



MARINE NEWS

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Top picture: A fire coral before and after bleaching. On the left is a healthy fire coral, while the right shows a completely bleached coral.

Bottom picture: The bleaching at Airport Reef in American Samoa assessed by marine biologist Alice Lawrence.

IUCN GMPP overview
Global Coasts: © IUCN Maldives

Global Commons: © John Weller

Global Threats: © William Rodriguez Schepis

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© Pierre-Yves Cousteau

The ocean is our future; for better or for worse.

"There are no passengers on spaceship Earth. We are all crew." - Marshall McLuhan, 1965.

The advent of agriculture over 10,000 years ago had a profound socio-economic impact on mankind. Today however, when it comes to the ocean, we are still very much hunter-gatherers. The sea belongs to no one, and to everyone. So in addition to being out of sight, it is lost to the tragedy of the commons, as defined by Aristotle: *"That which is common to the greatest number has the least care bestowed upon it."*

As our societies turn an avid eye towards the ocean, in quest for perpetual economic growth, we are at a fascinating crossroads. Blue growth can come as the nail in the ocean's coffin, with intensifying and unregulated fishing and mining, a plunder of the sea already well eroded by thousands of years of carelessness. Or blue growth can come as a milestone breakthrough for our species, with a sustainable and rational management of its habitats and resources, accounting for the erosion and recovery of ecosystem services, and employing our ingenuity to creating net positive value. Addressing the immense challenges the ocean faces today (climate change, pollution, overfishing...) is raising stimulating new questions about international governance (which is non-existent in the high-seas), the

externalisation of environmental costs (to abolish the business practice of deferring onto society and natural capital all the negative impacts of economic activities), and the cognitive frameworks and values that we are conditioned for by mainstream media and politicians (obsession with financial success, personal image and hedonism). These challenges also bring new opportunities, such as blue financial products derived from the improved management of ecosystems, new sources of energy and mineral resources, and a new understanding of the ocean system. Our ability to make the right choices, and to meet these challenges successfully, is impaired by blind spots in our knowledge of the oceans.

In order to sustainably manage the ocean, we need to better understand it. The ocean absorbs 90% of our planet's heat and captures one fourth of our CO₂ emissions. So much remains to be discovered today. The temperature of the sea at depth for instance, at ecosystem scale, is still today completely unknown. Realising this, I launched Project Hermes (www.project-hermes.com) this summer, to collect diving-related computer data from recreational divers and dive centres in order to monitor the temperature of the ocean at depth, worldwide, in near real-time. The consolidation of massive databases, which combine multiple sources of environmental data (such as global satellite observations, field research and citizen science) represents the

beginning of the "digitization of the Earth". How will Big Data shape conservation, sustainable development and decision making?

We are living a fascinating time, where the immense challenges mankind faces are matched by the technological ability to innovate and adapt. The barriers that hold us back from designing and implementing truly sustainable societies worldwide are mostly perceptual, within our minds. As my late father Captain Cousteau once said: *"The day every citizen of the Earth considers himself as a steward of the environment, we will be very close to the solution."*

Editorial

With the United Nations Climate Change Summit later this year in Paris, we can hope that the leaders of the world will use all available environmental data to make intelligent, informed, unbiased decisions about the future of our planet.

Pierre-Yves Cousteau



IUCN Global Marine & Polar Programme

A focus on three overarching priority areas

As its name suggests, the IUCN Global Marine and Polar Programme (GMPP) serves as the Union's vehicle for guiding and implementing projects and activities related to oceans and polar regions, as well as applying global solutions that ensure ocean health and sustainability. It does so in close partnership with IUCN's network of Regional Offices in addition to IUCN Commissions and Members organisations.

GMPP's mandate has grown and evolved over the years to address the emergence of new global threats and to adapt to the development of new approaches within the marine conservation sphere. It has therefore become necessary to streamline GMPP's body of work according to three strategic priority areas: Global Coasts, Global Commons and Global Threats. This categorisation enables those outside the Programme to get a better understanding of GMPP's body of work and for activities within each thematic priority to work more collaboratively and towards a single overarching goal.

Global Coasts

The Global Coasts Programme of IUCN brings together all of IUCN's coastal activities across all regions under one umbrella. GMPP's role within this IUCN-wide initiative is to coordinate the network, help develop concepts, design activity frameworks and provide on-the-ground technical support where needed.

Coastal regions harbour many of the ocean's richest and most productive ecosystems; they are also home to a wide array of human activities, many of which are in competition with each other and impact the environment. Coastal ecosystems have borne the brunt of the damaging effects of rapid development but also overfishing, destructive fishing practices and the consequences of climate change, such as ocean acidification. IUCN's coastal work has been concentrated on enhancing the resilience of the most valuable ecosystems so that precious ecosystems and the services they provide are not lost. Its work has centred on undertaking surveys and capacity building, working collaboratively to reduce ocean stressors, fostering improved governance and facilitating the implementation of both marine protected areas and marine managed areas.

The demand for GMPP expertise has led to collaboration in projects in all corners of the world but especially in the Indian Ocean and in EU Overseas territories where GMPP has led the implementation of multi-million dollar projects.

GMPP has built upon IUCN's niche as a unique convenor of stakeholders to drive and guide marine-based industrial partners towards stronger environmental performance and monitoring. Successes in this field include

the displacement of oil and gas infrastructure as well as the rescheduling of potentially harmful seismic surveying to protect critically endangered whales in their summer feeding grounds.

Global Commons

The Polar Regions and the High Seas (areas beyond national jurisdiction) form the focus of GMPP's programme of work on the Global Commons. These areas are subject to weak governance mechanisms that imperil the bi-

odiversity and living resources they harbour. The world is at something of a crossroads and some unique opportunities now exist to work towards the introduction of legally-binding conservation measures, notably in the high seas. Building on a 5-year programme of work, IUCN continues to work towards better governance of seamount systems in the Indian Ocean. Through a multi-partner scientific cruise, IUCN aims to improve the knowledge of seamount systems and thereby guide governance decisions in favour of stronger protection of these hotspots of biodiversity.

Global Threats

New threats to ocean life are emerging and require

specific targeted action in order to be contained and mitigated. GMPP is building a cross-sector coalition of actors to reduce the amount of plastic entering the ocean, particularly by focusing on upstream solutions. Against a background of rapid change in ocean temperatures, oxygen levels and acidity, GMPP is working with its network of experts to bring the very latest science together in peer-reviewed knowledge products so that decision makers are made aware of associated risks as well as the benefits of implementing nature-based solutions.

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

Global Coasts	Global Commons	Global Threats
		
<p>Current thematic priorities</p> <ul style="list-style-type: none"> • Coastal ecosystem resilience • Research & capacity building of local practitioners • Protect EU Overseas territories • Enhance performance of marine-based industries • Foster a global network of marine protected areas • Promote sustainable aquaculture and fish feed solutions <p>Main projects</p> <p>Maldives (USAID)</p> <ul style="list-style-type: none"> • Work with resorts & local stakeholders to create & manage networks of Marine Managed Areas • Enhance local GIS capacity, reef monitoring & science education to support marine spatial planning & protect threatened marine species <p>EU Overseas (European Union)</p> <ul style="list-style-type: none"> • A sustainable funding mechanism to support on-the-ground activities covering ecosystem services valuation; species conservation; invasive species control; capacity building for improved governance & resilience to climate change; & designation of protected areas <p>Vamizi</p> <ul style="list-style-type: none"> • Marine research in an Indian Ocean biodiversity hotspot • Supporting fishing communities' management of a marine protected area 	<p>Current thematic priorities</p> <ul style="list-style-type: none"> • Design a legally-binding Implementing Agreement for conservation & sustainable use of marine biodiversity beyond national jurisdiction for international ratification • Advocate a global, coherent, connected & representative system of marine protected areas • Enhance the scientific knowledge of seamounts & ridge ecosystems in the Indian Ocean to stimulate improved management of them <p>Main projects</p> <p>South West Indian Ocean project (FFEM)</p> <ul style="list-style-type: none"> • Conservation & sustainable exploitation of seamount & hydrothermal vent ecosystems of the South West Indian Ocean in areas beyond national jurisdiction. The project seeks to explore regional approaches to ocean governance <p>Arctic Conservation</p> <ul style="list-style-type: none"> • Ecosystem-based Approach for robust oil spill response capacity, a voluntary code of conduct for shippers & improved management of the Bering Strait <p>Sargasso Sea Commission</p> <ul style="list-style-type: none"> • Hosted & partnered by IUCN & pioneering an intergovernmental mechanism for the Sargasso Sea to keep its health, productivity & resilience under continual review 	<p>Current thematic priorities</p> <p>Threats</p> <ul style="list-style-type: none"> • Ocean warming, ocean acidification, marine plastics, deep sea mining & marine invasive species <p>Activities</p> <ul style="list-style-type: none"> • Promote of nature-based solutions to the challenges of climate change, disaster risk reduction & food security • "Science to governance" policy guidance • Yearly production of cutting-edge knowledge products <p>Main projects</p> <p>Ocean Acidification</p> <ul style="list-style-type: none"> • Host a high-level scientific committee to deliver latest knowledge, to apply science to resource management issues & provide sound policy advice <p>Marine plastics</p> <ul style="list-style-type: none"> • Build a cross-sector coalition to seek innovative & practical solutions to the problem of marine plastics <p>Blue carbon</p> <ul style="list-style-type: none"> • Scope, facilitate & generate recognition of the role of blue carbon in countering climate change whilst delivering ecosystem services of critical importance • Partner with the French government to maintain the ocean's climate-regulating role & to generate the global political will to protect & better manage the oceans

Oceans and Climate Change



© Carl Gustaf Lundin

After the hiatus following the UNFCCC COP15 in Copenhagen in 2009, the world's attention, and hope, is once more focused on world leaders to find a legally binding agreement to limit greenhouse gas emissions at the COP21 in Paris this December.

Ultimately, strong, near-term carbon emission reductions are vital to keep unavoidable impacts to a minimum. However, the oceans – both coastal and marine ecosystems – can underpin climate change mitigation and adaptation efforts.

Why are resilient oceans essential for mitigating and adapting to climate change?

Oceans play a critical role in regulating the climate, providing food security and sustaining livelihoods. However, the so-called “deadly trio” – ocean warming, acidification and deoxygenation – resulting from anthropogenic CO₂ emissions, is significantly limiting the oceans’ capacity to continue providing vital services for humans on Earth. The “deadly trio” will alter earth-system-regulating processes (e.g., climate, heat distribution, weather, water flow, and waste treatment), as well as compromise coastal protection,

carbon sequestration and cultural services (e.g., recreation and leisure, inspiration, and cultural heritage). These changes will have major economic impacts for humans via changes in ocean-derived resources and thereby increase risks to public health, well-being, security and food.

How are the oceans doing as a carbon sink?

The oceans have so far acted as a buffer for atmospheric climate change impacts. However, as excessive CO₂ from the atmosphere is absorbed by the oceans, they are becoming more acidic. This puts many marine species such as corals and other shell building organisms at risk, and with them the communities and businesses that depend on their services as food providers, commercial products or for coastal protection.

However, the oceans’ function as an effective carbon sink is diminished by climate change itself. Only a fraction of 21st century emissions will continue to be absorbed by the oceans. More specifically, emissions remaining in the atmosphere are projected to increase by 30% to 69% depending on the emission scenario.

Can we use the oceans and coasts to mitigate the impacts of increased GHG emissions?

Yes. Coastal ecosystems such as mangroves, saltmarshes and seagrasses need to be conserved and restored as globally vital carbon sinks. Despite their small size, they sequester and store carbon very efficiently in the sediment below them and thus contribute, alongside other systems such as tropical forests and peatlands, to the overall role of nature in climate change mitigation. The ongoing destruction and loss of these systems only contributes to the effect of additional human-induced GHGs.

Other marine ecosystems and species in the open ocean and deep sea play a significant role in absorbing, moving and storing carbon. Unlike coastal ecosystems, most marine systems and species do not demonstrate globally relevant, long-term climate mitigation potential and in some cases have jurisdictional challenges making the inclusion in national GHG accounting difficult.

A sick ocean is one that loses its capacity to support planetary processes. All international and national policy – from climate to biodiversity – need to be mobi-

lized to sustainably manage our many marine resources and their services.

Can we use the oceans and coasts to help people adapt to the impacts of climate change?

Yes, coastal ecosystems – including coral reefs, oyster beds, and kelp forests provide security by reducing coastal erosion and acting as a natural buffer against coastal storms and wave energy, thus protecting infrastructure and human lives. For example, coastal wetlands in the U.S. were estimated to provide 23.2 billion USD annually in storm protection services.

Sustainably managed marine ecosystems can support fisheries communities and nations adapting to new fishing areas due to moving species. They also help to maintain healthy stocks that have the best chance to cope with the impacts of the “deadly trio” - ocean warming, acidification and deoxygenation.

Do countries consider the nature-based mitigation and adaptation potential of oceans and coasts as part of the UNFCCC?

Countries can now account for the emissions and removals from

coastal ecosystems as part of the forest (for mangroves) and/or wetlands categories under the Land-Use, Land-Use Change and Forestry (LULUCF) sector. While the accounting for coastal wetlands has only been recently provided, several countries such as Indonesia, Ecuador and the United States are actively engaged in various efforts to include coastal wetlands in national GHG inventories or as part of other mitigation mechanisms such as REDD+ or NAMAs. Some technical elements need to be improved, for example, accounting for soil carbon. Overall, there needs to be an expansion of programmes and projects all around the world to stop the ongoing loss of these systems.

Other marine systems may not be included in national accounting schemes if there is limited scientific understanding, if they are not (solely) under national jurisdiction (which makes national accounting impossible under the current setup) or if they are not considered long-term stores. They instead play a vital role as carbon conduits, and their health status is better influenced via other international mechanisms.

Currently the management of marine ecosystems are not recognized

as climate mitigation options under the UNFCCC. Further debate and dialogues are now needed to analyse the usefulness and opportunities to develop an incentive mechanism for the open ocean under the Climate Convention.

