversity Offsets

Biodiversity offsetting is one emerging multidisciplinary tool that has the potential to enhance corporate environmental responsibility in a multitude of different settings where human and biodiversity values may conflict.

These settings are critical pressure points where science-based conservation planning may be able to affect maximum change and ultimately, greatly enhance conservation of biodiversity within the context of unavoidable impact.

However, offsets are currently a voluntary mechanism and one that is not readily available to many practitioners. Often, project development and construction is rapid and will not wait for what may be perceived as

‘lengthy or unnecessary biodiversity studies’.

This is complicated in marine offsets due to the inherent logistical difficulty in accessing and studying marine systems such as deep water or pelagic habitats, coral reefs, and seagrass meadows. Undertaking evaluations in such habitats increases the time necessary to evaluate or score biodiversity and consequently the costs associated (expertise, equipment, etc.).

Emerging Pilot Projects

As in all disciplines, theory must precede practice and implementation. Biodiversity offsets are a rapidly evolving multi-discipline within the Business and Biodiversity Offsets Program (BBOP) of Forest Trends and the Wildlife Conservation Society. BBOP is a partnership between companies, governments and conservation experts to explore biodiversity offsets. IUCN is one of the BBOP Advisory Group Members and is also a key technical developer of offset methodology including theory and design, specifically in marine habitats. The Program is currently engaged in: Demonstrating conservation and livelihood outcomes in a portfolio of biodiversity offset pilot projects; Developing, testing, and disseminating best practice on biodiversity offsets; and Contributing to policy and corporate developments on biodiversity offsets so they meet conservation and business objectives.

The partnership aims to show, through a portfolio of pilot projects in a range of industry sectors, that biodiversity offsets can help achieve significantly more, better and more cost-effective conservation outcomes than normally occurs in infrastructure development.

Related links:

<http://bbop.forest-trends.org/>
<http://www.ecosystemmarketplace.com/>

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Energy and Industry



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Yemen LNG

Yemen LNG Company Ltd. (Yemen LNG), a liquefied natural gas extraction company involved in a large-scale project in Balhaf, Yemen, has implemented an extensive marine biodiversity action plan (BAP) in the region. The BAP's goals were to eliminate or mitigate the company's impacts on the biodiversity of the area by redesigning its operations and to provide investment to promote sustainable improvement in the social and environmental conditions of the area.

The bay of Balhaf boasts a high level of biodiversity that includes a large number of corals and several endemic species. The area also plays an important role in the local fishing industry, which is the primary economic activity in the region. Yemen LNG designed the BAP in 2008 to maintain both the biodiversity of the bay and the livelihoods of the local fishermen. The company hopes the BAP will become a benchmark in the setting of demanding standards for corporate management of environ-

mental and social impacts. The plan consists of 25 actions: eight address biodiversity and related social and economic factors, nine involve company leadership in scientific research development and capacity building, and eight relate to the long-term protection of the area. The actions include redesigning project components to avoid impacting biodiversity, transplanting several corals to nearby protected areas, implementing a strict monitoring program, and developing awareness and education programs and workshops in the region.

One of the biodiversity actions is to partner with IUCN to establish an independent, third-party review process of the company's marine biodiversity strategy and actions. The Independent Review Panel set up in 2009 consists of six experts in marine ecology, coral reef translocation, marine protected areas, fisheries management, oil and gas marine impacts and environmental management systems. Two review

Also in this section

- 16 Offshore wind farms: transforming biodiversity risks into opportunities**
- 17 Offshore energy rigs and farms: their role as reefs**
- 18 International maritime policies and IUCN: a pathway to conservation**

missions have already taken place in November 2009 and May 2010 which have provided substantive feedback to the company on the implementation of their 24 biodiversity actions. This is a great opportunity for IUCN to influence, encourage and assist a company to conserve the integrity and diversity of nature. The third mission of the Panel is scheduled for November 2010 and is likely to focus on not only what the company is doing to conserve marine biodiversity but how the company communicates its biodiversity actions to key stakeholders.

For more information:
http://yemenlng.com/ws/en/go.aspx?c=soc_Environment

Contact:
 Francis Vorhies, Independent Review Panel Coordinator (fvorhies@earthmind.net)

Offshore wind farms

Transforming biodiversity risks into opportunities



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In June 2010, IUCN, in partnership with the multinational energy corporation E.ON and the Swedish International Development Cooperation Agency, launched the *Greening blue energy: Identifying and managing the biodiversity risks and opportunities of offshore renewable energy* report. This report seeks to improve the environmental performance of offshore renewable energy projects and develop comprehensive guidance to ensure best private sector practice. The guidelines produced will also serve to inform the policy and practice of the conservation community and governments, especially in developing countries.

Offshore wind could potentially supply between 12 and 16 per cent of the total EU electricity demand by 2030. This equates to more than 25,000 wind turbines, in wind farms covering up to 20,000 square kilometres of the European continental shelf. Other countries worldwide are also exploring offshore renewable energy including the USA, Japan, India and Eastern Africa.

However, any type of energy production will exert some impact on the local and global environment.

Accordingly, while offshore wind farms can provide advantages for the global environment, i.e. reducing the atmospheric impacts from our energy sources, and for local wildlife, i.e. the establishment of *no fishing zones* and the creation of artificial reefs, if not properly planned and managed, they can adversely affect marine biodiversity.

IUCN, in partnership with E.ON and SIDA, has developed guidance to support best practice biodiversity considerations. It is envisaged that the guidance will also serve to inform the policy and practice of the conservation community and governments. This is especially relevant for developing countries where capacity is lower but renewable energy infrastructure is increasingly promoted.

The guidance provides a synthesis of current knowledge on the potential biodiversity impacts of offshore wind energy on the marine environment. It is based on scientific evidence, i.e. more than 1000 reports and documents, and experiences from offshore renewable energy development and other relevant sectors. It aims to be user-friendly as well as structured in a way to provide more

detail for those that need it and ultimately to encourage improvements in the sustainability of the offshore renewable energy industry. Overall, the guidance promotes the consideration of science-based impact research, suitable for conducting, scoping and evaluating Strategic Environmental Assessments (SEAs) and Environmental Impact Assessments (EIAs), based on international and national standards.

The report highlights issues such as habitat loss for birds and sea creatures, potential collisions with wind turbines, deviation of the migratory routes of birds and whales, noise and electromagnetic disturbance, and navigational hazards for ships. It also provides recommendations on strategic and governance issues, mitigation and monitoring plans, Environmental Impact Assessment improvement as well as uncertainty and points to address in the future and research required.

Avoiding sensitive sites, integrating the development of wind farms in marine management decisions, using clever designs and offsetting residual impacts will minimize impacts and maximize the benefits for biodiversity, the report says. It will also help reduce the time spent on compulsory environmental assessment for licensing of wind farms, which currently takes around 5 years.

To download the full report:
<http://data.iucn.org/dbtw-wpd/edocs/2010-014.pdf>

For more information, please contact: James Oliver (james.oliver@iucn.org), Nadine McCormick (nadine.mccormick@iucn.org) or Georgios Sarantakos (georgios.sarantakos@iucn.org).

Offshore energy rigs and farms

Their role as reefs

The large-scale development of offshore energy installations may result in some significant environmental threats and opportunities. The hard substrates provided by these installations, functioning as reefs may benefit the local environment and society. However, careful management and monitoring should be implemented to maximise benefits and minimise associated risks.

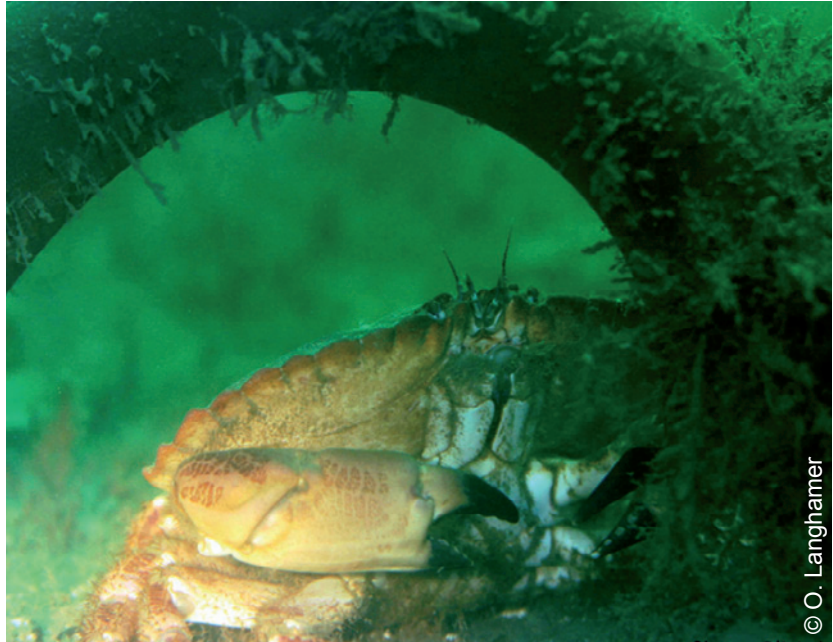
Offshore energy boom

As stated in the previous article (*Offshore wind farms: Transforming biodiversity risks into opportunities*, page 16), the offshore renewable energy technology is developing rapidly, mostly in the European Union. USA, Japan, India and Eastern Africa are also preparing for large offshore renewable energy projects. At the same time, there are 3.5 million offshore oil and gas rigs worldwide and over 4,500 of them around US coastal waters.