What is IUCN doing to ensure oceans and coasts are part of the climate discussions?

IUCN provides scientific and technical advice to governments and other NGOs on the impacts of increased GHG emissions in the atmosphere and oceans and has created a community of practitioners to provide knowledge and guidance on specific issues, such as ocean acidification. IUCN also supports governments and other stakeholders to find suitable solutions for integrating climate change into existing coastal and marine management and resource use plans.

IUCN also informs international and national policy development and financing efforts on climate change and fosters the integration of nature-based solutions around oceans and coasts.

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Ocean Warming

Why we must factor it into climate emission discussions

To the average person climate change may be synonymous with melting glaciers or an increasing likelihood of heat waves, while politicians and climate negotiators may be more consumed by deals related to keeping land surface temperature rises to within 2°C in the 21st century. But there is a danger that by looking at the obvious - and the land - we forget the ocean. This would be a truly staggering omission as it is the ocean that ultimately sustains all of us. Unless we understand, appreciate and embrace the status and role of the global ocean in climate change discussions, there is a real danger that we will try and achieve climate targets that ultimately, even if met, fail us all.

What is clear from science is that the ocean has been our ally through the years. In recent years, scientists have pointed to the fact that it has staved off more rapid climate change impacts by absorbing just over a quarter of our carbon dioxide emissions annually. We also now know that it has been absorbing significant amounts of heat: resulting in ocean warming.

Ocean warming is now one of the biggest challenges alongside ocean acidification. It has profound implications not just for ecosystems but also for communities and economics, given linkages to climate issues such as increased frequency of severe weather events and sea-level rise. Ocean warming is the price we are now paying for the fact that the ocean has been shielding us from more dramatic and faster climate change impacts that would otherwise have resulted

from the continuing excessive emissions of carbon dioxide and other greenhouse gases.

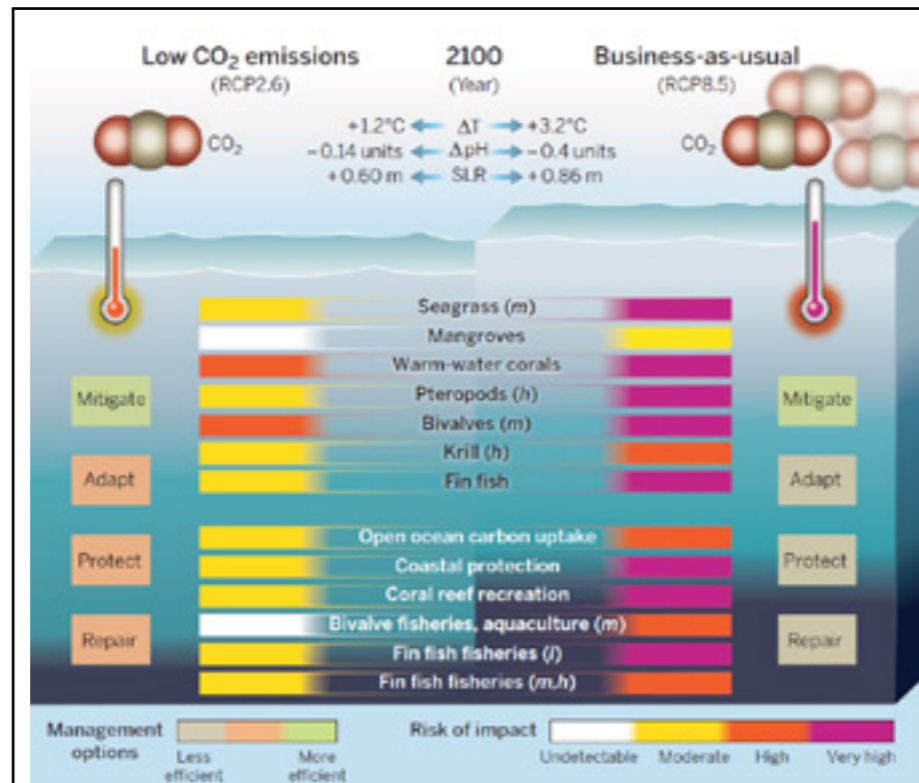
The 2014 IPCC report¹ concluded that 93% of the climate energy has actually accumulated in the ocean in the form of ocean warming. Scientists are virtually certain that the upper ocean warmed from 1971 through to 2010, and it is likely that this started as far back as the 1870s.

Global average sea surface temperatures have increased since the beginning of the 20th Century, and the science around this is 'virtually certain' since the 1950s. The average sea surface temperature of the Indian, Atlantic and Pacific Oceans has increased by 0.65, 0.41 and 0.31°C respectively over the period 1950–2009 (very likely). Some more specific areas have seen rises much greater than this, such as in the Baltic and parts of the Mediterranean where sea surface

temperatures have increased by several degrees centigrade over the same period.

Predictions are that overall the cascade of chemical and biological changes that this helps drive could see coral reefs irreversibly destroyed in 50 to 100 years, with marine ecosystems increasingly taken over by jellyfish and toxic algal blooms. We are already seeing shifts poleward in species of fish, with other effects on mid-latitude seagrass and bivalves, and high-latitude pteropods and krill. In addition, ocean warming may drive changes in growth, toxicity, and distribution of harmful algal blooms that have implications for industries such as coastal tourism, aquaculture and human health.

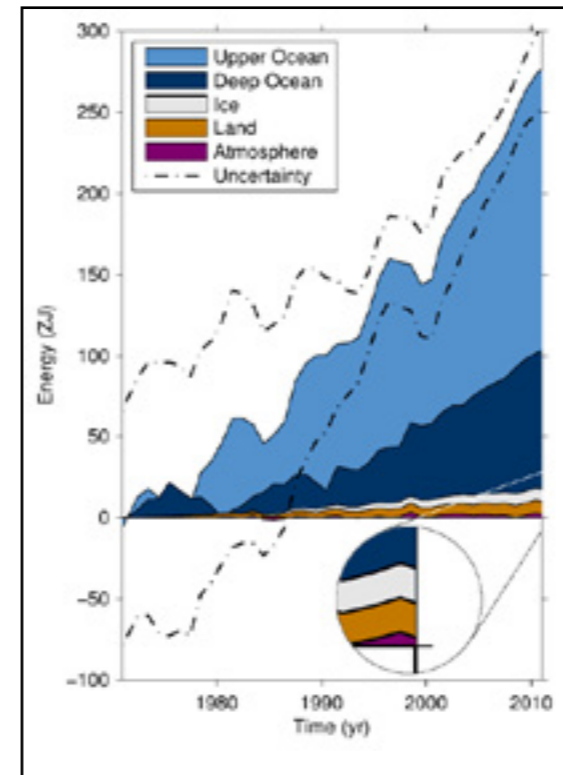
So why is embracing ocean warming and other stressors right now in climate negotiations so important? A recent study



Infographic demonstrating the impact of ocean acidification on marine life © Gattuso et al 2015

¹ <http://www.ipcc.ch/report/ar5/wg1/>

Graph demonstrating the increase in temperature of upper and deep ocean, though the increase in ice, land and atmosphere is moving in smaller increments © Climate Change 2013: The Physical Science Basis, IPCC Working Group 1



support all of us and how and whether they can be sustained in the future.

What are the "take home" messages from all this?

- The ocean really matters and we need to take decisions in light of the 'hidden' impacts our emissions are having, such as ocean warming and acidification;
- Impacts driven by warming and acidification are already observable on ocean ecosystems and species, thus supporting the view that dramatic cuts in emissions are needed;

- Emission reductions are needed to get the ocean back to a better situation. The current level of carbon dioxide in the atmosphere of around 400 ppm is already far too high for ecosystems such as coral reefs, and a 2°C-warmed world would be much worse.
- The conclusion is that if we really care about all our futures, we really need a way to get back to the 320-350 ppm range of carbon dioxide in the atmosphere. To do that we need to implement a low carbon trajectory to emissions (RCP2.6), as well as actually extracting carbon from the atmosphere.

published in Science assessed what warming and acidification may mean for business as usual in the future (RCP8.5) or if we took a dramatic shift towards a lower carbon global economy (RCP2.6)². The study showed that services such as coastal protection and capture fisheries are already affected by ocean warming and acidification.

- Emission reductions that do not ultimately result in 2°C or ideally even less warming this century are predicted to have dramatic and widespread impacts on ocean species, ecosystems and services on which we all depend;

That's why waking up to warming and factoring in the ocean to current discussions becomes such a clear imperative.

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Warming in the Baltic Sea

The Baltic Sea is a microcosm for the effects of warming on the global oceans. It has shown to be warming alarmingly rapidly since the first data was analysed in 1980. The most dramatic data is of a 1.5°C increase between 1871 and 2011 during the spring seasons.

Predictions of different emissions scenarios suggest that ice thickness in the Baltic Sea will continue to decrease. This warming has consequences for the ecosystem structure within the Baltic Sea: in particular, we may expect species movement and a decrease in the level of oxygen in the water. These changes would have a knock-on effect on other parts of the delicate ecosystem.

Another potential consequence is the run-off of nutrients, leading to eutrophication. The warming increases the rate of decomposition of the algae in the Baltic Sea, thereby compounding the problem. Moreover, warming could influence the precipitation and run-off of freshwater from rivers, changing the salinity of seawater and making it difficult for species to adapt. It is not only the Baltic that is facing these issues: other enclosed seas, like the Mediterranean, are also experiencing fast warming – pushing ecosystem species and processes towards their limits.

The recently released Ocean Health Index for 2015 announced that the global ocean score was 70 out of 100. The areas around the Baltic Sea were categorised between 50 and 75, suggesting that adaptation is needed to mitigate this problem, starting with efforts to restrict emissions of greenhouse gases.

The risks not only substantially increase with more emissions, but if a low carbon trajectory is not achieved by decisions at COP21 then all marine ecosystem services studied are put at high or very high risk. This is not just a problem of ocean warming and acidification, as it is exacerbated by continuing human impacts such as over-exploitation of living resources, pollution, and habitat destruction. The longer we wait to significantly reduce emissions the fewer are the options available to adapt, protect and repair, let alone the escalating costs associated with making that happen. This in turn will have a knock-on effect on the ocean services that

² J.-P. Gattuso et al., Science 349, aac4722 (2015). DOI: 10.1126/science.aac4722

Acting on Ocean Acidification: Investing for the future



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Ocean acidification is a growing problem within the marine environment. Though the ocean as a natural carbon sink has helped shield us from the full impact of increased carbon dioxide in the atmosphere, the consequences for the ocean are dire.

The process of ocean acidification occurs when carbon dioxide (CO₂) is released into the atmosphere by man-made processes such as fossil fuel combustion and deforestation. Excess CO₂ is absorbed into sea water and forms carbonic acid, which then results in a change in pH that disrupts the carefully balanced chemistry of the ocean, and compounds the impacts of other ocean stressors like warming, overfishing and pollution. Research has already demonstrated the potential impacts of ocean acidification, which range from reduced survival to slowed growth and decline of marine species. Notably, acidification hampers the ability

of calcifying organisms like coral reefs, pteropods and shellfish to produce calcium carbonate shells or skeletons, leaving these organisms vulnerable to other stressors. The longer this situation continues unregulated, the worse the likely consequences will be. The effects are already being felt in places such as the Oregon and Washington coasts of the USA, where acidification has contributed to a high mortality rate of oyster larvae, threatening an industry worth approximately \$270 million annually for the coastal economy.

How do we mitigate this problem?
The most effective solution to limit further ocean acidification is to reduce the release of future CO₂ into the atmosphere, namely through the commitments of countries to achieve overall national or regional reduction targets. The recently published report 'Acting on Ocean Acidification' sets out seven key recommendations for ocean acidification mitigation alongside and concrete climate targets that may arise from COP21 in Paris,

and that need to be achieved within the next ten years.

Observing and forecasting systems: Investing in observing strategies that cover a wide range of areas and species, especially where ocean acidification threatens to compromise livelihoods, will help policy makers to target responses more effectively. Additionally, investing in better forecasting infrastructure will help scientists to stay a step ahead of developments in ocean acidification.

Assessing impacts on coastal zones: With the help of the aforementioned forecasting systems, priority will be given to coastal zones where ocean acidification is likely to elevate risk and/or cause impacts, where a more immediate policy response is required.

Linkages to human and ecosystem health and well-being: Another important tool to combat ocean acidification is research. Improved information

sharing between the ocean-observing communities, either through data sharing or improved data management models, would help to increase our knowledge on the impacts of ocean acidification on human well-being and ecosystems, and help bring together science and policy. Expanding the knowledge base helps policy makers create up-to-date plans that reflect the action needed to slow this problem. In particular, the Global Ocean Acidification Observing Network (GOA-ON), established in 2013, is a tool that provides context to the situation of ocean acidification and aims to escalate information sharing to better create solutions.

Generating risk awareness: A risk-aware public is one that understands how ocean acidification will affect their own local community. Understanding the impacts will likely create a public that puts pressure on their policy-makers to make effective change, as well as understands how to adapt and manage the impacts of ocean acidification. An essential part of this, according to the report, is decoding complex scientific information into easily digestible information for the public.

Scientific coordination and cooperation: The report recommends expanding the zone of cooperation to involve seafood producers, mariners, coastal planners, governments, and any

other relevant stakeholders to widen the support base and increase the effectiveness of any plan to combat ocean acidification.

Political leadership: Finally, strong political will is needed to inspire global action and encourage cooperation between countries. What is clear is that ocean acidification is a problem that touches all nations – even land-locked ones – that contribute to the release of carbon dioxide into the atmosphere. This issue can therefore only be effectively managed on a scale that also involves problem-solving for other ocean stressors, as previously noted, such as eutrophication and deoxygenation. This problem requires dedicated leadership, investment and information to create concrete changes for the future.

This article draws from the report "Acting on Ocean Acidification:

improving prospects by planning ahead", authored by Dan Laffoley and John Baxter. The report can be found online at <https://www.iaea.org/ocean-acidification/act3/new%20RUG%20docs/aooa.web.pdf>

For more information, please contact Dan Laffoley (danlaffoley@btinternet.com) or John Baxter (j.baxter4@btinternet.com).

Ocean Acidification in Numbers

- 4** The number in kg of CO₂ per day on average that is taken up by the ocean from each person's activities
- 30** Percentage increase in acidity (as concentration of H⁺ ions) caused by CO₂ pollution since the Industrial Revolution
- 400** The level of CO₂ in the atmosphere in May 2015 measured in parts per million by the Mauna Loa observatory in Hawaii
- 936** The level of CO₂ projected to be in the atmosphere by 2100 on a "business-as-usual" scenario (i.e. RCP 8.5)

Plastic pollution

Continuing the fight against a pervasive problem



Microplastics are becoming a pervasive problem in the marine environment. They can enter the marine environment in different ways: either through the breakdown of larger plastic items through exposure and embrittlement, or through accidental introduction, for example of plastic resin pellets via shipping spillages. These microplastics can pose a problem by bioaccumulating up the food chain, potentially affecting human health through our own consumption of fish, but they also absorb harmful chemicals like Persistent Organic Pollutants (POPs) and therefore can bear high levels of toxicity. The IUCN has been working on this problem through a number of projects.

Azores Plastic Project

The IUCN has been working on the issue of microplastics since 2011. A recent report, entitled "Plastic Debris in the Ocean: The Characterization of Marine Plastics and their Environmental Impacts" outlined the current status of marine plastics, sampling and data collection techniques, the impacts of these plastics on the marine environment, existing legislation on marine plastics as well as making a series of recommendations to manage this problem.

Now, IUCN seeks to get a clearer picture of microplastics in the Azores, an autonomous region off the coast of Portugal. With financial support from the Gallifrey Foundation, IUCN has expanded research in this region, identifying the best scientists to establish a baseline on marine litter in the Azores with two research grants. Further development and collaboration will include research counterparts to study how birds, fish and turtles are impacted by the rising level of microplastics in this region.

Workshops help to complement the research done in the field to find achievable targets to reduce marine pollution. A recent workshop last June in Azores entitled "Towards a Solution for Marine Litter" involved governments, recycling industries, and representatives from academia to host an open discussion about future solutions on this problem.

Is the Mediterranean a plastic gyre?

The Mediterranean basin receives waters from densely populated river catchments (Nile, Rhone, Ebro and Po), with a water residence time of up to a century. It is connected to the Atlantic Ocean through the Strait of Gibraltar in the west, to the Sea of Marmara and the Black Sea, in the east. The Suez Canal connects it to the Red Sea.

While the less salty water from the North Atlantic Ocean inflows into the Mediterranean, the salty bottom layer outflows into the Atlantic Ocean. Since evaporation from the warm weather in the region greatly exceeds precipitation and river runoff into the Mediterranean Sea, there is an imbalance in the movement of water. This means that the plastic input, coupled with limited export of water to the Atlantic Ocean, results in the accumulation of plastics in the Mediterranean.

The average density of plastic in the Mediterranean Sea, as well as its frequency of occurrence, are comparable to the accumulation zones described for the five plastic ocean gyres, though the dispersion effect observed in all the 5 gyres in the open oceans has not been similarly observed in the Mediterranean.

This suggests that the cumulative effects of plastic in the Mediterranean Sea will build up exponentially if nothing is done to remedy the situation.

Race for Water

In March 2015, the Race for Water Foundation launched a 300-day scientific voyage to explore and analyze the world's five trash vortices. Trash vortices are immense zones where concentrations of trash are particularly high because of marine currents. Locating and mapping these vortices is extremely difficult. The Race for Water Odyssey (R4WO) team relied on specimen collection (NOAA protocol) and drones (to map shorelines and identify macro debris) to draw a first global report on marine litter with comparative data in all of the trash vortices.

The crew made 11 scientific stops (17 in total) and focused on islands located near the gyres, because they serve as natural barriers and retain the debris that the currents carry.

R4WO mapped and collected data from beaches in the Atlantic (the

Azores and the Bermudas) and in the Pacific (Easter Island, Hawaii, Guam and Palau). The teams worked in collaboration with local associations to complete an overview of the ways waste is managed on-site and to better understand the impact of this pollution on local populations.

While heading to the Indian Ocean for stopovers on Chagos (UK) and Rodrigues (Mauritius), the vessel capsized due to a gush of wind during night sailing. The Odyssey continued without the boat, traveling to all intended spots while still collecting plastic samples from the sites.

The expedition aimed to raise interest in the marine litter issue among the public, the authorities and younger generations. After Bordeaux, New York, Valparaiso, Hawaii, Tokyo and Shanghai, the expedition will still stop in Cape Town and Rio de Janeiro before coming

back to Bordeaux. IUCN supported the Race for Water Foundation by studying the negative environmental, social and economic impacts of plastic litter in the oceans and by providing logistic support where it was needed.

A pilot project to transform waste is planned for 2016. Pilot projects in the form of cooperatives will be established in 2016 following an initial phase in 2015 that identified and assessed solutions. The objective is to give plastic a value through an innovative technology that transforms plastic into energy. The result will be a virtuous circular economy that will give new life to old matter. This approach, based on social entrepreneurship, will create jobs, particularly for the underprivileged. The process of energy production will also have substantial environmental benefits by significantly reducing plastic pollution. The successful pilot cooperatives will then be replicated to multiply their positive impact.

Close the Plastic Tap

As evidenced by recent scientific research, there is an urgent need to increase public awareness about the adverse effects of plastic pollution on marine organisms, to foster a sense of individual responsibility and to encourage government action and private voluntary initiatives for a reduction of the most severe impacts.

Last year, IUCN received a grant from the Swedish Postcode Lottery Foundation to take further action on this problem. Following on from the recent analysis report "Plastic Debris in the Ocean", IUCN established a stakeholder platform and coalition of actors from the private sector, governments and NGOs to discuss and develop best practice solutions to address plastic and microplastic marine pollution.

The kick-off meeting was held in Monaco in November 2015, and helped to create an open discussion on solutions for this problem in the marine environment.

For more information, please contact Joao Sousa (joao.sousa@iucn.org).



© Christophe Launay / Race for Water

Blue Solutions

Sharing lessons learned on marine protection



Next Steps on Blue Carbon

Mitigating climate change by restoring coastal marine ecosystems

Marine and coastal biodiversity and ecosystems are fundamental to human well-being. They provide valuable services such as food, medicine, climate regulation and coastal protection, as well as recreational and spiritual benefits. Despite their global significance, these ecosystems are now more than ever at risk of being degraded or even lost.

To help ensure the conservation and sustainable use of marine and coastal resources, the Blue Solutions Initiative was launched as a collaborative project funded by the German Ministry for Environment (BMUB) and implemented by GIZ and its partners, including IUCN, UNEP and GRID-Arendal. The Global Marine and Polar Programme (GMPP) is supporting the IUCN Global Protected Areas Programme by implementing IUCN's component of this initiative.

Blue Solutions highlighted some best practices at the IUCN World Parks Congress Ocean+ Pavilion in Sydney (November 2014). Solution providers from the world over were invited to share lessons learned in the management of marine protected areas. These solutions were selected based on their measurable impact, their ability to be replicated, and their demonstrated ability to improve livelihoods.

Despite the ocean being the blue heart of the planet, marine protection has lagged behind conservation on land. Thus, at the WPC, marine protection was a "visible" topic that

gathered much attention. The Congress called for a "fresh global understanding and respect for the ocean's role in sustaining human life," with a strong emphasis on the increase of no-take marine protected areas, and a commitment to creating a global network of marine protected areas that will connect ecosystems from the shorelines to the high seas, allowing marine life to recover and thrive.

In April 2015, the Blue Solutions Initiative convened its second Regional Forum on Solutions for Oceans, Coasts and Human Well-Being. Held in Cancun, Mexico, the forum welcomed more than 110 participants from Latin America and the wider Caribbean Region. Over the course of three days, inspiring blue solutions were presented and discussed. Presentations on marine spatial planning, sustainable finance, climate change adaptation and disaster risk reduction focused on what worked, why and how. The participants learned about the various elements, referred to as building blocks, which ex-

plained each project's success story. In a participatory exercise, the participants were then asked to re-use and adapt those building blocks to find solutions to new challenges.

The Regional Forum was supported by the Mexican Government's Environment Ministry (SEMARNAT) and Protected Area agency (CONANP). It was organised in collaboration with the Convention of Biological Diversity (CBD) and its Sustainable Ocean Initiative (SOI).

CALL FOR BLUE SOLUTIONS

Dear friends of the coastal and marine world,

We would like to invite you to share "blue solutions" to be presented at the Regional Forum on Solutions for Oceans, Coasts and Human Wellbeing in Africa organized by the Blue Solutions Initiative. The Forum will take place in **Zanzibar, Tanzania in early June 2016**.

Blue Solutions are successfully implemented initiatives, projects, processes, methods or tools, related to marine and coastal planning, management and governance for sustainable development. They can fall into one of the Blue Solutions Initiative's focal areas (marine and coastal spatial planning and management, marine protected areas, ecosystem services, climate change adaptation and mitigation, sustainable finance), or address related issues such as sustainable fisheries, tourism, marine litter, educational or capacity development measures, etc.

To submit a solution, you can directly fill in the Blue Solutions template, in either English or French, available on the Blue Solutions website (<http://bluesolutions.info/africaforum/>), or contact us.

If submitted by 30th November, your Blue Solution will be considered for presentation at the Regional Forum.

As part of the Blue Carbon Initiative and the GEF Blue Forests project, IUCN and Conservation International Ecuador convened an international policy workshop on Blue Carbon (BC) in Guayaquil, Ecuador in June.

Around 50 participants from around the world joined the discussion in Guayaquil and shared lessons learned from national- and project-level implementation efforts on Blue Carbon. There was a focus on the evaluation of the applicability and specific relevance of the range of existing, and potentially new, financing mechanisms as tools for supporting coastal blue carbon conservation and restoration. These include incentive mechanisms like NAMAs (Nationally Appropriate Mitigation Actions) or national initiatives such as Ecuador's Socio Manglar or Debt-for-Nature Swaps.

Inserting mangroves into REDD+ national programs was one of the potential solutions discussed. Indonesia has already advanced with important steps in this

regard; however, there is a need to improve the accounting for soil carbon in coastal ecosystems so as to value the real potential of mangroves in result-based mechanisms. Special attention was given to the formulation and review of policies in order to optimize the multiple benefits of BC activities. Participants sought synergies between mitigation and adaptation approaches as a key step for supporting BC implementation and financing.

Although many advances have been made in the last few years, there are still many challenges associated with unlocking the values of coastal carbon and ecosystem services and converting them into options for improved ecosystem management revenue. By combining research, policy development, technical advice and practical tools, as well as small-scale interventions (SSIs), the four-year GEF "Blue Forests" project aims to demonstrate how incorporating carbon and other ecosystem services values into local and national financial markets and coastal management plans can

ensure the long-term protection of these ecosystems. The project is being executed by United Nations Environment Programme (UNEP), and implemented by GRID-Arendal. IUCN is one of the several project partners and leading the policy development process.

The Blue Carbon Initiative (BCI) is the first integrated programme with a comprehensive and coordinated global agenda focused on mitigating climate change through the conservation and restoration of coastal marine ecosystems.

A recent workshop of the International Blue Carbon Scientific Working Group (Sept 2015, Tanzania) further deepened the scientific and technical understanding of carbon in coastal ecosystems, debated the best means to overcome scientific challenges (including monitoring) and fostered partnerships with regional experts.

For more information, please contact Dorothee Herr (dorothee.herr@iucn.org).

Community based conservation in Vamizi Island, Mozambique

If you want to go far, go together

More and more, Marine Protected Areas (MPAs) have been established to preserve and protect marine environments. Since 1990, the number of MPAs has increased by 58%, with a 48% increase in the extent of existing MPAs (Silva et al 2015). The Vamizi Community Sanctuary (CS) is located on the western side of the Vamizi Island, covering an area of about 10,000 hectares of reefs, mangroves, sand flats and deeper waters, and extending 3 miles out to sea. It is one of the most successful examples of a community-managed protected area in East Africa – despite having existed for less than 10 years,

it has many measurable benefits.

In the early stages of the Vamizi Conservation Project, an awareness of the concept of sustainability amongst resident fishermen was evident, as they understood that fisheries could sustain them if they only extracted what they needed for subsistence. The same could not be said of the migrant fishermen, who did not consider this issue as relevant for their livelihoods. With the increased immigration on the island and the introduction of unsustainable fishing methods, a significant decline in fish catch was noticed. Concerned about the future and

sustainability of their resources, the resident fishermen turned to the Vamizi Island Conservation Project for support in regaining control over access to their marine resources. In 2003, the government of Mozambique introduced legislation to create Community Councils for Fisheries (Concelhos Comunitários de Pesca – CCPs) as an attempt to decentralise authority and empower local communities to manage their marine resources. Under this framework, a CCP was created in Vamizi that same year. One of their first initiatives was to create a Community Sanctuary (CS) that would allow for fish stocks to

recover and in time ensure the sustainability of such important resources, allowing the local communities to use them as they had done for centuries. The CS of Vamizi was officially declared in October 2006 as a no fishing-zone, in collaboration with the Institute for Small Scale Fisheries (IDPPE), the district authorities and the Vamizi Conservation Project. The sanctuary is managed by the CCP in collaboration with the local communities, and with logistical and financial support from the Conservation Project.

Flora and Fauna inside the CS

The Vamizi Community Sanctuary is composed of a group of different ecosystems - from coral reefs to sand flats and mangrove areas. The reefs are composed of about 180 species of reef-building coral (identified to date), which provide homes and feeding grounds to over 300 species of fish, humpback whales, 8 species of dolphins, as well as some endangered species like green and hawksbill turtles. There are also 8

species of mangroves, which provide important nursing areas to several species of fish.