Impact on biodiversity

The biodiversity impacts of this large-scale offshore energy development are still uncertain. Noise disturbance, electromagnetic fields and migration barriers are some of the suggested adverse effects on fish, marine mammals, birds and benthic communities. However, the underwater parts of installations function as artificial reefs and the *no-take zones* (trawling exclusion) around them may positively affect the abundance of a number of species.

A recent IUCN report, entitled *Greening Blue Energy*, provides a review of these impacts. Regarding artificial reefs, it concludes that the addition



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of hard substrate increases habitat heterogeneity and biodiversity of sessile organisms, marine mammals and fish. Wind turbines' and wave installations' foundations attract many fish species, including cod and flatfish with a potential radius of influence of several hundred meters (see photo above, showing an edible/brown crab (*Cancer pagurus*) taking shelter on a wave energy foundation). Also, offshore renewable energy farms, as a whole, present increased abundance of species such as sand eels, cod, whiting and sole. Moreover, oil rigs increase the abundances of rockfishes and other species, by providing artificial reefs such as those off Louisiana that represent 90% of the hard substrate of the region.

Importance of reefs

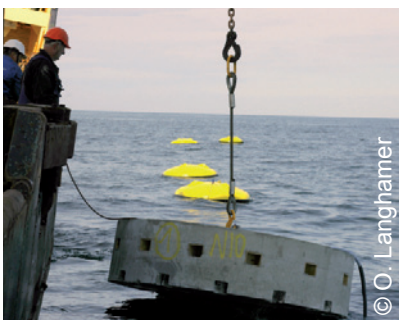
Many IUCN Global Marine Programme publications point out the importance of reefs for ecosystem resilience, biodiversity and human societies, especially in developing countries. Artificial reefs, like natural coral reefs, can protect coastlines from storm damage and reduce beach erosion. In addition, they provide homes, breeding areas, nurseries and food for many economically important marine species. Moreover, reefs and associated species are the main sources of protein for many

people, and human activities such as fishing and tourism provide incomes for many others.

Development with precaution

Hence, the foundations of offshore energy installations can benefit local ecosystems and society. However, special care must be taken to minimize other potential risks associated with these energy installations, such as oil spills and damage to marine protected areas. Their development should be incorporated within Integrated Coastal Zone Management (ICZM) and spatial planning instruments, where applicable, to monitor and reduce the cumulative negative effects of human activities in the area and *orchestrate* a common mitigation plan. At the same time, strategic planning, mainly during the construction and decommissioning phases of the development, could maximize benefits to biodiversity. Increasing the connectivity of artificial reefs could provide habitat corridors, aiding the movement of marine species and providing further biodiversity and social benefits.

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International maritime policies and IUCN

A pathway to conservation

Shipping is omnipresent in the marine environment and so is its impact. The rapidly expanding world fleet can hugely affect the global marine ecosystem, interfering with conservation goals. For IUCN, it is important to follow developments in international maritime policies and bring its expertise to the floor. IUCN does so as an observer to the International Maritime Organization (IMO, the UN Agency for Shipping), largely focusing on the work of the Marine Environment Protection Committee (MEPC). IUCN provides technical advice on key issues such as ballast water (BW), bio-fouling, underwater noise, pollution by ships, and the designation of protected areas.

To maintain stability and draught ships carry BW, often in tremendous amounts, which is typically taken from one region and discharged in another region. BW discharge can introduce aquatic invasive species and cause extensive environmental, human health and economic damage. IUCN participated in the development of the Ballast Water Management (BWM) Convention adopted in 2004. This was only the start of IUCN's involvement in this issue. The complexity of minimising the transfer of invasive species by phasing-in of mandatory treatment of BW required the development of detailed guidance for uniform implementation of the Convention. Confidence needed to be earned in the maritime sector, which often perceived the challenge of implementing the Convention as a looming threat. The guidance resulted in 14 separate BWM guidelines, a number far exceeding that of any other IMO Convention. Confidence was boosted by regular reviews of the status of present technology

to treat BW and means to ensure compliance.

Technologies to treat BW, initially perceived as non-existent, saw a rapid development, often by ship-related water-treatment manufacturers that searched potential solutions to meet the expected demand. After all, IMO had been discussing ballast since 1990. Evaluating performance of BW treatment is another challenge. BW needs to be analysed to find minimal numbers of organisms (less than 10) in large volumes of water (1 cubic metre). Such testing requires highly sophisticated biological oceanographic science. One of the core institutes that provide such science, the Royal Netherlands Institute for Sea Research (NIOZ), now coordinates a regional BW project in the North Sea called Ballast Water Opportunity (www.NorthSeaBallast.eu). As a partner in this project, IUCN provides advice on conservation and maritime policy. The project aims to develop a coherent regional BW policy through cooperation between policy makers, scientists, industry, IGOs and NGOs, in this region with its high level of technical, scientific and policy development on BWM. Safeguarding access to information on the environment is a core value of the project.

IUCN played a key role in the development of BWM system certification and testing guidelines, in particular drawing attention to the risk of disinfection by-products, once the treated BW is discharged.

Once the BW Convention was adopted, another ship-related vector for invasive species, bio-fouling (i.e. the accumulation of microorganisms,

algae, and animals on a ship's hull) entered the IMO agenda. Bio-fouling interconnects with anti-fouling (i.e. the coating of a ship's hull to prevent the settlement of organisms) subject of another IMO Convention, which was slow to enter into force. IUCN joined other NGOs to submit a substantiated call to ratify that Convention. Regarding bio-fouling, IMO-MEPC is developing a set of guidelines, to be completed in 2012. Adoption of the guidelines might be a first step towards developing a mandatory instrument for bio-fouling.

Another potential threat to marine life is underwater noise generated by ships. Recognising the scope and impact of such noise pollution on marine animals' acoustic sense, behaviour and life strategies, IUCN entered informal debates with a view to get underwater noise on the IMO agenda. Eventually, MEPC recognised the need to take the issue onboard after the US presented a thorough study on scope and potential damage to marine life by underwater noise. Between MEPC meetings, IUCN participates in further developing the knowledge basis on quieting technologies and mitigation measures.

Although not an IMO agenda item, ship strikes with whales is also being discussed in MEPC. IUCN follows this with keen interest, as it reflects the need to take animal migratory patterns and strategies into consideration in the development of maritime and marine policies.

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Marine Protected Areas



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Chagos Islands Marine Reserve

A lease of life for the Indian Ocean and coral reefs

On 1 April 2010 the United Kingdom designated the Chagos Archipelago a Marine Protected Area (MPA). This created the largest fully no-take MPA in the world (544,000 Km sq), increasing the marine area held in MPAs by 20% and doubling the marine area held in no-take zones.

The announcement followed a public consultation led by the UK Foreign and Commonwealth Office. Three workshops were held to debate the scientific, socioeconomic and fishery merits of an MPA. Over 275,000 individuals and organisations from 200 nations and territories responded to the consultation, with an overwhelming majority, well over 90%, being in favour of greater protection.

IUCN and its World Commission on Protected Areas (WCPA) made a submission based on consultation with members, partners and experts, supporting the creation of a full marine reserve in Chagos, and stressing the need for meaningful involvement of all relevant stakeholders in defining the outcome of the consultation. The submission is available on the members' section of the IUCN website, along with comments received on it. IUCN's Shark Specialist Group also made a submission highlighting the damage being done to sharks by the fishing industry.

The environment of Chagos is uniquely healthy, in part as a result of limited human activity. The reloca-

- Also in this section**
- 21 Global Ocean Biodiversity Initiative**
 - 22 Outstanding Ocean Heritage**
 - 23 Moving the Needle Ocean Protection**

tion between 1967 and 1971 of the Chagossian population mainly to Mauritius and the Seychelles to make way for the military base on Diego Garcia has been challenged in UK courts. A 2008 House of Lords ruling bars islanders from returning, while proceedings in the European Court of Human Rights are pending. IUCN has provided recommendations regarding establishment of the MPA based on the present situation and with the aim of securing the greatest global benefits of the Chagos archipelago. Irrespective of the legal process regarding resettlement and of its outcome, it is clear that actions that maximize the environmental health of the Chagos archipelago, and the functions and services that it provides, will best contribute towards that end. IUCN's support for protection of the marine

environment of the Chagos archipelago does not imply taking or endorsing any position on the dispute between the UK and Mauritius concerning sovereignty over the Chagos archipelago.