Challenges in setting up the CS

Getting a community that has been relying on fisheries for centuries to give up a large area of fishing grounds can be a challenging task. However, because the initiative to create the protected area came from the local community themselves, and because they are the ones in charge of managing and protecting it, better results are seen than in other places.

However, the news of the increasing amount of fish seen in the waters inside and surrounding the community sanctuary soon spread to nearby villages, other provinces and even Tanzania, which has led to greater numbers of migrant fishermen seen on the island in recent years. These fishermen are harder to manage, as they have no real investment in the sustainability of the marine resources they are removing from the water, and because they bring improved and more destructive fishing gear. A lot of work is done to ensure that as the migrant fishermen arrive on the island, they are informed of the sanctuary and the rules related to fishing around the island.

The sound conservation and management of an area and the sustainable use of resources requires more than just scientific analysis. The success of such management will depend of the level of involvement and empowerment of local communities in all areas, from data collection to decision making and monitoring.

Benefits of the CS

One of the immediate benefits of creating the CS was the empowerment of the local communities, allowing them to manage their own fishing grounds and have a significant impact on the sustainability and conservation of such important resources. They are in charge of handing out fishing licences and educating the fishermen on protected species and banned fishing gear, which can have a direct impact on the way the resources are used and perceived.

Fish stocks and community structure of the reefs around Vamizi have been monitored since 2004, 3 years before the creation of the CS, which has allowed us to measure the direct benefits of the protected area over time. A recently-published paper by Silva et al (2015) has shown the existence of a significant and consistent effect on the abundance and distribution of reef fishes of the Vamizi CS. Six years after its establishment, both herbivorous and piscivorous fish are more abundant inside the reserve than outside, where no difference existed before the closure.

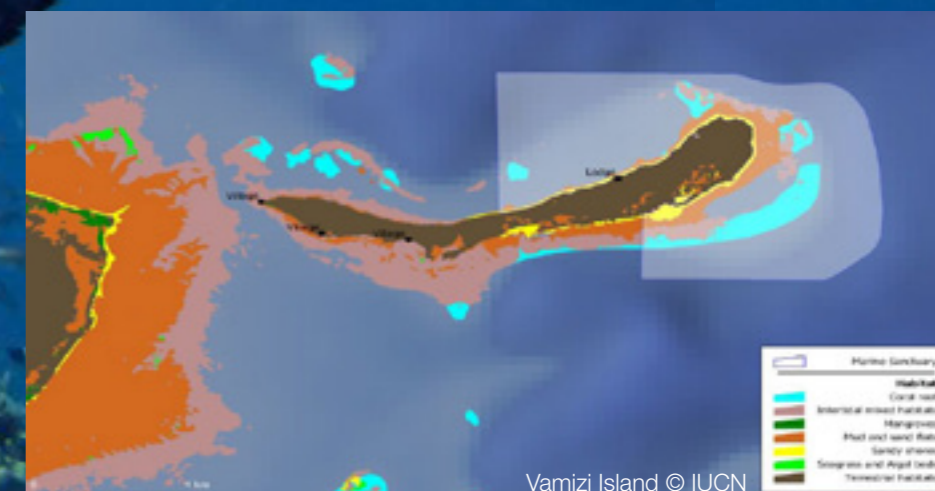
Additionally, spillover effects were detected for herbivorous fish, meaning the abundance of these species has increased outside of the sanctuary. Most importantly, fish abundance outside the sanctuary has not decreased in relation to its abundance prior to the reserve establishment, despite the pressure

of fisheries. Good numbers of herbivores are a sign of reef resilience to climate change.

In the context of MPAs, protection and recovery of herbivorous fishes is of major importance to the conservation and recovery of coral cover and health. Another important finding is that despite the existence of what is called “fishing the line” (when fishermen fish right on top of the border of the sanctuary), the spillover effect was detected in a distance over 1km from the border, which contrasts with experiences in other areas with similar closures, where the spillover effect can be traced to only 200-300m instead (Silva et al 2015). Moreover, the study seems to show that a homogeneous habitat around the reserve can enhance spillover, which highlights the need to protect the reef as a whole in order to allow for this recovery to continue and reach areas further from the border of the CS.

Most of the controversy surrounding MPAs concerns the benefits to fisheries, and to local communities, who rely so deeply on them. Vamizi seems to be a good example of a community managed Marine Protected Area that has shown the potential to benefit both the conservation of one of the most pristine reefs in the world, and those same communities whose livelihoods depend on it.

For more information, please contact Joana Trindade (joana.trindade@vamizi.com).



The Maldives

A hotspot of biodiversity under the threat of a changing climate

An exciting scientific expedition was recently undertaken in the Maldives, a globally unique biodiversity hotspot. Dr. Ameer Abdulla introduces the research expedition and some of the work that was undertaken.

We want to share with you a unique adventure that was undertaken this year in the Maldives; an exciting collaboration with a number of national and international research partners to study the fauna of the Atolls of the Maldives. The aim of this expedition was to lead a multi-disciplinary research team to one of the most scientifically exciting areas of the world; the Laccadives-Maldives-Chagos Ridge in the geographical centre of the Indian Ocean (see Figure 1). The Ridge is also known as the Chagos-Laccadive Plateau and comprises a 2,550 km long and 200 km wide set of features formed by the Reunion Hotspot 60-45 million years ago.

Given its location and geomorphology, the Chagos-Laccadive Ridge represents a globally unique biogeographic province (see Figure 2). This has raised an intense scientific interest in the Maldives over the past centuries, with a number of research missions launched to study the archipelago. The history of scientific expeditions can be tracked down to Robert Moresby (1835) who, after navigating and travelling the Red Sea with the East India Company, ventured into the Indian Ocean in the 1820s and 1830s to create a path through the Maldives Archipelago allowing steam vessels heading from Europe to South and East Asia to have a safe passage through the extensive system of coral reefs, islands, and sandbars.

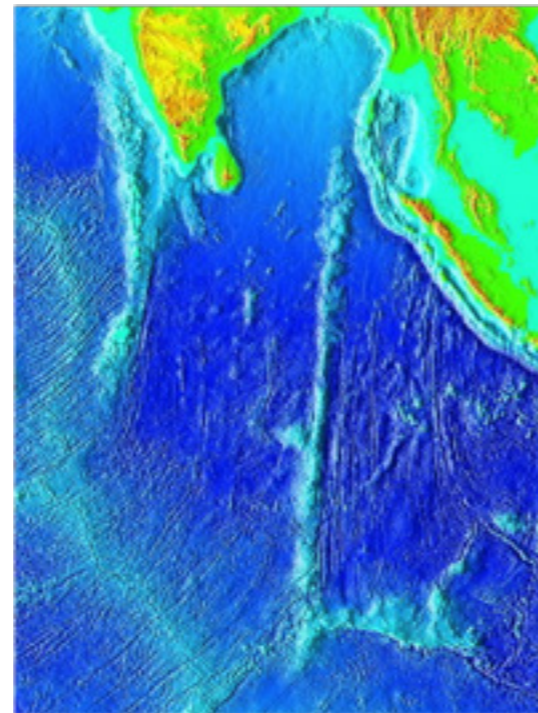


Figure 1. The Ninety East Ridge can be seen roughly in the centre of this image while the Chagos-Laccadive Ridge is on the upper left.

The aim of the 2015 expedition jointly organized by the Maldives Marine Research Center, the University of Queensland, Catlin Seaview Survey and IUCN was to

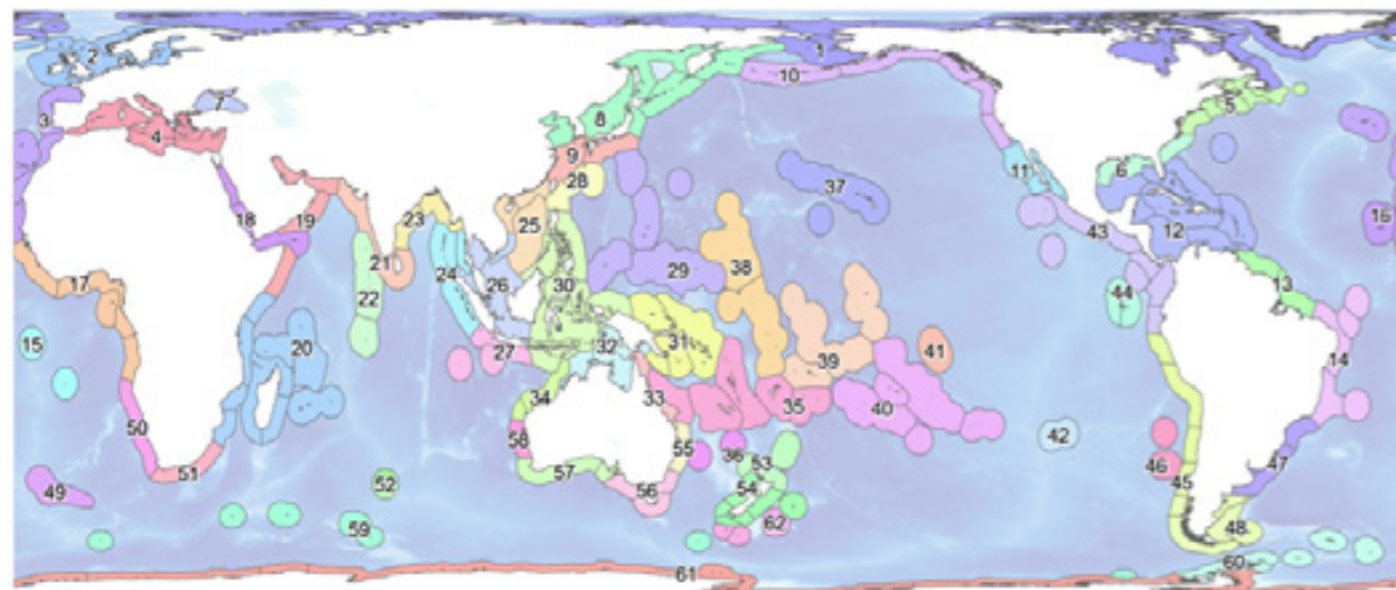


Figure 2. The sixty-two nearshore and continental biogeographic provinces of the world according to the MEOW classification (Spalding et al. 2007, map adapted from Abdulla et al. 2013). The Chagos-Maldives-Laccadive archipelago is labeled 22 and represents a globally unique biogeographic province that has attracted scientific interest since the 1800s.

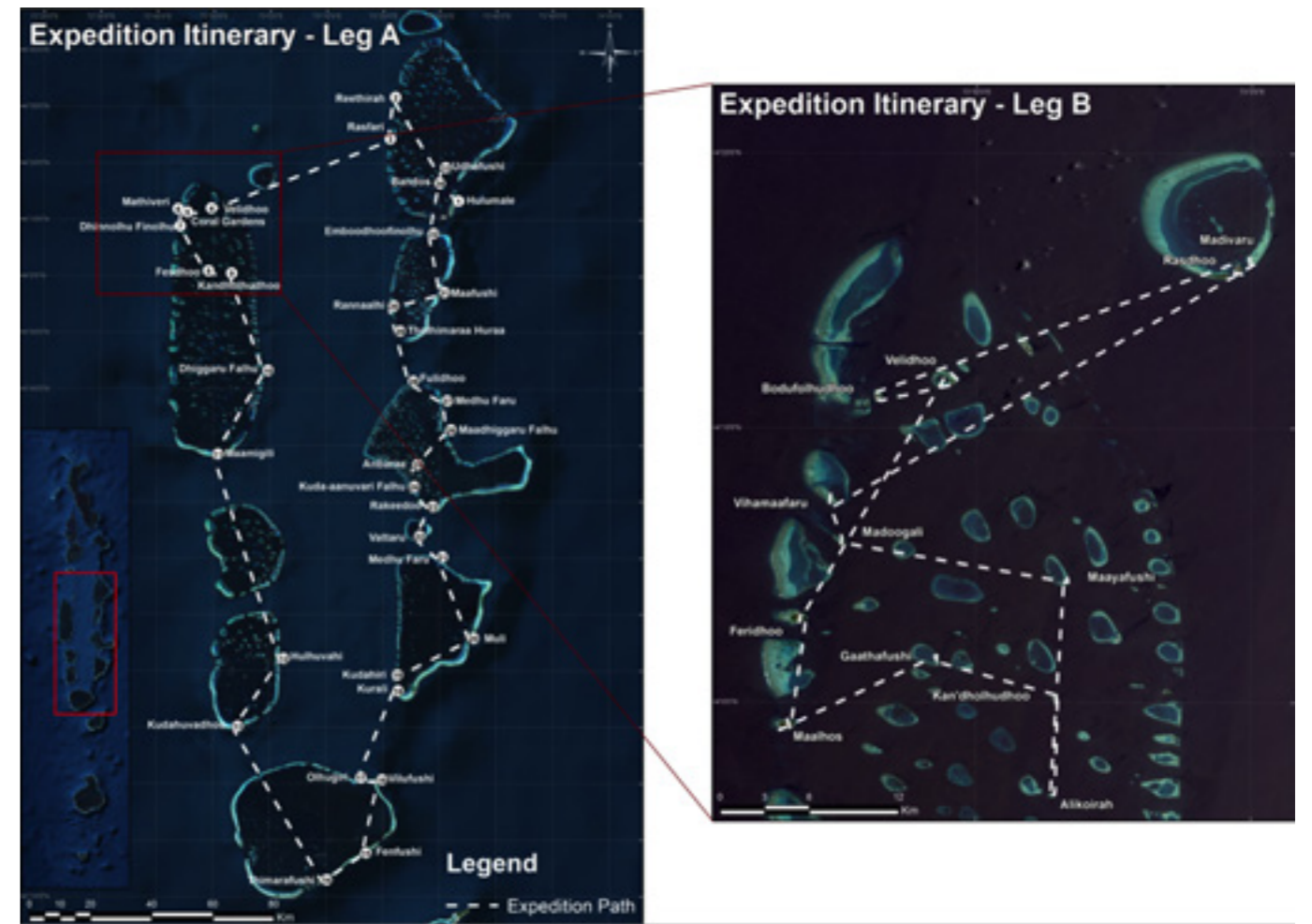


Figure 3. The maps present the itinerary of the 2015 expedition which surveyed 8 atolls over a 5-week period. The expedition collected data from 44 islands representing community, resort, and uninhabited islands.

provide a baseline on the status of coral reefs, their characteristics and health, and to identify the presence of different morphological groups i.e. branching, plating, foliose species, and functional types. Information collected also refers to interactions between corals and algae, fish abundance and diversity, and the relationships among reefs across varying gradients of human influence (low vs. high) and development (inhabited vs. uninhabited) between and within atolls.