The Chagos Islands Marine Reserve addresses a shortcoming in the global network of MPAs. It is large, covering over half a million sq. km with immense importance for the biodiversity and the people of the Indian Ocean, and it makes significant gains on global targets for marine environmental protection.

The MPA provides comprehensive and effective protection to the full range of ecosystems and habitats in the archipelago, which include deep ocean trenches, seamounts, coral reefs and islands, ensuring ecological integrity. This means it secures a refuge for many threatened species, including corals, fish, turtles and numerous sea birds and, importantly, provides protection to pelagic and deep-sea species that are usually not well protected through MPAs. This will end the negative impacts of fishery bycatch, a damaging feature of both long lining and purse seining that have been common in the area.

But the value of Chagos Islands Marine Reserve goes further. Most areas in the world are altered by human activities to a point where it has influenced our interpretation of nature – a shifting baseline. The unparalleled environmental health and low pollution of Chagos makes it a unique scientific reference site for marine as well as climatologic research and monitoring.

Preserving the environment of Chagos will lead to significant conservation gains that ultimately also benefit areas outside its boundaries. The resilience of the archipelagos' reefs is recognized. Protecting these reefs will help maintain their function as a source of larvae that can reseed areas that have been degraded, such as most reefs in the Western Indian Ocean.

Thus Chagos Islands Marine Reserve constitutes a lifeline for the world's troubled oceans and an outstanding legacy for present and future generations. The world's governments have set targets to protect more of the oceans and this designation is a major step forward, which

we hope will be repeated many times over in other places.

IUCN has in the past supported conservation in Chagos, including through participation in the Chagos 2006 scientific expedition. Coral reef resilience assessments were carried out using methods developed by the IUCN Working Group on Climate Change and Coral Reefs. A baseline survey of marine invasive alien species, conducted as part of a project aimed at assessing isolated island environments in the Indian Ocean, found no marine invasive alien spe-

cies in over 1,000 samples collected – a unique finding and testament to the environmental health of Chagos.

IUCN will continue exchanging views with all stakeholders interested in the future of the Chagos Archipelago, and will actively support a process of consensus building to reach the best possible conservation outcome for the area, with due respect to the rights of all such stakeholders.

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Global Ocean Biodiversity Initiative

Protecting the high seas

The open ocean and deep seas, our “interior space”, constitute the last frontier in the exploration of our planet. Life on earth originated in the margins of the primordial ocean and for billions of years evolved in this aquatic milieu. Although intelligent automata are exploring the boundaries of our known universe, we still know no other planet with life in the universe.

Until recently poorly known and neglected, the open oceans and deep seas play a key role in regulating the Earth’s climate and sustaining life on Earth. Scientific research in the last decade has brought to light the uniqueness, diversity and fragility of marine species and habitats. These complex marine ecosystems are particularly vulnerable to a number of threats, including pollution, climate change and unsustainable human activities. The Ocean has already spared us from catastrophic climate change by accumulating the larger fraction of the extra heat generated by the combustion of fossil fuels and by absorbing the extra carbon dioxide. However, its capability to buffer climate change depends on healthy and functioning marine ecosystems.

The Convention on Biological Diversity (CBD) provides since 1993 a framework for international collaboration on the conservation of biodiversity. With the adoption in 2008 of seven scientific criteria to identify ecologically or biologically significant marine areas (EBSAs) in need of protection, the CBD opens a new avenue and adds new momentum to conserve biodiversity on the high seas. Why should marine areas in need of protection be identified on the high seas? This will enable to conserve, protect and possibly restore important ecological functions as well as key species and habitats needed to sustain whole ecosystems.

In its role as CBD President from 2008 to 2010, Germany decided to support the development of an international science partnership to help identify EBSAs in marine areas beyond national jurisdiction. This international partnership, the Global



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Ocean Biodiversity Initiative (GOBI), was established in late 2008. It was set up as a scientific collaboration between the German Federal Agency for Nature Conservation (BfN), IUCN, UNEP-World Conservation Monitoring Centre, Marine Conservation Biology Institute, Census of Marine Life, Ocean Biogeographic Information System and the Marine Geospatial Ecology Lab of Duke University. Today, GOBI comprises 14 scientific partners¹. GOBI is supported by BfN and facilitated by IUCN’s Global Marine and Polar Programme.

GOBI aims to help countries, as well as regional and global organisations, to use existing data and to develop new data, tools and methodologies to identify EBSAs on the high seas. To this end, GOBI prepared illustrative examples showing how data and methods can be used to identify EBSAs. For instance, tagging devices placed on the back of marine species can track their movements in space and time. Adding to that a species’ biological information can help to explain why they use a particular area. This type of data showed for example that northern elephant seals spend most of their time on the high seas to feed. Satellites can detect physical features such as eddies or upwelling areas, which promote biological productivity. They can also

¹ Partners include: BirdLife International, the United Nations University Institute of Advanced Studies, AquaMaps, UNESCO’s Intergovernmental Oceanographic Commission, Hermione, the Census of Marine Life’s CenSeam and Tagging of Pacific Predators.

perceive oceanic fronts, areas of extreme temperature differences that often determine a species’ distribution. Particularly productive areas such as the Costa Rica Dome in the Eastern Pacific or special habitats like the Sargasso Sea in the Western Atlantic can be identified with these methods. Multi-criteria analyses, i.e. looking at more than one criterion at a time, are the next step to be applied in the identification of EBSAs.

In Nairobi last May, at the meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), State parties requested the CBD Secretariat to “*outline a process for creating and maintaining a CBD global inventory of EBSAs in marine areas beyond national jurisdiction*”. GOBI was explicitly invited to continue its leading work and to actively participate in this process. A global EBSA inventory would provide an overview of all EBSAs identified and would facilitate the design and application of a diverse array of effective network-based protective measures spanning the time and space dimensions. This recommendation and the others decided at this meeting will need to be adopted at the CBD Conference of Parties in October 2010.

For more information, visit:
www.GOBI.org
www.GOBI.org/Library (to download GOBI’s publications)
<http://www.cbd.int/sbstta14/>

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Outstanding Ocean Heritage

Helping countries protect the best marine places on Earth

Most people have heard of, or been lucky enough to see, places like the Grand Canyon, Victoria Falls and The Great Wall of China. These places, along with ~890 others, are *World Heritage Sites* and are meant to be the best examples of cultural and natural phenomena in the world. However, of these sites, only 43 have been recognized for their marine and coastal properties.

Many of us who work in the marine environment know there are stunning examples out there of places that should be protected as the best of the best in the Ocean. However, until now, there has not been clear guidance for countries who wish to nominate sites on how to choose them. Conveniently, IUCN is the technical advisor to the UNESCO World Heritage Program. A key action from the Global Plan of Action of IUCN's World Commission on Protected Areas – Marine, launched at the World Conservation Congress in Barcelona, was to expand UNESCO's World Heritage Programme into coastal and marine waters in a more prominent and organized way. The Bahrain Action Plan, a report that described various actions to help strengthen marine

world heritage in general, was a first step to address this expansion, and the Outstanding Ocean Heritage Report is one of the specific actions that arose from the Bahrain Action Plan.

Building upon previous World Heritage workshops, experts met in Vilm, Germany recently to detail out what a marine site nomination process would look like. This process was enhanced by the hiring of a UNESCO Marine World Heritage manager (Fanny Douvère) and the appointment of an IUCN lead author for the thematic report on Marine World Heritage (Caitlyn Toropova).

Using the momentum, lessons learned, and expert advice from these previous workshops, the organizational committee (IUCN, UNESCO and the German Federal Agency for Nature Conservation) and participants discussed the scope of the report, potential methods to help State Parties best choose sites, the feasibility of incorporating High Seas sites and adapting the existing World Heritage framework to a marine setting.

The Vilm meeting participants agreed to methods we felt could help

countries choose outstanding marine sites they wanted to nominate. These methods are quite detailed but generally can be described as:

- Interpret the existing, terrestrial-based UNESCO World Heritage Convention to better fit with ocean habitats;
- Provide countries with a gap analysis of current marine world heritage sites; and
- Provide countries with protection and management standards for nominated marine world heritage sites.

The final report will be presented in Bahrain at the next World Heritage Committee meeting in spring 2011. It is expected this product will enable and equip States to make appropriate and effective proposals for new sites, and will help create a balanced, credible and representative selection of marine world heritage sites.

For more information, please contact: Caitlyn Toropova, IUCN Marine Protected Areas Coordination Officer (caitlyn.toropova@iucn.org).



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Moving the needle on ocean protection

Highlighting protection progress at a global level in relation to CBD Goals



© Carl Gustaf Luncdin

With international commitments to biodiversity in the marine realm reaching an integral inflection point in 2010 and 2012 (the dates when the Convention on Biological Diversity (CBD) and World Summit on Sustainable Development (WSSD) goals are meant to be met), significant acceleration is needed to conserve all marine diversity and productivity. Not merely to maintain but also to recover ecosystem structure, function and processes in order to support the necessary economic and social values and uses of nations and regions, and deliver sustainable development.

IUCN and partners have come together to address what countries can do to fulfill their commitments with the *Moving the needle on ocean protection* report.¹ It will be launched

¹ This report was developed collaboratively by IUCN, its World Commission on Protected Areas-Marine (WCPA-Marine), The Nature Conservancy (TNC), the United Nations Environmental Programme (UNEP), the World Conservation Monitoring Centre (UNEP-WCMC), the Institute of Advanced Studies of the United Nations University (UNU-IAS) and the Wildlife Conservation Society (WCS).

at the October 2010 meeting of the CBD Conferences of Parties in Nagoya, Japan, and champion the IUCN Marine Protected Area (MPA) Plan of Action. The report will provide evidence-based advice on improving and accelerating actions to deliver ocean protection through MPAs.

The core objectives of the report are:

- To offer decision makers science-based recommendations from diverse stakeholders on how to accelerate ocean protection and management;
- To create a series of global maps that highlight progress, gaps and representation of marine protected areas; and
- To present an analysis of regional-level successes that facilitates shared experiences and lessons learned.

The report is particularly relevant to policy makers and decision makers.

In particular, it includes an overview of:

- The use of marine protected areas and the benefits that they provide to local communities, fisheries, local economies and the marine environment;

- The progress made towards achieving CBD and WSSD targets to establish networks of MPAs and to conserve at least 10% of the world's marine ecoregions by 2012;
- Ocean protection through MPA networks and other innovative approaches at the regional and subregional level that highlight unique efforts towards achieving the 2012 target;
- The likely impacts of climate change on coastal and marine environments, and the role of MPA networks in helping countries and communities adapt to these impacts; and
- Successful experiences and innovative ideas that have been implemented to accelerate progress towards increasing the coverage and improving the management of MPAs.

It is expected that this report will inform State Parties and decision makers on how to best move forward with their ocean protection agenda.

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Managing Marine Invasive Species



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Invasive Alien Species

Addressing a growing threat to the marine environment

Species introduction is one of the most significant threats to biodiversity – where a species is not subjected to the controls of its native environment, such as predators or competitors, it can rapidly take over an ecosystem and fundamentally alter its functions and services. Such species are called Invasive Alien Species (IAS).

An example is the accidental introduction to the Caribbean of the Indo-Pacific lionfish (see photo above), probably in the early 1990s. With few known natural predators, the lionfish has spread rapidly and, on many reefs, reduced the number of native reef fish, crustaceans and other reef species. It is feared this may hurt commercial fisheries and further accelerate reef degradation in the region. Eradicating the lionfish is virtually impossible – it reproduces relatively quickly, it has spread to many areas, and occurs also at depths outside easy reach of humans.

This illustrates the difficulty of managing introduced species in the marine environment, where prevention is the best - often only - cure. However, effective prevention depends on awareness and ability to act among a broad range of stakeholders.

With the support of Total Foundation, the IUCN Global Marine and Polar Programme is working to provide information, guidance and tools for addressing marine IAS. The leaflet *Marine Invasive Alien Species - Recent progress in addressing a growing threat to ocean biodiversity and ecosystems* summarizes projects implemented since 2005. A booklet with facts and figures, *Marine Menace: Alien invasive species in the marine environment*, was released in 2009 in English, French and Spanish.

Recognizing that lack of awareness and capacity remain significant challenges in addressing marine IAS, a project funded by Total Foundation was initiated in 2010 to fill critical

awareness and capacity gaps, including creating a professional development course at the World Maritime University. Further, IUCN is working with the Globallast Partnership in preparing guidance that can support ratification and implementation of the International Ballast Water Convention. *Guidelines for development of a national ballast water management strategy* were released early in 2010, and a guideline for *Economic assessments for ballast water management* is being finalized for release later in 2010.

Materials are available on the IUCN Global Marine and Polar Programme Website.

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Fisheries and Aquaculture



Following the fish

Small-scale migratory fishing in West Africa

Small-scale fishermen in West Africa have followed fish migrations far from their home shore since they mastered navigation with sail and paddle, tens of decades ago. They have, in turn, migrated in order to adapt to migratory cycles of fish and have gathered in fish aggregation areas (for example egg laying areas). Thanks to technological progress, migrant fishers, beginning with Ghanaians and Senegalese, have gone further since the 1950s while periodically returning to their villages of origin. The massive rural exodus engendered by the repeated droughts in the 1970s supplied the fisheries sector with a ready supply of labour. As a result, fishers' population has multiplied by 3 to 4 times within a decade.

The expansion of export markets following the Yaoundé convention in 1963 and especially the convention of Lomé¹ in 1975 has pushed migrant

¹ Through giving favour to exports of raw products from Africa-Caribbean-Pacific countries (48 countries in 1975) to Europe (free of custom rights and absence of quotas on exports).

fishermen towards fishing for high value species, the catches of low value species progressively delegated to non-motorized canoes aiming for subsistence fishing or the local markets. Meanwhile, the establishment of Exclusive Economic Zones (EEZ) from the end of the 1970s as a result of the third conference of the United Nations conference of the Law of the Sea² has impacted the migration of fishermen by restricting their rights to fish in foreign EEZs. Since then, their access to foreign EEZs is supposedly regulated by licenses but in fact hundreds of canoes fish in neighbouring waters without licences or permits.

This massive development of the fisheries sector has been rapidly followed by a dramatic decline of fisheries resources in countries such as Senegal, which forced fishers to engage in a migratory process

² This conference led in 1982 to the signature of the Convention of the United Nations on the Law of the Sea (UNCLOS) signed in Montego Bay.

in order to find new fishing zones. This was possible in neighbouring countries, such as Guinea-Bissau, Sierra Leone or Liberia, where fisheries were still rudimentary and resources more plentiful. In 2000, signs of depletion of main fish stocks have become more pronounced, and this trend has increased rapidly. How long will these resources sustain intensive small-scale fishing from Senegalese fishers and others? Contemporary migratory fishing is therefore an emerging symbol of an economic deadlock whose flows of fishers is nothing but a sign of degradation of stocks. The few attempts from national authorities to put some control over this phenomenon, including, for instance, the limitation of fishing licenses given to foreign fishers, are undermined by stealthy behaviours of some fishers, the lack of income-generating alternatives available to them, and the limited control by authorities over such large areas. As a result, while migrants operate furtively and far from capitals, this phenomenon gathers more attention among national policymakers from West African countries.

The phenomenon attracted attention in the early 90's but no studies have been done since then, although migratory fishing by small-scale fishermen has increased dramatically over the last two decades. The IUCN project *Strengthening regional capacity for fisheries management in West Africa*, based at the Sub Regional Fisheries Commission in Dakar, has started to study small-scale fishermen migration in order to bring new evidence that the phenomenon must be dealt with, especially at the regional level. Another aim of the project is to look into the relationship between migrant fishermen and marine protected areas, since fishermen tend to migrate in zones where fish are plentiful and often exploit resources without following local management rules.

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Ocean Governance



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Rapid decline in world fish stocks

Global legislators call for joint action

On June 8th, World Oceans Day, 40 senior Members of Parliament from 15 key fishing nations and regions, including Japan, US, Europe, Canada, Indonesia, Mexico and Brazil agreed a Global Marine Recovery Strategy on world fisheries. This is the first part of a three-pronged Marine Ecosystems Recovery Strategy spearheaded by GLOBE International (Global Legislators for a Balanced Environment). The international legislators were advised by leading scientific and policy experts who presented a bleak outlook for fishery stocks if immediate political action was not taken.

The meeting was organised by GLOBE to challenge the current political failure to address the rapid decline of global fisheries stocks. IUCN's high seas policy advisor Kristina Gjerde participated as a member of GLOBE's marine advisory panel.

As highlighted in the Strategy, open access to marine resources and the

provision of inappropriate subsidies for fishers have created huge incentives for overfishing. Sector-specific policies mean that environmental, conservation and development issues are often addressed separately from fisheries, while decision-makers frequently ignore scientific advice. Lack of communication, transparency and inclusive decision-making has contributed to distrust amongst stakeholders, scientists and managers. Existing high seas legislation is often poorly implemented, leading to continued overexploitation of stocks, the use of destructive fishing practices and illegal and unregulated fishing. Regional Fisheries Management Organisations, the cornerstones of international fisheries governance, are too narrow in scope and coverage and the performance of many has been poor. Policing the oceans is a challenge facing all fishing and coastal nations. Illegal, Unregulated and Unreported fishing seriously undermines existing management efforts and threatens sustainability.