The results of the 2015 expedition will be used to support marine management efforts in the Maldives and to assess the risks that coral reef ecosystems are facing from increasing anthropogenic influences and a changing climate. The overarching goal is to provide wide-ranging expertise and insights into the potential drivers of coral reef decline as related to human activities in the Maldives. To this end, eight atolls

have been surveyed to investigate habitat conditions and composition, and fish community structures and productivity in Maldivian atolls (see Figure 3). As part of the survey, the team collected information on coral populations, diseases and bleaching, bottom dwelling communities and their composition, fish and protist populations – each giving information on a different aspect of coral reef health. In addition to the lead institutions, the expedition was joined by marine scientists from the Scripps Institute of Oceanography, CRILOBE, the French Natural History Museum, and the University of Fribourg and generously funded by the Catlin Seaview Survey and the United States Agency for International Development.

In the following articles, some members of the research team tells us about the Maldives 2015 expedition's research, method-

ologies and preliminary results. Gabriel Grimsditch elaborates on the definition of resilience in the context of coral reef ecosystems, and tells us about the work being done undertaken by IUCN and partners in improving coral reef resilience in the Maldives. Ulrike Siebeck presents the role of fish populations on the reef and how to survey coral reef fish communities using classical and novel techniques. Michael Sweet explains what exactly happens when corals bleach. Last but not least Ahmed Basheer provides an inspiring account about the first time he was exposed to marine science and how he quickly switched to being an avid citizen scientist on his way to becoming a marine conservation biologist.

For more information, please contact Ameer Abdulla (ameer.abdulla@iucn.org).

Resilience and Coral Reefs

© IUCN Maldives

Resilience is a powerful word. It encapsulates that quality that allows us to bounce back from difficult times, to survive, and to thrive. Without resilience, we would succumb to our injuries and struggle to carry on. But a resilient individual, or a resilient society, can overcome the challenges thrown at them.

A definition of resilience is often quoted as 'the ability of biological or social systems to overcome pressures and stresses by maintaining key functions through resisting or adapting to change'. This rather dry definition touches upon some important concepts: pressures and stresses, key functions, change, and adaptation – all important in understanding how we can maintain the resilience of the very ecosystems upon which we depend for our own survival.

Coral reefs are resilient yet delicate systems. They have persisted and thrived for millions of years, creating structures large enough to be observed from outer space, and yet their basic component is the humble coral polyp. They have survived changes in climate and sea level in the past; but today they are facing one of their greatest challenges – the 'anthropocene'; an environment dominated by human activity.

Since 1950, 19% of the world's coral reefs have effectively been lost due to bleaching events, destructive fishing, overfishing, nutrient and sediment overload, pollution, coastal development and increased hurricane activity. Some of these pressures are

short, acute bursts of mortality, for example, bleaching events or hurricanes; while other pressures such as overfishing, nutrients overload or pollution tend to be more long-term chronic causes of mortality that erode the resilience of a coral reef over time. Like all systems, coral reefs can bounce back from the acute, sharp pressures if they are in a healthy state. If a coral reef is free from nutrient overload and overfishing, and has healthy populations of fish with good water quality, the chances that it can recover from a bleaching event are higher. Managing the chronic long-term stresses can give the coral reef a better chance of long-term survival.

In the case of the Maldives, the survival of coral reefs is key to the survival of the nation. IUCN is therefore working with local communities, the government and the private sector to understand what factors are driving coral reef resilience and degradation in North Ari – the Project REGENERATE demonstration atoll – and how to address them. Coral reefs are complex systems, so this involves gaining an understanding of many interacting components. Scientific ecological surveys capture information about coral communities, fish populations and substrate dynamics. We can learn how different components of the reef are linked, i.e. how the functionally important herbivorous fish or coralline algae can help to create suitable conditions for coral growth. Herbivores such as the parrotfish and surgeonfish are key in keeping algal growth down and therefore giving space for corals to grow, and coralline algae are key

in consolidating the substrate and making it firm enough for corals to settle and grow. This is one component of resilience.

Understanding the ecology of the reef is nevertheless only half of the story. It is equally important to understand how humans interact with the reef – fishing habits; where and how many nutrients enter the water; tourism activities; which islands are being reclaimed and so on. In addition, understanding how temperatures are changing in the water around the reef, and how they have caused bleaching events in the past and potentially in the future is also key to understanding where the most vulnerable areas are. Together, the ecology, the human impacts and the physical environment can tell us a story about which parts of the coral reef we need to be worried about and which we must pay most attention to. Mapping these factors can allow us to identify vulnerable areas, and to develop interventions to protect them. Activities in certain crucial parts of the reef could then be managed to reduce pressure and allow for recovery.

We know that the coral reef system is not a static environment: it is ever-changing. By identifying and monitoring key functions and key threats, we can devise plans and management interventions to give it the best chance to adapt to changes and remain healthy for the benefit of all.

For more information, please contact Gabriel Grimsditch (gabriel.grimsditch@iucn.org).

CORAL REEF RESILIENCE IN THE MALDIVES

CORAL REEFS

SOME OF THE MOST DIVERSE ECOSYSTEMS ON EARTH

<0.1%
OCCUPY LESS THAN 0.1% OF THE WORLD'S OCEAN SURFACE

GROW BEST IN WARM, SHALLOW, CLEAR WATER

25% OF ALL MARINE SPECIES

MALDIVES CONTAINS

~4,513 ±225 KM²
OF CORAL REEFS

3.14%
OF THE WORLD'S TOTAL

(Waseer & Hatcher 2004)

GLOBAL STATUS

19% LOSS OF CORAL REEF AREA SINCE 1950

15% UNDER CRITICAL STATE WITH POTENTIAL LOSS IN 10 - 20 YEARS

20% UNDER SERIOUS THREAT WITH POTENTIAL LOSS IN 20 - 40 YEARS

46% HEALTHY & UNDER LITTLE STRESS EXCEPT GLOBAL CLIMATE THREATS

(Wilkinson 2008)

RESILIENCE CAPACITY OF AN ECOSYSTEM TO WITHSTAND SHOCKS AND IMPACTS AND TO RECOVER FROM THEM

TWO COMPONENTS OF ECOLOGICAL RESILIENCE:

- RESISTANCE, I.E. TOLERANCE AND SENSITIVITY
- RECOVERY, I.E. ABILITY TO GROW BACK FROM DISTURBANCE

FACTORS AFFECTING RESILIENCE

HERBIVORY
Herbivorous fish control algal overgrowth

CORAL RECRUITMENT
Juvenile corals are the new generations

SUBSTRATE QUALITY
Stable substrate for new coral larvae to settle and grow

HIGHER WATER QUALITY
Nutrients and pollution increase algal overgrowth

BIODIVERSITY
More species performing ecological functions = Higher resilience

REFUGES
Habitat diversity = More areas to reseed

ANTHROPOGENIC PRESSURES
Lower disturbance = Higher resilience

THREATS

PULSE TYPE (ACUTE) STRESSORS:

- Cause high mortality of corals in a short time
- Include: storms, tsunamis, bleaching events caused by high sea surface temperatures, crown-of-thorns starfish outbreaks, destructive fishing

PRESS TYPE (CHRONIC) STRESSORS:

- Degrade coral reef health slowly
- Erode coral reef resilience, lower capacity to recover
- Include: pollution, sedimentation, coastal development, nutrient input, over-fishing, ocean warming, ocean acidification

MANAGING FOR RESILIENCE

- REDUCING PRESSURES AND EXPOSURES TO STRESS
- SUPPORTING THE SYSTEM'S RESILIENCE TO THESE THREATS

- Silt screens to protect against sand pumping / construction work
- Sewage Treatment Plant (STP) with effluent pipe extending beyond the bottom of the reef slope
- Moor buoys to reduce anchor damage
- Zoning of activities that might damage the reef
- Management of fisheries with minimum catch sizes and no use of destructive gear

SPATIAL MANAGEMENT OF CORAL REEFS CAN BOOST RESILIENCE

NO-TAKE ZONES
Critical areas where no fishing is allowed

BUFFER ZONES
Restricted multiple use areas

MULTIPLE-USE ZONES
All legal activities are permitted

1998 Bleaching and Coral Reef Resilience in Maldives

Pre 1998 coral cover around 60%

1998 bleaching event. Coral cover down to <math>< 10\%</math>

2010 bleaching event

Coral cover recovery has been good but patchy and is still vulnerable

(Adapted from Meek et al 2015 - approximated data)

Assessing Maldivian Fish Populations



© Seaview

Coral bleaching: a worrying phenomenon



Bleached Acropora, © IUCN Maldives

It seems hard to believe that we counted a total of 22,668 fish belonging to 224 species during our expedition to the Maldives. We visited 20 sites, swam 6 km (defying almost all currents) and deployed 5 km of transect tape as part of Leg A of the expedition.

Our mission was to assess fish diversity, abundance and biomass in the Maldives, based on traditional belt transect survey techniques. At each site, we marked the area we assessed with transect tapes so that the camera survey team could swim over the exact same area. Results of our underwater measurements will be compared with fish data extracted from our images. We hope to help establish the XL Catlin Seaview Survey as a novel and fast way of conducting fish surveys.

During our time in the field, we had the opportunity to work

with IUCN as well as the Maldives Marine Research Centre (MRC). We learned that the local reef fisheries mostly target groupers as well as small fish, such as some triggerfish and fusiliers, which are used as bait fish for the tuna fishery. We certainly noticed the general lack of large groupers at our survey sites and it remains to be determined whether baitfish numbers are also diminished in more heavily targeted areas and/or over time. We visited several MRC long-term monitoring sites and plan to work with the MRC to compare our data with those collected in the past.

While the field trip is completed, more exciting work lies ahead of us. Analysis of our data will show if there is a difference between sites heavily influenced by humans (land reclamation, population size, known fishing practices, etc.) and sites that are more removed from such influences.

We will then be able to combine data collected by all XL Catlin Seaview Survey teams to create a comprehensive picture of the present condition of Maldivian reefs along this gradient of human influences. Ultimately, we hope that through working with MRC and IUCN, our data will contribute to the planning and improvement of local conservation efforts to preserve these beautiful reefs for the future.

Dr Ulrike Siebeck
Senior Research Fellow,
University Of Queensland, XL
Catlin Seaview Survey.

What exactly do we mean when we say a coral is bleached? Most corals, which build up the reefs we know and love, have a symbiotic relationship with microscopic algae. The algae get energy from the sun (like most plants) and share their energy with the coral.

Interestingly, unlike most organisms, corals and their algal counterpart live on the edge of their tolerance with regard to thermal temperatures. Therefore, any fluctuations in this usually stable environment will lead to the coral becoming stressed, often resulting in bleaching. Simply put, corals bleach when they lose their symbiotic algae. Corals have been shown to bleach due to increase in sea surface temperature (SST), decrease in SST, increase in sedimentation, increase in nutrients or even the presence of specific bacteria, as some researchers have proposed.

During a bleaching event, the colony is in a stressed state and needs a little time to recover. The

chances are that the coral will be fine as long as the stressors in the environment are removed, allowing the coral to become healthy once again. However, the corals cannot help themselves to get over this stressed state. Furthermore, when the corals are in this bleached state, they have to rely on feeding (i.e. using their tentacles to acquire the tiny particles (plankton) floating in the water column).

There are other impacts to coral bleaching. For example, as the corals have lost their algae partner in the bleaching process, they no longer receive solar energy. Growth is significantly reduced, reproduction is put on hold and the coral is more vulnerable to attack from opportunistic pathogens.

To defend themselves, the corals have two main strategies: their stinging cells (usually used to catch prey but that can also give a nasty sting), and their surface mucus layer, initially produced when corals are bleached. This surface mucus layer has often

been categorised as the 'first' line of defence for corals. This is because the mucus acts as a host to a community of microbes, including potentially beneficial bacteria that can improve the health of the coral. However, mucus is expensive as far as producing it is concerned, and the corals often struggle to replenish their stores, making them vulnerable to disease.

It is important to keep an eye out for coral bleaching by monitoring your reef and let us know when you see sick corals. At the time of writing, throughout the world, corals are bleaching due to the increases in sea surface temperature brought about by the phenomenon known as El Niño. This could be the largest bleaching event witnessed since 1998 and is worrying for reefs on a global scale.

Dr. Michael Sweet
Lecturer in Invertebrate Biology
University of Derby.

A Maldivian marine scientist in the making



© IUCN Maldives

Western Gray Whale Advisory Panel Whale protection during offshore oil and gas mapping in Sakhalin



© Dave Weller

Citizen science is scientific research conducted by non-professional scientists. This is a novel way to engage concerned citizens and interested stakeholders in the research in their community. Here, Ahmed Basheer describes his experience working as a citizen scientist in the Maldives.

I have always been a keen environmentalist, and my passion intensified with my first dive into the ocean. With each new dive I wanted to delve further into the marine field and fortunately in 2013, I got the opportunity to be an Assessor for Green Fins (a UNEP initiative coordinated by Reef World). This led to my training on environmentally-friendly dive practices, assessing dive schools all over the Maldives and giving presentations on maintaining the coral reef ecosystem and suggesting areas of improvement. My experience with Green Fins encouraged me to learn more about marine conservation, and in April 2015, I was given the op-

portunity to be a part of the IUCN Coral Reef Research Expedition in North Ari Atoll as a Citizen Scientist.