In recognition of the crucial role of legislators in putting words into practice, the Strategy sets out Priority Actions required to successfully restore fish stocks and the marine ecosystems impacted by fishing. Recommended measures include adjusting economic incentives by eliminating subsidies that contribute to overcapacity and overfishing and instead supporting programs that improve fisheries management. To bolster implementation and enforcement of the existing legal framework, the Strategy calls for relevant countries to ratify and adopt robust implementing legislation for marine and fisheries related treaties, to promote cooperation between port and coastal states to eliminate safe havens for illegal fishing, and to increase support for the International Monitoring, Control and Surveillance Network, a global network of fisheries enforcement officers. And to address the problem of underperforming Regional Fisheries Management Organisations, the Strategy calls for a modernization of

the underlying agreements to reflect best practices and procedures, and a regular, global level review of their performance.

As part of the toolbox for enhancing sustainable fisheries and safeguarding marine biodiversity, the Strategy calls for the adoption of modern marine protected area targets, aiming for 25% coverage in national waters and in areas beyond national jurisdiction. The Strategy further underscores the need for a more joined-up relationship between environmental and fisheries legislation, especially – in light of the Gulf oil spill – for environmental impact assessments to be conducted for infrastructure affecting the marine environment. And building on growing national experience with marine spatial planning, it calls for governments to investigate the establishment of a new global framework agreement for marine spatial planning in areas beyond national jurisdiction. Such an agreement, it is proposed, could provide a science-based framework for Marine Protected Area network designation,

management and enforcement, while improving the integration of marine conservation into sectoral and regional management.

These and many other recommendations are contained in the full report available at: http://copenhagen.globeinternational.org/includes/documents/cm_docs/2010/m/mers_final_08_06_10.pdf.

On Oceans Day, the gathered parliamentarians spoke with one voice about the need for concerted global and regional action to restore marine ecosystems. The Strategy marks an important step towards inspiring a global vision for a healthy and productive ocean that can support us all. As highlighted in a 2008 World Bank report, current inefficiencies in fisheries management are costing governments up to \$50 billion a year. Improvements in fisheries management and recovery of marine ecosystems are clearly in the interests of all nations and peoples. The next step is to secure wider support for the

GLOBE Marine Ecosystem Recovery strategy from legislators around the world, and to build the legal and institutional means to implement it.

IUCN's Kristina Gjerde continues to work with GLOBE and legislators around the world to secure support for the Ocean's Day Marine Recovery Strategy, which advances many of the IUCN's policy goals for reforming high seas fisheries management, rebuilding fish stocks, and safeguarding the marine environment.

Related document:
The World Bank. 2008.
Sunken Billions: The Economic Justification for Fisheries Reform, <http://siteresources.worldbank.org/EXTARD/Resources/336681-1224775570533/SunkenBillionsFinal.pdf>

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Arctic



© Samuel Gagnon

Advancing Ecosystem-based Management in the Arctic marine environment

Summer sea ice retreat caused by climate change will increase human activity in the Arctic marine environment. This will require certain new ways of integrated and sustainable management. IUCN and the Natural Resources Defense Council (NRDC) are undertaking a cooperative project to explore ways of advancing implementation of ecosystem-based management (EbM) and to begin the process of identifying ecologically significant and vulnerable marine areas that should be considered for enhance protection in any new management arrangement. Partners in the project include the Ecologic Institute and the Center for Marine Biodiversity and Conservation (CMBC) at the Scripps Institution of Oceanography, University of California, San Diego. Three workshops will be held during this one and a half year project.

A first workshop was convened in Washington D.C. on 16-18 June 2010 to discuss opportunities to enhance EbM and regional coopera-

tion in the Arctic marine environment. Participants represented a multitude of Arctic stakeholders, including government officials from Canada, Sweden, Iceland and the United States, indigenous peoples representatives, NGOs and industry stakeholders. Policy discussions were complemented by scientific insight.

It was proposed that EbM has the potential to provide an organizing framework for decision-making about Arctic marine activities. Discussions focused on how to best implement such an approach. EbM, which is generally accepted at the international level, includes definition of portions of ocean space for management purposes, based on oceanographic and ecological criteria, and the development of trans-boundary management arrangements. Participants identified fishing, tourism, shipping, oil and gas development, mineral development and the arrival of invasive species as driving forces for environmental change within the Arctic. In particular, climate change

will be affecting the Arctic region dramatically. Its impacts need to be included in the development and implementation of an EbM approach. Participants envisioned the creation of a non-binding strategy overseen by the Arctic Council. The Arctic Council is well placed to develop an Arctic marine EbM strategy, given its history of exploring EbM and participation of indigenous peoples. Since Arctic States have already agreed to apply EbM to the region, an EbM Strategy would provide a regional plan for future actions.

It was suggested that the Strategy should be enacted based upon geographical extents of ecosystems, implemented by national to trilateral transboundary agreements, and that a scientific advisory group should be formed to assist in the development of the Strategy. The scientific group and relevant stakeholders would provide advice throughout the implementation process. Participants intended for the EbM Strategy to include environmental impact assessments, ecosystem health reports and reports on the effective implementation of the Strategy by member states. Marine protected areas, marine spatial planning and pilot projects were suggested as three of many useful tools for EbM in the Arctic.

The second workshop in this series, planned on 2-4 November 2010, will convene experts in various aspects of Arctic marine ecosystems to help identify biologically or ecologically important or vulnerable habitats using internationally accepted criteria. The third workshop will be convened in Europe in spring 2011. It will aim to further refine the EbM Strategy and align outcomes of the previous workshop sessions. The final report will present: 1) policy recommendations to advance ecosystem-based marine management in the Arctic region and 2) scientific findings (including maps) on areas of ecological and biological significance or vulnerability that should be considered for enhanced protection in the Arctic marine environment.

For more information, please contact Tom Laughlin (thomas.laughlin@iucn.org).

Members and Commissions



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Also in this section

30 Reaching out for oceans: Europe's biggest nautical spectacle

Oyster reefs are a critically imperiled marine habitat

The Nature Conservancy

The world's oyster reefs are likely the most imperiled kind of marine habitat on earth. A recent study led by The Nature Conservancy (TNC) and involving leading experts from five continents concluded that oyster reefs had declined by an estimated 85% in the past century. This loss exceeds published estimates for other habitats that have been assessed at global scales, including seagrasses (29%), coral reefs (20%) and coastal marshes and mangroves (50%).¹ While the study identified many ongoing threats to oyster reefs, it also included many practical recommendations for halting these losses and reversing the overall decline.

¹ Beck, M.W., R.D. Brumbaugh, L. Airoldi, A. Carranza, L.D. Coen, C. Crawford, O. Defeo, G.J. Edgar, B. Hancock, M. Kay, H. Lenihan, M.W. Luckenbach, C.L. Toropova, and G. Zhang. 2009. *Shellfish reefs at risk: A global analysis of problems and solutions*. The Nature Conservancy. 52pp.

Oysters provide important and economically valuable benefits for people that extend far beyond commercial harvest: they form reefs that provide essential fish habitat for many other species of fish and crustaceans; they filter vast quantities of water and help to *denitrify* estuaries and control eutrophication; and, in some locations, their reefs can form protective barriers for shorelines that reduce erosion and loss of salt marsh.

TNC and other partners have been taking steps to reverse the decline of oyster reefs in the U.S. through restoration projects designed to return the full array of ecosystem services such as water filtration, shoreline protection and fish habitat. Much of this work has been conducted through a National Partnership between TNC and the National Oceanic and Atmospheric Administration (NOAA) that has funded more than 45 oyster reef restoration projects in the USA since 2001. Using lessons learned from these projects, TNC is

working to elevate oyster reefs and other bivalve assemblages as an international conservation priority.

Some initial progress outside the USA includes the development of an independent South American Network for Bivalve Conservation, comprised of bivalve experts from throughout South America. This Network has met twice and is planning a third workshop in late 2010 to continue to exchange information about restoration and conservation efforts across national borders. TNC provided financial support for these workshops and is committed to helping the Network find additional sources of funding for monitoring and restoration activities that help to build the case for conservation in South America.

Other progress includes a resolution prepared for the next Ramsar Conference of Parties that will encourage the inclusion of oyster reefs and other bivalve assemblages as primary targets for conservation in sites nominated for designation as a Ramsar Wetland of International Significance.

One of the greatest threats to the critically imperiled species of reef-forming oysters around the world is the lack of awareness of their decline and of the vital role they play in the world's coastal waters. An additional step that could help to reverse their decline is an assessment of their status by the Red List. This would help raise awareness of the risks faced by shellfish reefs and inform future policy- and decision-making at national, regional and international levels.