As a Citizen Scientist, we assisted the scientists in collecting data. Each day consisted of three dives at three different locations around each island. Each of us was assigned a group of organisms to study. My colleague Mahid and I mainly assisted in data collection of the benthic substrate (corals, algae, sponges, etc.) on the reef crest according to the guidelines of the National Coral Reef Monitoring Framework. We were also given the chance to participate in activities of other groups throughout the expedition.

Furthermore, we organized workshops for the locals in island communities providing them with basic knowledge of what we learned from coral reef monitoring methods.

Before the expedition, I was only able to differentiate the major genera of corals, but following the

expedition, I was able to identify types as well as many species and sub-species of corals. I learned about coral diseases and relationships along with predation on corals. Our expedition focused on the differences between reefs of inhabited, uninhabited and resort islands.

Throughout the expedition, the scientists were more than happy to share their vast knowledge in different areas of their expertise and provided in-depth explanations to the many questions we had. As a beginner I got first hand experience and immense knowledge in an educational and extremely warm and friendly environment that I am very grateful for. The expedition gave me a valuable insight into life as a marine biologist and I decided to continue further studies in marine conservation.

Ahmed Basheer

In the summer of 2015, IUCN seconded an Independent Observer to follow the implementation of monitoring and mitigation measures during a seismic survey that had just begun close to the main western gray whale feeding area near Sakhalin Island, on the Russian coast, just north of Japan.

Grigory Tsidulko was present in the field and permitted to observe the seismic survey, a technique used for assessing and mapping oil and gas deposits. His remit was developed in close collaboration with Sakhalin Energy, an oil and gas company conducting the survey, and IUCN's Western Gray Whale Advisory Panel (WGWAP).

In a seismic survey, air guns towed behind a ship repeatedly emit powerful bursts of sound. Sensors measure the return echo to reveal details of the sea floor and underlying geologic structure to a depth of several kilometres to pinpoint the location of oil or gas.

Seismic surveys - in order to be conducted in an environmentally responsible manner - require careful design and special measures to protect marine mammals such as whales, which rely on sound for communication. Exposure to loud noise from seismic surveys can cause direct physical damage to an animal that is too near the source, as well as stress and behaviour changes that could affect foraging, resting and nursing.

In the summer of 2015 at Sakhalin, special measures were put in place by Sakhalin Energy to minimise the effects of the survey on gray whales and to maximise data collection to assist in the planning of similar monitoring and mitigation programs for future seismic surveys. Those included, for example, timing of the survey to avoid the peak of the whales' presence and ensuring key protective measures. The company also committed to monitoring whale numbers, distribution and behaviour; to maintaining a distance of at least two kilometres between the airgun array and any whales; and to halting the operation if whales come too close

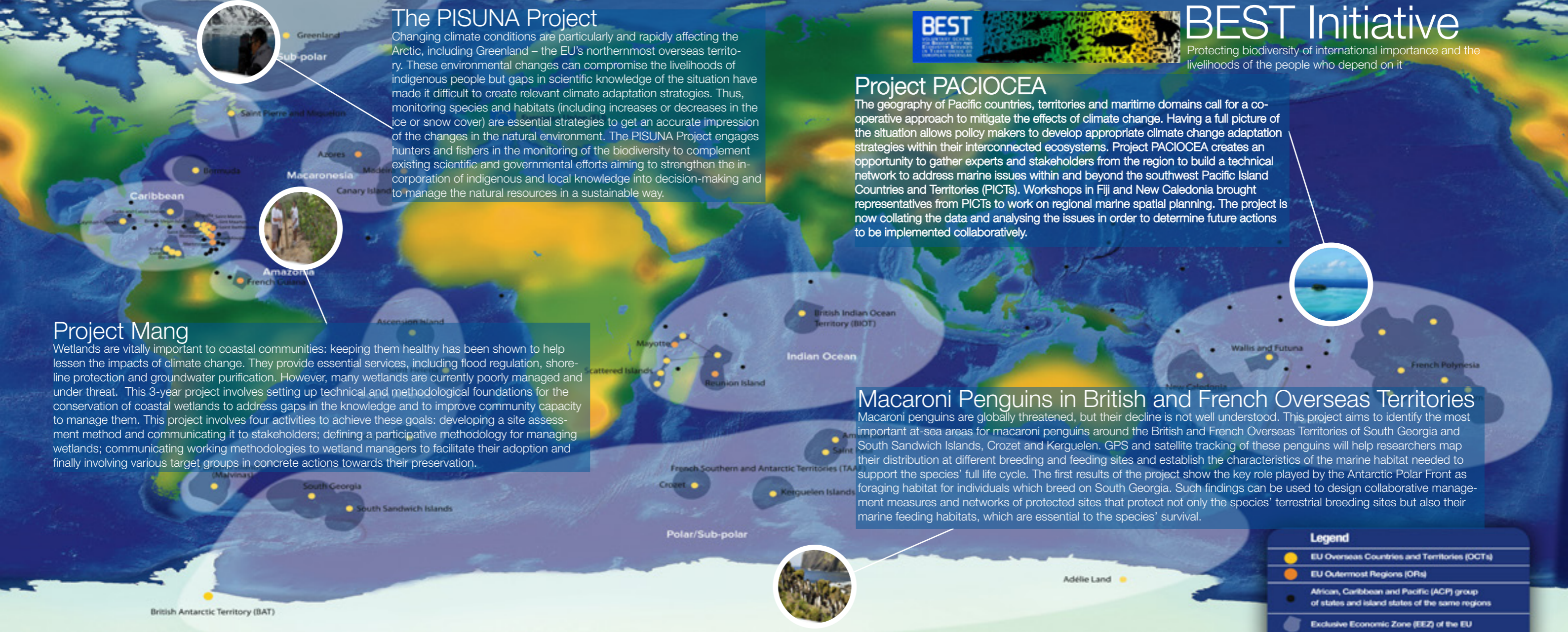
to the potential injury zone.

The full report of the Independent Observer on the implementation of the company's monitoring and mitigation plan will be made public on the WGWAP website (www.iucn.org/wgwap). The report will assist the WGWAP and the company in evaluating the effectiveness of the mitigation effort and may provide useful insights and recommendations for future surveys.

A similar arrangement for independent observation of the company's seismic survey was made in 2010.

Sakhalin Energy is the only energy company operating at Sakhalin that has accepted the inclusion of an Independent Observer as part of its seismic survey monitoring and mitigation programme.

For more information, please contact Anete Berzina (anete.berzina@iucn.org) or Giulia Carbone from IUCN's Global Business and Biodiversity Programme (giulia.carbone@iucn.org).



The PISUNA Project

Changing climate conditions are particularly and rapidly affecting the Arctic, including Greenland – the EU’s northernmost overseas territory. These environmental changes can compromise the livelihoods of indigenous people but gaps in scientific knowledge of the situation have made it difficult to create relevant climate adaptation strategies. Thus, monitoring species and habitats (including increases or decreases in the ice or snow cover) are essential strategies to get an accurate impression of the changes in the natural environment. The PISUNA Project engages hunters and fishers in the monitoring of the biodiversity to complement existing scientific and governmental efforts aiming to strengthen the incorporation of indigenous and local knowledge into decision-making and to manage the natural resources in a sustainable way.

BEST

BEST Initiative

Protecting biodiversity of international importance and the livelihoods of the people who depend on it

Project PACIOCEA

The geography of Pacific countries, territories and maritime domains call for a cooperative approach to mitigate the effects of climate change. Having a full picture of the situation allows policy makers to develop appropriate climate change adaptation strategies within their interconnected ecosystems. Project PACIOCEA creates an opportunity to gather experts and stakeholders from the region to build a technical network to address marine issues within and beyond the southwest Pacific Island Countries and Territories (PICTs). Workshops in Fiji and New Caledonia brought representatives from PICTs to work on regional marine spatial planning. The project is now collating the data and analysing the issues in order to determine future actions to be implemented collaboratively.

Project Mang

Wetlands are vitally important to coastal communities: keeping them healthy has been shown to help lessen the impacts of climate change. They provide essential services, including flood regulation, shore-line protection and groundwater purification. However, many wetlands are currently poorly managed and under threat. This 3-year project involves setting up technical and methodological foundations for the conservation of coastal wetlands to address gaps in the knowledge and to improve community capacity to manage them. This project involves four activities to achieve these goals: developing a site assessment method and communicating it to stakeholders; defining a participative methodology for managing wetlands; communicating working methodologies to wetland managers to facilitate their adoption and finally involving various target groups in concrete actions towards their preservation.

Macaroni Penguins in British and French Overseas Territories

Macaroni penguins are globally threatened, but their decline is not well understood. This project aims to identify the most important at-sea areas for macaroni penguins around the British and French Overseas Territories of South Georgia and South Sandwich Islands, Crozet and Kerguelen. GPS and satellite tracking of these penguins will help researchers map their distribution at different breeding and feeding sites and establish the characteristics of the marine habitat needed to support the species’ full life cycle. The first results of the project show the key role played by the Antarctic Polar Front as foraging habitat for individuals which breed on South Georgia. Such findings can be used to design collaborative management measures and networks of protected sites that protect not only the species’ terrestrial breeding sites but also their marine feeding habitats, which are essential to the species’ survival.

Taking Action on Climate Change: Island States Show the Way

Islands are on the front line of the impacts of climate change like increased storms, sea level rise, drought, and salt water intrusion into the water table. Their economies are especially dependent on the natural environment, both marine and terrestrial, which provide vital ecosystem services such as food (fisheries), tourism (attractive beaches, showy corals, unique habitats and wildlife) and coastal protection (coral reefs, mangroves, seagrasses buffering the coast from storms).

In the statements ahead of COP21 in Paris, islands asked that their concerns be heard and also wanted offers of solutions and commitments towards addressing these impacts. Several lead by example with clear commitments to transition to renewable energies and achieve significant

GHG emission reductions by 2030 - some even committing to change to 100 % renewables. More and more prioritize nature-based solutions for adaptation efforts, recognizing how cost-effective they are.

Almost all of EU Outermost Regions and Overseas Countries and Territories are islands with biologically important marine and coastal ecosystems. They are located in every major ocean of the world and harbour ecosystems as varied as polar seas, tropical coral reefs and sub-Antarctic kelp forests. Taking into account the critical role of these marine ecosystems, French Polynesia is calling for a “Défi de Paris” that would, in a global partnership, foster more actions for the oceans. The role of the ocean on the climate machinery is indeed fundamental - absorbing 93% of the

heat, about ¼ of CO₂ emissions and thus acting as shield and regulator. Some of the most isolated islands reveal how little damaged an environment far away from anthropogenic impacts can be and thus show resilience capacities. They also represent key sites to study the consequences of climate change. Islands can be seen as microcosms of our planet, giving us the opportunities to observe problems and test solutions.

EU overseas entities bring significant contributions to both the study of the impacts of climate change and the development of solutions to mitigate and adapt to them. Their special links to European nations can assure that their efforts inform and improve policies at the global level - island solutions are relevant to coastal areas worldwide!

Timeline: islands’ engagements against climate change

25 June 2014: Islands Declaration on Climate Change: Island and regional leaders commit to:

- Reinforce public policies enabling development of renewable energies;
- Request that islands are prioritised in the post-2015 intl climate agenda.

4 September 2014: S.A.M.O.A. Pathway (SIDS Accelerated Modalities of Action): Joint statement of government leaders and high-level representatives at 3rd Small Island Developing States (SIDS) Conference noting the importance of climate finance in addressing CC.

23 September 2014: The SIDS Lighthouse Initiative - Joint statement and 5-year action plan by 25 island states and partners for deployment of renewables.

April 2015: Lifou Declaration - Joint statement by 15 Pacific member states’ leaders of the Oceania 21 Initiative

- Urge UNFCCC to commit to legally binding GHG emission reduction

targets, to limit global warming to <2°C or even 1.5°C;

- Commit to educate youth on CC adaptation tools, such as ecosystems and nature-based projects.

9 May 2015: Declaration of Fort-de-France - Joint statement of the Caribbean Community (CARICOM):

- Clarity on targets for developed countries, adaptation measures, and financial and technological support to address CC impact in small developing countries.

June 2015: Hawaii enacts a law mandating all of the state’s electricity to be from renewable sources by no later than 2045. This makes Hawaii the first U.S. state to adopt such a standard.

8 June 2015: The Alliance of Small Island States (AOSIS), calls for the inclusion of “below 1.5°C” as a long-term temperature goal.

16 July 2015: Polynesian P.A.C.T. (Polynesia Against Climate Threats) - Common climate declaration notably calling to:

- Foster a circular and low carbon economy more respectful of traditional ways of living, of their environment and resources;
- Recognise continuous Polynesian Exclusive Economic Zones (> 10 million km²) as one of the biggest carbon sinks in the world.

11 September 2015 Pacific Islands Forum Leaders Declaration on Climate Change Action - calling to:

- Recognise the special circumstances of SIDS;
- Limit global average temperature increase to below 1.5°C;
- Uphold the Polluter Pays principle.

End of October 15: Caribbean communities launch the 1point5 campaign to raise awareness of the social justice dimensions of climate change.

Climate Change in EU Overseas Regions and Overseas Countries and Territories

Sunrise on Pitcairn Island, © Stewart McPherson

The first impacts of climate change on the biodiversity can already be observed in most of the EU Overseas Regions (OR) and Overseas Countries and Territories (OCT).

Climate change and sea level rise contribute to coastal erosion, flooding, damage to coral reefs from bleaching and disease, and the destruction of coastal and marine ecosystems, such as mangroves and seagrass beds. Coastal erosion, some of which is linked to climate change, is causing the loss of turtle nesting sites in the Caribbean territories. Additionally, Caribbean corals have declined by more than 50% since the 1970s. Some areas like the Caribbean and the Pacific will experience an increase in the intensity of tropical cyclones, leading to a loss of important coastline protection and coastal ecosystems, not to mention the high economic and social costs associated with recovery from the damages. In 2004, in the Cayman Islands, Hurricane Ivan caused the

greatest loss to date at more than US\$3 billion (or 183% of GDP). It was estimated that by 2050, losses due to increases in sea surface temperature in British Virgin Islands could be valued at between US\$ 19.4 billion and US\$ 30.9 billion, meaning a range of 341% to 1,863% of 2008 GDP in BVI.