For more information, please contact Robert D. Brumbaugh, Restoration Program Director, TNC Global Marine Team (rbrumbaugh@tnc.org).

Reaching out for oceans

Europe's biggest nautical spectacle

Once every five years, tall ships from all over the world come to the Dutch capital for the five-day international nautical spectacle: SAIL Amsterdam. Attracting over 600 ships and an expected 1.8 million visitors, it is the largest admission free nautical event in Europe.

Highlight of SAIL Amsterdam 2010 is the SAIL-IN parade on the first day, an impressive fleet of tall ships and a large fleet accompanying them crossing the North Sea Canal to Amsterdam on 19 August.

This year, *Fleur de Passion*, the flagship of the IUCN member Antinea Foundation, is one of them. *Fleur de Passion* is a 33m sailing ship used by the Antinea Foundation for the Changing Oceans Expedition on a mission to validate and improve a global map of cumulative human impact on marine ecosystems.¹

Moored in the heart of the SAIL event, *Fleur de Passion* will act as the centre of a varied outreach program supported by the Dutch Coalition for Biodiversity. During three days, the vessel and the nearby theatre Panama will serve as a centre where the public will be overwhelmed with the wonders and mysteries of oceans in a joined outreach program from several IUCN members and the municipality of Amsterdam.

Highlights of the program are the multimedia show Ocean Experience, a drawing contest for children, an evening event as part of the National Postcode Lottery Project Oceans, and a meeting organized by the IUCN National Committee of the Netherlands' (IUCN NL) Leaders for Nature to discuss the interdependencies of businesses and oceans with business leaders, politicians and NGOs.

Twice a day, SAIL visitors can experience Antinea's multimedia show for free in Panama. The show

underlines the beauty and treasures of the underwater world and human impacts that pose a threat to future generations of mankind. The show is adapted for the occasion and contains footage of the rich biodiversity in the Dutch Caribbean, the North Sea, the Wadden Sea and water-rich Amsterdam. It includes footage and contributions from the Dutch Caribbean Nature Alliance, the local organisations of the Coastal and Marine Union (EUCC), WWF, the municipality of Amsterdam and the IUCN NL.

Currently, *Fleur de Passion* sails across the Wadden Sea, the latest marine site that was added to the UNESCO World Heritage list. This unique ecosystem is the largest unbroken system of intertidal sand and mud flats in the world. Together with Dutch and German scientists from the Institute for Marine Resources and Ecosystem Studies (IMARES), DEEPWAVE and EUCC, they will further explore and document this region. In collaboration with IUCN and UNESCO, a best practice program will be run in order to highlight the innovative management solutions that

have been put in place in different Marine Protected Areas.

Ocean Experience at SAIL Amsterdam is part of the 10-year Changing Oceans Expedition of *Fleur de Passion* around the planet. <http://www.changingoceans.org/en/home.php>

IUCN NL's Leaders for Nature initiative is an international network for the current and future business leaders of over 20 companies, focussed on ecosystems, integrating sustainability in the core business, and leadership. <http://www.leadersfornature.nl>

More information about SAIL Amsterdam 2010 can be found here: <http://english.sail2010.nl/>

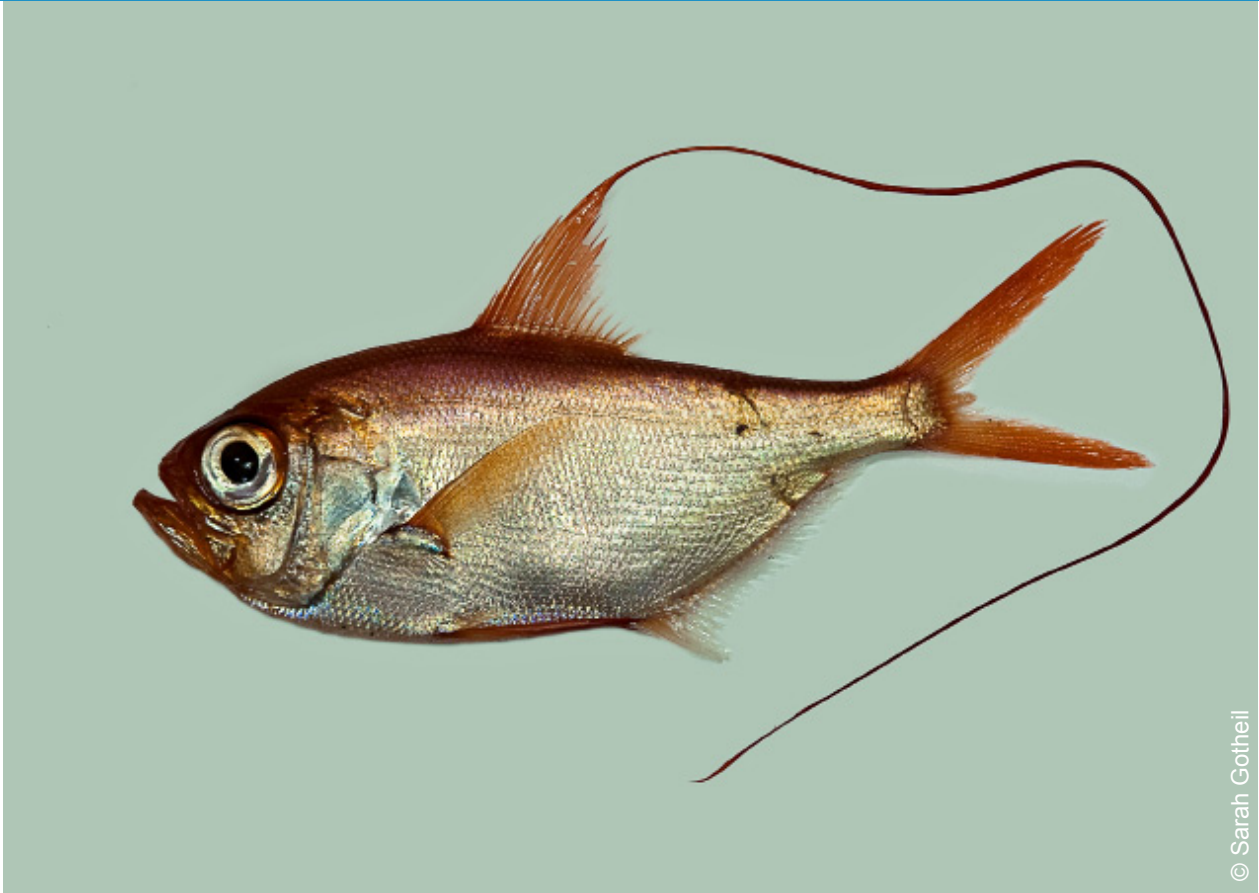
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¹ More information on this global map is available here: <http://news.sciencemag.org/science-now/2008/02/14-02.html>

Expeditions



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Unique data collected on Indian Ocean seamounts

Also in this section

33 Tara-IUCN expedition: How are coral reefs coping with climate change?

34 Ocean hope at Mission Blue: A collaboration experiment

Within the framework of its GEF-funded Seamounts Project, IUCN, in collaboration with many partners, organised a survey of seamounts in the international waters of the southern Indian Ocean. The highly successful study was carried out on the Norwegian research ship Dr Fridtjof Nansen last year, from November to end of December 2009, and represents the first comprehensive biological survey ever conducted on the pelagic ecosystems associated with these underwater mountains.

Over 40 days, a team of the world's leading marine experts, paired with scientists from the Western Indian Ocean region, travelled 6,000 miles to sample the rich marine life above five seamounts of the South West Indian Ocean Ridge (SWIOR) and one seamount further north at Walters Shoal. The scientists, covering a range of expertise, including

acoustics, physical oceanography, and biology of phytoplankton, zooplankton, fish and seabirds, returned with a wealth of unique data and specimens. Nearly 7,000 lots of samples were gathered and labeled, including an unexpected diversity of fish, shrimps, squid and gelatinous marine creatures. Many more samples of phytoplankton and zooplankton, representing the base of the ocean food chain, nutrients, isotopes and particulate organic matter (POM) were also collected. The two seabird and marine mammal observers recorded thousands of seabirds from as many as 36 species and 26 marine mammals over the course of the expedition.

Seamounts, underwater mountains of volcanic and tectonic origin, are known to be hotspots of biodiversity and attract a range of oceanic predators, including seabirds, whales and

sharks. They also attract deepwater fisheries, as they host many species of commercial interest, most of which are very vulnerable to over-exploitation. Two of the surveyed seamounts had been set aside on a voluntary basis as benthic protected areas by the Southern Indian Ocean Deepsea Fishers Association (SIODFA), which will allow for comparison between fished and unfished seamounts. Preliminary results show that the six seamounts surveyed are very different from each other and indicate that they will help improve knowledge and understanding of seamount ecosystems globally.