Another impact is change in the distribution, range and abundance of plants and animals. Changed climatic conditions will either allow them to thrive outside their usual range or make their usual range inhospitable. Melting glaciers could increase the habitat of invasive mice and reindeer, which would put the Antarctic's only songbird, the endemic South Georgia pipit (*Anthus antarcticus*), at risk. In French Polynesia, the Miconia invasive tree covers now about 2/3 of Tahiti Island and is a direct threat to 70 endemic Tahitian plant species. This could lead to a decline of native plants or animals and an overall reduction in the variety of plants and animals found in a given area, thereby making it one of the most

pressing threats to biodiversity. There is only very limited information about the impacts of climate change on biodiversity. To date, there has been little climate change-specific monitoring in most territories. Making projections about future impacts is complicated by the fact that most global climate change models are not at a high enough resolution to provide information about "small islands".

Understanding both the need and the opportunities for adaptation to climate change is fast becoming an essential requirement of both governments and the private sector of vulnerable countries. Preparing for climate change impacts will now be less costly and more effective than remedial measures in the future. Immediate action is therefore an opportunity for the OR and OCT to build resilience in the face of their inherent vulnerabilities, improve natural resource management and physical planning processes, and adapt to changing climate conditions.

BEST Newsletter: Stay up to date with the BEST Initiative!

The newsletter of the BEST initiative brings you, twice a year, updates on biodiversity and ecosystem conservation in EU overseas entities and their regions. Marine conservation is a key concern as all these entities manage large and important exclusive economic zones (EEZs) – collectively comprising the world's largest marine territory – as well as some of the largest marine protected areas (MPAs). Have a look at the latest issue of the BEST newsletter to see how previously funded projects, and current efforts under the BEST Initiative are progressing, read success stories, and discover something new about the natural heritage of Europe and why it is of such global importance. The BEST newsletter includes highlights from the regions, profiles BEST teams and partners, and presents some of the 18 funded projects. The BEST newsletter can be found at the [BEST website](http://bestinitiative.org). Go here to subscribe: <http://eepurl.com/bewCBT>.



BEST 2.0 Programme

Biodiversity and Ecosystem Services in European Overseas Territories

The BEST Initiative was established in response to the recommendation from the 2008 conference on strategies to counter climate change and biodiversity loss in the EU and its overseas entities in Réunion. It supports the conservation of biodiversity and sustainable use of ecosystem services, including ecosystem-based approaches to climate change adaptation and mitigation in the EU overseas entities, which comprise the nine Outermost Regions (ORs) and 25 Overseas Countries and Territories (OCTs).

Following the overwhelmingly positive response to the two calls for proposals, launched in 2011 and 2012, under the BEST Preparatory Action - a total of 84 proposals were submitted and 18 projects were funded - the European Commission Directorate General for International Cooperation and Development (DEVCO) committed an additional 8 million Euros for the BEST 2.0 Programme to support further calls for proposals for projects to be implemented in the 25 OCTs.

IUCN is responsible for implementing the programme with support from four partner organisations which are based in each of the regions in which the OCTs are located (IUCN French Committee in the Pacific and Indian Ocean, SAERI¹ in the South Atlantic, TAAF² in the Polar/Subpolar and CAR-SPAW³ in the Caribbean).

BEST 2.0 aims to enable, empower and strengthen local actors that are committed to promoting biodiversity conservation and the sustainable use of ecosystem ser-

1 South Atlantic Environment Research Institute
2 French Antarctic and Sub Antarctic Territories
3 Regional Activity Centre implementing the UNEP protocol on specially protected areas and wildlife in the Caribbean region



vices in the OCTs through capacity building activities delivered in the regions by IUCN's partner organisations, and by providing much needed, accessible and targeted funding for projects that will deliver tangible results on the ground.

A combination of small grants (≤100,000 Euros) and medium grants (≤400,000 Euros) will be funded. Small grants primarily target stakeholders based in the OCTs and support actions implemented within individual territories. Medium grants aim to promote regional inter-territorial cooperation and can involve European, regional and international organisations on the condition that they partner with and delivery capacity building to local stakeholders. The programme will draw on the ecosystem profiles currently being developed by the BEST III consortium (also managed by IUCN) as well as other local and territorial strategies to assess the relevance of proposals with regards to local needs and priorities, and to inform the selection of grantees.

A first call for proposals was

launched on 14th September 2015 for small grants in the Indian Ocean, Polar/Subpolar and South Atlantic regions, as well as for medium grants in the Caribbean and Pacific regions. In a second call – to be launched in spring 2016 – stakeholders in all five regions will then be able to apply to the grant category from which the region did not benefit during the first call. Information related to the call can be found on the [BEST 2.0 Portal](http://bestinitiative.org).

With the OCTs hosting a significant proportion of the EU's biodiversity, BEST 2.0 will make an important contribution to the achievement of European and global biodiversity targets. As all OCTs are islands, responsible for a marine territory often 100,000 times larger than their land area and dependent on a healthy coastal environment for their well-being, BEST 2.0 can offer much needed support towards the conservation of Europe's marine world.

For more information, please contact Carole Martinez (carole.martinez@iucn.org)

Regional approaches to conservation beyond national boundaries in the South West Indian Ocean



Areas beyond national jurisdiction (ABNJ) represent 64% of the surface of the world's ocean. Within the framework of the ongoing marine conservation project in ABNJ of the South West Indian Ocean (FFEM-SWIO Project), IUCN Global Marine and Polar Programme and project partners are focusing on two specific types of ecosystems: seamounts and hydrothermal vents.

The project is funded by the French Global Environment Facility (FFEM; <http://www.ffem.fr/>) and aims at improving the governance framework for these areas in order to conserve their marine biodiversity and sustainably exploit their living and non-living resources, acknowledging the fact that the lack of scientific knowledge is one of the main barriers to conservation of biodiversity in ABNJ.

These ecosystems, which are considered as biodiversity hotspots, are facing two major threats: (i) overfishing and potential destruction of habitats through deep sea bottom-trawling; and (ii) potential destruction of habitats and pollution from deep sea mining exploration and future exploitation activities.

The *Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region* is the Regional Seas Convention under the auspices of the United Nations Environment Programme for this region of the world's ocean (<http://www.unep.org/regional-seas/about/default.asp>).

Last June, the 8th Conference of the Parties (COP) to the Nairobi Convention took place in Seychelles. In the context of the FFEM-SWIO Project, IUCN and its partner IDDRI (Institute for Sustainable Development and International Relations) presented the issues and held a side-event in plenary to discuss the possible role of the Nairobi Convention in the development of area-based management tools in ABNJ.

One of the resulting decisions of this COP was to "urge Contracting Parties to cooperate in improving the governance of areas beyond national jurisdiction, building on existing regional institutions including the Nairobi Convention and developing area based management tools such as marine spatial planning to promote the blue economy pathways in the Western Indian Ocean Region".

Regional approaches to the conservation of biodiversity and the sustainable use of resources in ABNJ are being explored and developed in several regions of the world's ocean. This runs in parallel to the international discussions on this topic that are taking place under the UN General Assembly auspices aiming for the same goal, that is, improved governance and good management of areas beyond national jurisdiction.

For more information on the FFEM-SWIO Project, please contact Aurélie Spadone (aurelie.spadone@iucn.org).



Project partners: National Museum of Natural History (France), the Institute of Research for Development (IRD, France), Institute for Sustainable Development and International Relations (IDDRI) and Oxford University

The project is supported by the French Ministry of Foreign Affairs and the French Ministry of Higher Education and Research.

Project implemented in collaboration with several institutions, ongoing projects or programmes: notably, the Department of Environmental Affairs and the Department of Agriculture, Forestry and Fisheries of South Africa, the Deep Sea Project of the FAO ABNJ Program and its partners, The Nairobi Convention, The Southern Indian Ocean Deepsea Fishers Association, universities in South Africa and Reunion Island, IFREMER, the International Seabed Authority, SAPPHERE and AfriCOG.

High Seas conservation: speaking with Kristina Gjerde



© John Weller

In June 2015, UN Member States formally adopted a resolution to develop a legally-binding international instrument to conserve and sustain marine biodiversity in areas beyond national jurisdiction. Kristina Gjerde, Senior High Seas Advisor to IUCN's Global Marine and Polar Programme, has kept IUCN in the forefront of efforts to promote improved management and governance of the two-thirds of the ocean located beyond national boundaries.

Since 2003, Kristina has been urging both a new international agreement and better use of existing instruments at the United Nations, the Convention on Biological Diversity and the international organizations charged with managing fishing, shipping and seabed mining. In 2003, she helped establish a special task force of the World Commission on Protected Areas on high seas MPAs; in 2008 she co-founded the Global Ocean Biodiversity Initiative; in 2010, the Sargasso Sea Alliance; in 2011, the High Seas Alliance; and in 2012, the Deep Ocean Stewardship Initiative.

For more information, you can watch her TED talk at http://www.ted.com/talks/kristina_gjerde_making_law_on_the_high_seas or follow her at @4kgjerde.

We sat down with her to discuss her insights on the current status of marine conservation.

Why is conserving the high seas important?

Often referred to as the blue heart of the planet, the global ocean is vital for maintaining life as we know it on Earth. I prefer to call it the blue lungs of the planet, for ocean phytoplankton supply fifty percent of the oxygen we breathe. Achieving effective ocean governance cannot be considered a luxury, but rather an essential foundation for sustainable development.

What is the biggest problem facing the high seas today?

Today the biggest problem is fishing: too many fisheries management organizations in charge of regulating regional fisheries (RFMOs) are doing a poor job of preventing overfishing, ending illegal fishing, or protecting marine life. This frustration is driving a global movement calling for better protection of high seas biodiversity and ecosystems, including through a system of marine protected areas and reserves.

However, it's important to note that the biggest problem facing the high seas tomorrow is climate change and other impacts stemming from

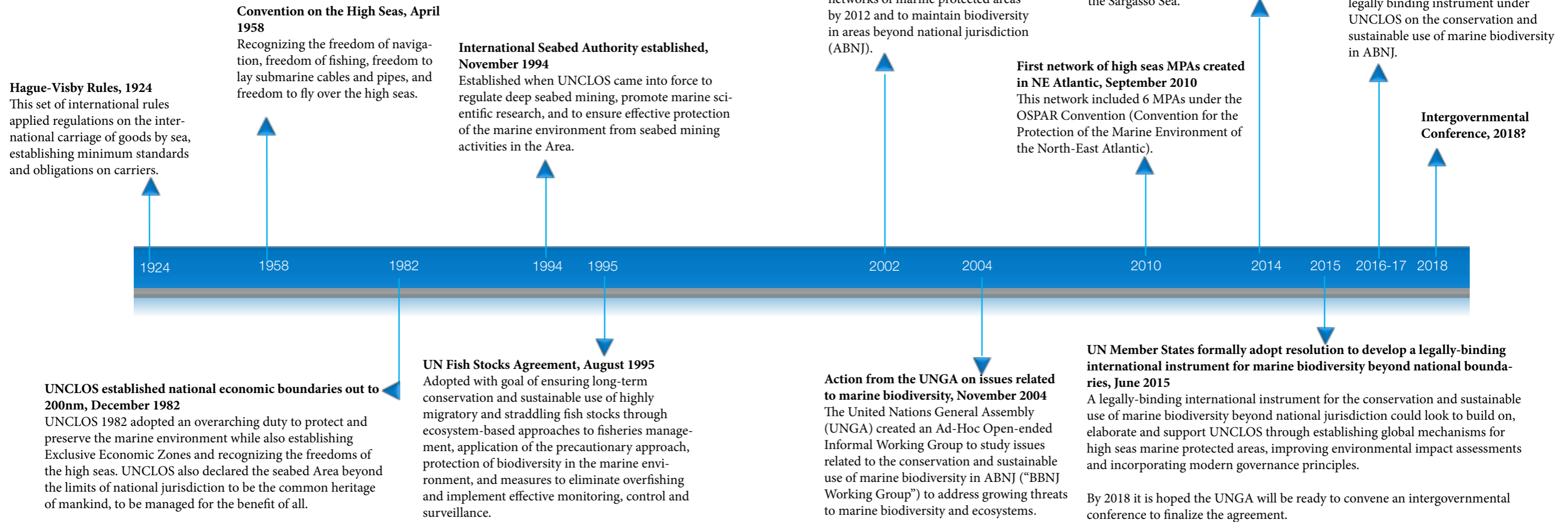
rising carbon dioxide emissions on land. We simply must act individually and globally to rapidly reduce CO₂.

What is currently lacking in existing ocean governance mechanisms?

Although we have an international framework treaty to govern ocean activities, called the UN Convention on the Law of the Sea, it has some critical weaknesses and gaps, including:

- 1) **MPA Networks:** There is no way to establish a network of globally-recognized marine protected areas beyond national boundaries to sustain marine wildlife, build resilience to the impacts of climate change and ocean acidification or provide insurance against mistakes and poor management.
- 2) **Accountability:** There is no way to hold States and international organizations (such as RFMOs) accountable for their failure to safeguard marine biodiversity and ecosystems that effectively belong to all of us.
- 3) **Finance:** There is no globally supported financial mechanism to spur marine scientific research; to build capacity of developing countries, or to support conservation.

Looking at a history of high seas governance



What are the biggest obstacles to an effective high seas protective agreement?

The greatest obstacle will be getting all countries to agree on a robust framework that enables strong, long-term and comprehensive protection. While most nations recognize the need for urgent action, there are still a few suggesting that fisheries should be excluded from the agreement. This is supposedly on the ground that high seas fisheries are already so well managed. I only wish that were the case.

What is the best way for people to become involved in high seas conservation issues?

The best way to get involved would be to send a letter to your national

leaders and even your UN representatives to let them know how important it is to protect marine life in the ocean beyond boundaries and urging them to create a strong high seas biodiversity treaty. You can also follow the High Seas Alliance on Facebook, twitter and the web, and to support the call for a #waveofchange.