A scientific workshop, including research cruise participants and local scientists as well as invited renowned experts, is planned to take place towards the end of 2010 to identify the species unidentified during the cruise and carry out analyses

of the samples collected. In addition to the species that have been recorded for the first time in the region, we hope to have found some species new to science.

Through the Seamounts Project, the results of the research will not only have a scientific interest, but will directly feed into recommendations to help improve conservation and management of Indian Ocean marine resources. More generally, this process will inform future management of deep-sea ecosystems in the high seas globally.

The expedition would not have been possible without the support in expertise and funding provided by our partner organisations, including the Global Environment Facility (GEF), the United Nations Development Programme (UNDP), the Zoological Society of London (ZSL), the Natural Environment Research Council (NERC), the EAF-Nansen Project (executed by the Food and Agriculture Organisation [FAO]), the Norwegian Institute of Marine Research (IMR), the Agulhas and Somali Current Large Marine Ecosystems (ASCLME) Project, the African Coelacanth Ecosystem Programme (ACEP), the Marine Ecology laboratory of Reunion University (ECOMAR) and the Southern Indian Ocean Deepsea Fishers Association (SIODFA).

Additional information is available on

- the project website: <http://www.iucn.org/marine/seamounts>
- the cruise blog: <http://seamounts2009.blogspot.com/>
- the cruise diary, BBC Earth News: http://news.bbc.co.uk/earth/hi/earth_news/newsid_8363000/8363108.stm

For more information, please contact James Oliver (james.oliver@iucn.org).



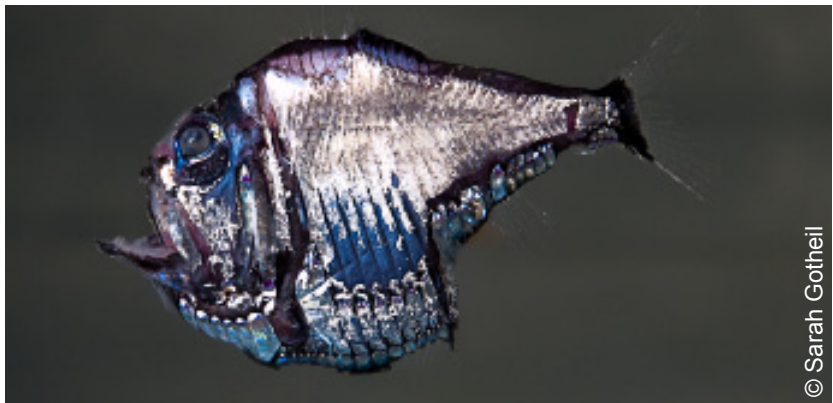
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Tara-IUCN expedition

How are coral reefs coping with climate change?

The effects of climate change on coral reefs are visible today on many reefs worldwide. Predictions for coral reefs are extremely dire with many experts arguing that major changes in abundances of shallow water coral assemblages are inevitable this century. As yet the effects of climate change and other agents of disturbance on coral reefs are not well understood.

It is critical for scientists and managers to determine the range of threats affecting this ecosystem and to predict the potential biological responses to these threats. Further, it is crucial to identify actions to mitigate threats, including climate change, to reef ecosystems. It is important to understanding how tolerant coral assemblages are to thermal stress and how resilience of a site will buffer a coral reef from the impacts of climate change. This is called *monitoring for resilience*, where *resilience* is the ability of a system to absorb or recover from disturbance while maintaining its functions and services. A number of resistance and resilience indicators have been proposed to allow coral reef managers to predict a coral community's response to thermal stress (see *IUCN Working Group on Climate Change and Coral Reefs* article on page 11).

To address these research priorities, the IUCN Global Marine Program establishes critical partnerships with foundations, scientific bodies,

and governments to undertake key multi-disciplinary coral reef conservation research and public/educational outreach projects. In particular, the IUCN Global Marine Programme recently developed a partnership with the Tara Foundation and provides technical support to its non-profit program, Tara Expeditions. Tara Expeditions is directed by Etienne Bourgois, chief executive officer of Agnès b, a French fashion brand. The program was initiated in 2003, thanks to the brand's founder, Agnès B., and her determination to commit herself to the planet's remediation. Tara Oceans is its current expedition. The starting point for Tara Expeditions was the acquisition of the unique expedition sailing schooner Tara, previously owned by Dr Jean-Louis Etienne and Sir Peter Blake.

Tara's voyages are dedicated to scientific research on the impact of global warming on the oceans by providing a platform for scientific research and exploration, and raising public awareness through these adventurous voyages. Tara's scientific program combines work on plankton, during long ocean crossings, and coral reefs, at selected islands and coastlines in between. IUCN's involvement focuses on the coral reef research components, contributing to the science program developed by Francesca Benzoni, of the University of Milano-Bicocca. While keeping a basic set of methods and research topics consistent among all

sites, each coral reef leg also varies according to local interests and needs, and a changing complement of scientists

In the first half of 2010, Tara visited three coral reef sites in the Indian Ocean – Djibouti, St. Brandons Island in Mauritius, and Mayotte. The first leg, in Djibouti, was conducted from 27 January to 12 February and included researchers from CORDIO (Coastal and Ocean Research in the Indian Ocean), the Monaco Marine Research Center, the University of Miami, and IUCN. The IUCN and CORDIO team conducted resilience and biodiversity surveys to provide an overview of the threats and state of the system at 27 different sites. One of the findings was that the reefs did not show signal of the widespread bleaching in 1998 that affected the Indian Ocean, and that other local threats, such as sedimentation and crown of thorns sea-star outbreaks, were also important determinants of reef health. Fishing pressure was, however, very high, shown by the absence of large fish and top predators at all survey sites.

Next, the Tara stopped at St. Brandons Island in Mauritius, from 22 April to 6 May – a small set of sand islands and reefs on the Cargados Carajos shoals some 400 km north of Mauritius. On this leg, scientists from the Mauritius Oceanography Institute, CORDIO, and the University of Miami were present. The islands are privately managed by a fishing company that conducts carefully controlled fishing of reef fish and astounded expedition members by having among the best fish populations they had ever seen in the Indian Ocean. Nevertheless, fabled sharks were absent from the waters, quite different from the last scientific surveys conducted in 1997, in which researchers often left the water as a result of the abundant and active sharks. The visit coincided with peak sea surface temperatures of the local summer season, with moderate levels of coral bleaching expected across much of the western Indian Ocean. Moderate levels of bleaching were found, but as yet very little evidence of any mortality.



For its last coral reef stop in the Indian Ocean, the Tara stopped in Mayotte, from 29 May to 18 June (see bottom left photo). With broad interest among French and European institutions, this leg had to be split in two parts to accommodate all scientists, adding the European Marine Biological Laboratory, IRD (Institut de Recherches et Developments) and the Museum of Tropical Queensland. This visit coincided with the end of the local summer season, and the expedition recorded the highest levels of coral bleaching and mortality yet seen in the Indian Ocean this year – affecting over 50% of corals and with mortality of

over 30% at the most vulnerable reef habitats. Most of the branching Acroporas (the fastest growing and dominant corals on the reefs) were clearly pale, bleached white and dead (see bottom right photo). With over 70% cover of Acropora, the reefs have shown rapid recovery from the last major bleaching event in 1998, but it is not yet known how well they may withstand the increasingly frequent major bleaching that rising temperatures will impose.

In addition to the reef status and resilience work that was the focus of IUCN researchers, a variety of other research projects were conducted,

including integrated systematics of corals, algal studies, coral calcification and bio-mineralization studies and imaging techniques.

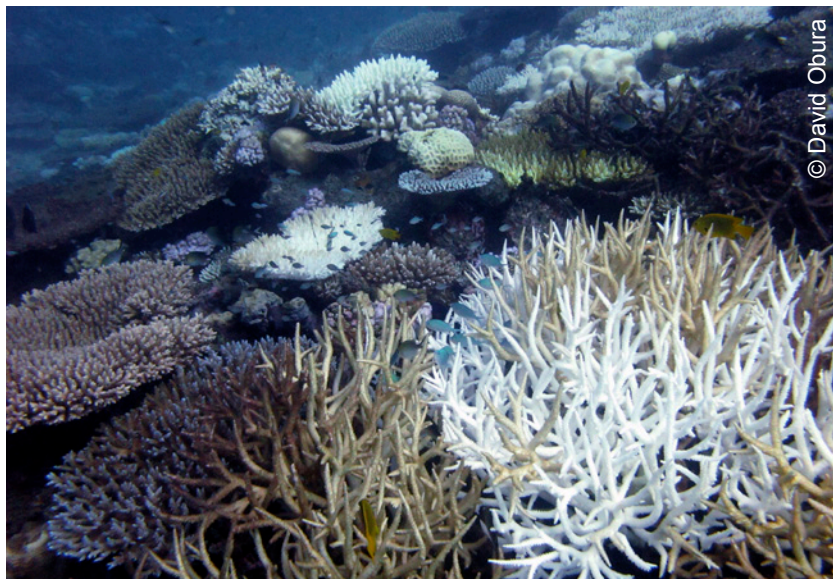
With the end of its first season of coral and plankton work, the Tara will next cross the Atlantic and initiate its next round of coral work in the Pacific in 2011.

More information is available here: <http://oceans.taraexpeditions.org/>

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Ocean hope at Mission Blue

A collaboration experiment

Mission Blue, a Galapagos sea-voyage of 100 people including Sylvia Earle, Leonardo DiCaprio, Edward Norton, Glenn Close, Elizabeth Banks, Steve Case, Ted Waitt, Bill Joy, Jackson Browne, Damien Rice, Chevy Chase, Jean-Michel Cousteau and 30 of the world's leading marine scientists, including Carl Gustaf Lundin, Dan Laffoley, Kristina Gjerde and Laura Cassiani, turned into an epic event that may have significant impact on global efforts to save our oceans.

It happened because the individuals and organizations on board chose to abandon the obstacles that often engulf nonprofit work, and engage in a process of emergent collaboration. Eight separate initiatives were kick-

started, aided by \$15m in commitments from the individuals on board. These included:

- \$1m to complete a package to protect the waters around Galapagos themselves
- \$1.1m to launch a plan to protect the 1m-square-mile Sargasso Sea and commitments to raise a further \$2.5m to see the plan through to success
- \$350k to boost ocean exposure in schools
- \$3.25m to commence a campaign to end fishing subsidies
- \$10m to kickstart a new partnership to fund longer-term ocean projects

This story began with *one wish to change the world*. That's the gift

given to winners of the TED Prize. Last year, the iconic ocean explorer Sylvia Earle was a recipient of the prize and in her blockbuster acceptance speech at TED, she declared her wish "to ignite public support for a global network of Marine Protected Areas, hope spots large enough... to restore the blue heart of the planet." Her wish supports the WCPA - Marine Global Plan of Action on MPAs (<http://www.protectplanetoocean.org/resources/docs/PlanofAction.pdf>). IUCN and WCPA - Marine are lead technical advisors on the wish.

For more information: http://blog.ted.com/2010/04/13/ocean_hope_at_m/
<http://www.mission-blue.org/>

Underwater Photographer of the Year



Peter Verhoog has photographed nearly every underwater creature imaginable, but sharks are his favourite photography subjects. He is the Netherlands' most renowned underwater photographer and his work has won many awards. Peter and his wife, Georgina Wiersma, have published two books. Their second book, *Sharks - Close Encounters*, published in 2010, illustrates the beauty, vulnerable majesty and astonishing diversity of sharks.

For more information, please visit: www.peterverhoog.com or www.underwatermagic.com

Upcoming Events

2010

- **18-29 October, Nagoya**, 10th meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP 10)
- **First week of November, Monaco**, launch of *Ocean Acidification: Questions Answered*
- **2-4 November, La Jolla, CA**, Workshop to Identify Ecologically Significant and Vulnerable Marine Areas
- **5 November, La Jolla, CA**, Workshop on Arctic Marine World Heritage
- **16-18 November, Monaco**, Economic Costs of Ocean Acidification International Meeting
- **4-6 December, Geneva**, 9th meeting of the Western Gray Whale Advisory Panel (GWAP-9)
- **17-21 February, Washington DC**, American Association for the Advancement of Science (probable GOBI-related participation)
- **April or May, Geneva**, 10th meeting of the Western Gray Whale Advisory Panel (GWAP-10)
- **12-14 May, Victoria BC**, International Marine Conservation Congress
- **Spring, probably in Mauritius**, IUCN-GEF Seamounts governance workshop
- **Around September, probably on a cruise ship on the Mediterranean between Rome and Athens**, 6th GEF Biennial International Waters Conference
- **26-30 September, Aberdeen**, 2nd World Conference on Marine Biodiversity
- **November-December, south of Madagascar**, IUCN-GEF Seamounts cruise part 2

2011

- **31 January - 4 February, Rome**, FAO Committee on Fisheries (COFI)
- **Dates and venue TBC**, International Tropical Marine Ecosystems Management Symposium (ITMEMS 4)
- **Dates and venue TBC**, Western Indian Ocean Marine Science Association (WIOMSA) Symposium

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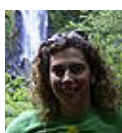
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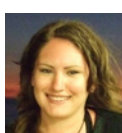
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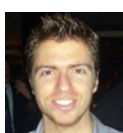
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Global Ocean Biodiversity Initiative: www.gobi.org

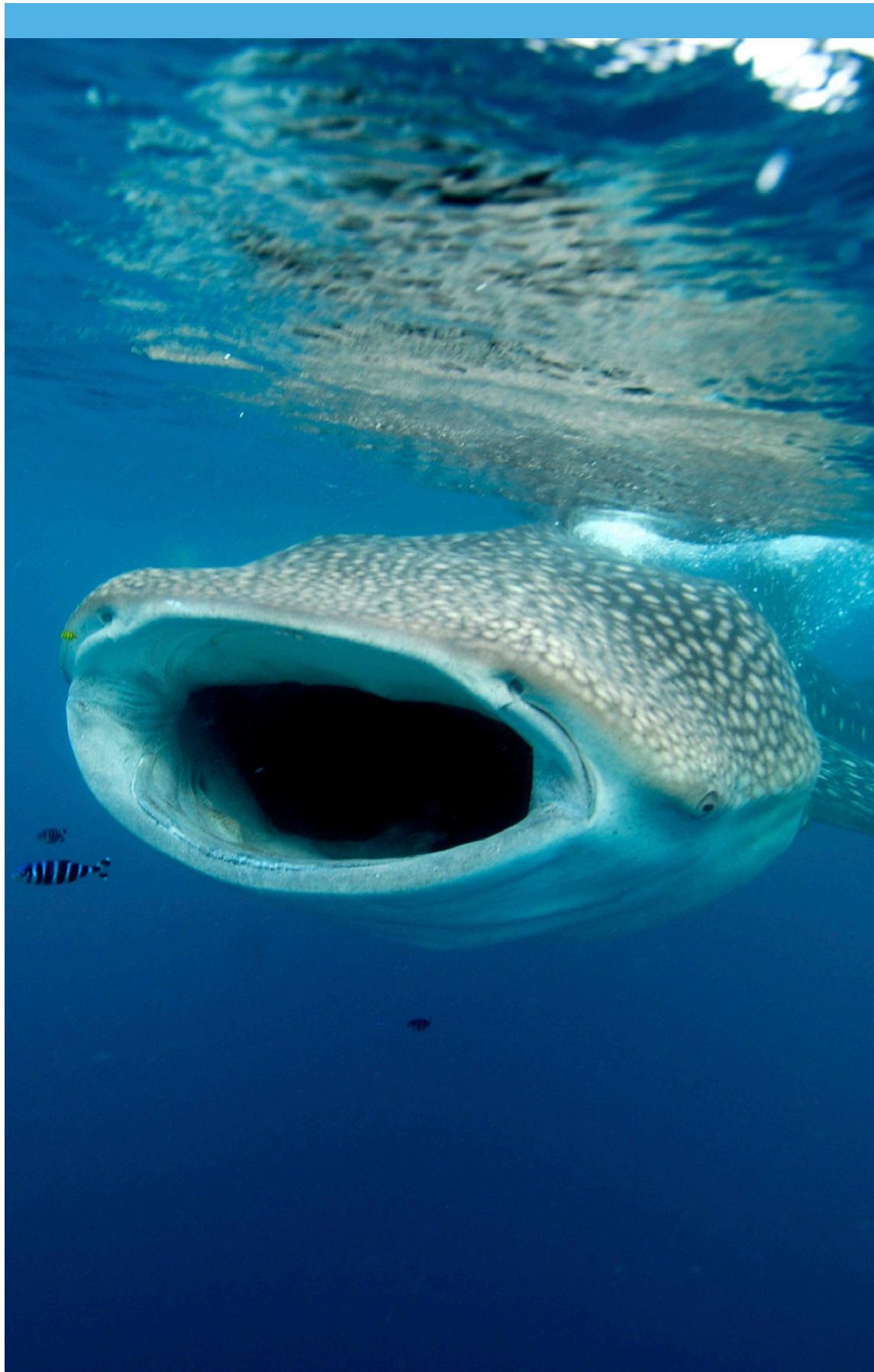
Protect Planet Ocean: www.protectplanetoclean.org

The Official MPA Blog: <http://blog.protectplanetoclean.org/>

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