What are your future aspirations for high seas conservation?

My future hopes for high seas conservation include the rapid roll-out of a truly comprehensive system of marine protected areas that can safeguard the full range of species, habitats and ecosystems across our blue planet. At the same time we need to vastly expand our understanding of the remote ocean

through new global cooperative research programmes as we strive to ensure that 100% of marine activities are truly sustainable.

For further information, please consult the following pages:

- IUCN World Commission on Protected Areas Marine: <http://www.protectplanetoocean.org/>
- Global Ocean Biodiversity Initiative: <http://www.gobi.org/>
- Sargasso Sea Commission: <http://www.sargassoseacommission.org/>
- High Seas Alliance: <http://high-seasalliance.org/>
- Deep Ocean Stewardship Initiative: <http://dosi-project.org/>

You can reach Kristina Gjerde at kgjerde@eip.com.pl

As the timeline indicates, international law of the sea has evolved beyond the narrow recognition of high seas freedoms such as the freedom to fish or navigate. Since 1982, the law of the sea also includes a duty for States to protect and preserve the marine environment and the life it contains. But we have not done a great job of implementing this duty. We know how to: apply precautionary and ecosystem approaches; establish MPA networks, and integrate biodiversity conservation into sectoral management. Many are hoping that the new agreement being developed by the

UNGA will enable these existing tools to be applied in a more integrated and comprehensive way, and provide a mechanism to regularly review progress. These principles and tools could do much to support marine biodiversity conservation and sustainable use in areas beyond national

jurisdiction in an era of escalating threats from climate change and ocean acidification.



Kristina giving a TED talk on the law of the high seas, April 2010

Protecting habitats in the Sargasso Sea

First complete protection measures achieved for Sargasso Sea habitats



© Duke University Marine Geospatial Ecology Lab

Since 2012, the North Atlantic Fisheries Organization (NAFO) has been considering measures to protect habitats in the Sargasso Sea – particularly the seamounts. At its 37th Annual Meeting in Halifax in September 2015, it decided to prohibit the use of mid-water trawling gear with discs, bobbins or rollers on its footrope or “any other attachment designed to make contact with the bottom” in seamount area closures under its jurisdiction. NAFO also agreed that all Vulnerable Marine Ecosystem indicator species caught during fishing on seamount closures need to be reported. NAFO also agreed to remove the exemption for “exploratory bottom fishing activities” in seamount protection zones². These key regulatory agreements will provide the strongest protection from damage due to fishing achieved to date for seamount ecosystems and represent the most substantial regulatory measures achieved for fisheries in the Sargasso Sea.

NAFO is still actively considering whether the Sargasso Sea provides forage area or habitat for living marine resources that could be impacted by different types of fishing and whether there is a need for any management measure, including a closure, to protect this ecosystem.

¹ Northwest Atlantic Fisheries Organization (NAFO), NAFO/FC DOC. 15/13, Seamount Closures: gear specification for the use of midwater trawls and reporting of VMEs (September 2015).

² NAFO/FC DOC. 15/15, Revision of Article 17 of the NAFO CEM (September 2015).

Two new Commissioners join the Sargasso Sea Commission

On September 30th, 2015, the Government of Bermuda announced the appointment of two new members of the Sargasso Sea Commission. Professor Stephen de Mora, Chief Executive of the Plymouth Marine Laboratory in the UK, and Mark Spalding, President of the Ocean Foundation, join the six-person Commission. The Commission was established by the 2014 Hamilton Declaration on Collaboration for the Conservation of the Sargasso Seas to exercise a stewardship role for the Sargasso Sea, the unique two-million-square nautical mile High Seas ecosystem in the North Atlantic.

Exploring partnerships to protect eels that spawn only in the Sargasso Sea

The Sargasso Sea is the only place in the world where the European eel (*Anguilla anguilla*) and the American eel (*A. rostrata*) spawn. Both species are listed as endangered on the IUCN Red List, the European eel critically so¹. In 2014, the Government of Monaco, supported by the Sargasso Sea Commission (SSC), sponsored the listing of European Eel under the Appendix II Convention for Highly Migratory Species. The SSC is now working to convene a Range State Workshop in 2016 to discuss collaborative measures that can be taken by European Eel Ranges States.

In October 2015, the SSC partnered with Dalhousie University, the Ocean Tracking Network, Maine Law School and the Gulf Coast Research Institute to host a two-day multilateral symposium with a wide range of experts to focus on concrete “next steps” to protect the American eel.

For more information, please contact David Freestone (dfreestone@sargassoseacommission.org) or Faith Bulger (fbulger@sargassoseacommission.org) or consult the website www.sargassoseacommission.org.



© David Curnick

¹ See IUCN, available online: <http://www.iucnredlist.org/details/60344/0>.

The Arctic: A Period of Global Changes and Action

The Arctic is changing rapidly, attracting more and more global attention. IUCN's Global Marine and Polar Programme aims to tackle the latest threats that emerge in this region.

The Arctic has long been known as a Persistent Organic Pollutants (POPs) and mercury sink, but now it seems to face a new threat. It recently emerged that the Arctic is also a sink for microplastics. Some scientists claim that that “arctic sea ice from remote locations contains concentrations of microplastics that are several times of magnitude greater than those found in highly contaminated surface waters, such as those of the Pacific Gyre”¹. Marine plastics accumulate toxic pollutants present at the sea surface and serve as a potential transport vector for chemical contaminants of concern.

These microplastics pose a serious threat not only to marine organisms via ingestion, but also to public health, as some of the world's largest commercially exploited fish stocks are found in the Arctic. Approximately 40% of the United States' commercial fisheries (by weight) come from the Bering Sea, and about half of the fish consumed in the European Union is from the European Arctic.

So far, a fine assessment of the quantity, type, sources, transport, accumulation and fate of plastics in the Arctic waters is lacking; therefore IUCN aims to tackle this issue that could have a global negative impact.

¹ Global warming releases microplastic legacy frozen in Arctic Sea ice. R. W. Obbard, S. Sadri, Ying Qi Wong, A. A. Khitun, I. Baker, R. C. Thompson, 20 June 2014, available at <http://agupubs.onlinelibrary.wiley.com/agu/>

IUCN will:

- Perform a quantitative and qualitative analysis of amount of microplastics present in the arctic waters and their origins;
- Assess the harmful effects of plastic ingestion in the arctic food web and its potential to affect food security, i.e. assess the public health concerns for the consumption of fish and seafood living in polluted waters enriched in microplastics;
- Explore a possible correlation between microplastics and ice formation and melting. +

These findings will provide important information for regulatory and environmental decision-making and allow arctic states to design prevention measures as required.

IUCN, jointly with UNESCO and the Natural Resources Defense Council, has also recently launched a joint project to identify Arctic marine sites that meet the natural World Heritage criteria² for inclusion into the UNESCO World Heritage List³. In 2012, a UNESCO overview identified the Arctic region as being significantly underrepresented in the World Heritage system. IUCN is planning an Expert Workshop that will gather Arctic scientists to evaluate marine areas and their potential to be protected under the World Heritage Convention, and develop an initial strategy to facilitate nominations of Arctic marine areas for World Heritage listing. This will strengthen the credibility, balance

² UNESCO Selection Criteria available at <http://whc.unesco.org/en/criteria/>

³ This project builds upon the work of IUCN and NRDC in 2010 and 2011, which was generously funded by the Fondation Prince Albert II of Monaco, to identify ecologically and biologically sensitive areas in the Arctic marine environment that should be considered for protection, and promote ecosystem-based management in this region. The project also builds upon the initial Arctic work of the World Heritage Centre in 2007, also co-funded by Fondation Prince Albert II of Monaco.

and representation of marine sites on the list and advance the conservation and sustainable management of exceptionally important natural arctic marine areas.

IUCN continues to support WWF in its efforts to develop a set of voluntary measures for shipping in the Bering Strait region. This includes facilitation of a multi-stakeholder bi-lateral process to develop voluntary measures for shippers that may be used by government agencies within the two Bering Strait States (US and Russia) to ensure safety and stewardship within this region. Such measures may also form the basis of future cooperative agreements and standards in the region. These measures could be further implemented in other Arctic (or Sub-Arctic) regions with similar conditions.

On a positive note, the five arctic coastal States (Canada, Denmark, Norway, Russia and USA), applying the precautionary approach, recently adopted a declaration establishing interim measures to deter unregulated fishing in the future in the high seas portion of the central Arctic Ocean.

IUCN also welcomed the news that Shell will cease further exploration activity in offshore Alaska for the foreseeable future. We believe that other oil companies should follow the trend and avoid hydrocarbon exploration and exploitation activities in other arctic seas as much as possible. Mutually beneficial dialogue between oil and gas companies and environmental organizations can give an opportunity to discuss the environmental risks during the design and implementation of various oil and gas projects, thereby allowing truly meaningful opportunities for a winning solution for all parties.

For more information, please contact Tatiana Saksina (tatiana.saksina@iucn.org).

Mediterranean: Regional cooperation increases



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A common strategy is under preparation between the Barcelona Convention and the UNEP Mediterranean Action Plan, represented by its Regional Activity Centre for Specially Protected Areas (UNEP-MAP-RAC/SPA), the Agreement for the Conservation of Cetaceans of the Black and Mediterranean Seas (ACCOBAMS), the General Fisheries Commission for the Mediterranean (GFCM), the IUCN Centre for Mediterranean Cooperation (IUCN-Med) and the Mediterranean Protected Areas Network (MedPAN) for the conservation of the Mediterranean marine environment. The draft strategy will be presented for review and approval by the Contracting Parties during the COP to be held in February 2016.

The Mediterranean Marine Programme has been focused on four main topics in the 2013-2016 work programme: (1) deep sea knowledge and conservation, (2) marine protected areas and fisheries, (3) governance and (4) species, ecosystems and habitats.

1) Deep sea knowledge and conservation

Knowledge

Following the preparation of a report on canyons, the IUCN-Mediterranean office is completing an Atlas of Mediterranean Seamounts, covering 244 underwater features. Missions at sea were also organised to study the possible relationship between seamounts and the presence of marine mammals and large pelagic fish.

Mediterranean Deep Sea Ecosystems expert meeting

In collaboration with the French Agency for MPAs, the Mediterranean Institute for Biodiversity and Ecology and the Pytheas Institute, and with the financial support of MAVA, the "Mediterranean Deep Sea Ecosystems" meeting held on 9-10 September 2015 looked at the information currently available and explored collaboration opportunities to gather and identify missing data required to better inform the conservation and management of deep-sea ecosystems. It also discussed the understanding of present pressures and how to prevent detrimental impacts on vulnerable deep-sea ecosystems, i.e., deep-sea corals, sponge communities and other specialized

biological assemblages of canyon, seamount and chemo-synthetic ecosystems. This meeting also examined the information systems used by different organizations and research institutions, the pros and cons of a shared data platform, and how these can help in assessing the ecological status and human pressures in Mediterranean deep-sea ecosystems. Options for a common monitoring system for a standard set of data were also considered. The final objective is to implement an effective strategy for Mediterranean deep sea conservation, management and monitoring.

2) Marine Protected Areas and fisheries

All activities related to MPAs and fisheries are the result of strong collaborative approaches with the two most relevant instruments in the Mediterranean on this topic: the General Fisheries Commission for the Mediterranean (GFCM) and the ACCOBAMS Agreement.

IUCN Mediterranean is cooperating with these two regional instruments and other interested stakeholders on the review legislation and institutional mandates for MPAs and fisheries, as well as

on specific problems such as by-catch of endangered or protected species and on governance in the areas beyond national jurisdiction.

During 2015, several meetings were held on the adoption of a common approach for the development of the regional network of MPAs. The GFCM is completing a review of the fisheries reserves, temporary and permanent, existing in the Mediterranean - to date, more than 130 have been identified. An update on conservation efforts by non-European Countries of the Mediterranean is under preparation by IUCN-Med and MedPAN. For the North African countries (Morocco, Algeria, Tunisia, Libya and Egypt), 94 marine conservation areas have been declared (previously only 11 were listed) corresponding to 44 sites (multiple designations in the same area) and covering about 2,200km² or 1.2% of North Africa territorial waters (previously about 1,100km²). Both documents will be published before the end of 2015.

At the national level, the bottom approach developed within the framework of the USA funded-Millennium Challenge Programme on the specific activities on MPAs and artisanal fisheries has resulted in the identification and negotiation of three potential MPAs to be proposed by fishermen associations. Along the Mediterranean coast of Morocco, between Tamrabet and Oued Amttter, an area of about 250km² has been approved by the administration with strict regulations of fishing techniques, opening and closure of fisheries and a request for more control of illegal activities. In Lebanon, a similar process is under development with the participation of IUCN-ROWA in the existing nature reserve of Tyr for the preparation of a management plan for artisanal fisheries.

Within Mediterranean waters, the EU-funded project Fish-MPA-Blue has completed an analysis of the integration of artisanal fisheries in and around marine protected areas of Spain, France, Italy,

Croatia and Greece. The project has been able to propose specific activities for improving the governance on this topic and developing new approaches for a sustainable exploitation of the sea. A second project is under preparation for implementing the recommendations based on studies on specific sites.

Future agreements include a GFCM meeting on Small Scale Fisheries, with special attention on MPAs, to take place in Algeria in March 2016, as well as the adoption of a common strategy between all partners under the auspices of the Barcelona Convention - Mediterranean Action Plan for MPA network development and management in February 2016.

3) Mediterranean Governance

In collaboration with RAC/SPA and with the support of the Environmental Law Centre of IUCN, an assessment of the legal and institutional national framework for MPAs was conducted in three Adriatic countries: Albania, Croatia and Montenegro, with a preliminary review for Bosnia-Herzegovina.

Under the framework of different projects such as PEGASO and MEDINA, preliminary reviews were also done for Algeria, Egypt, Morocco and Tunisia, covering both MPAs and monitoring frameworks.

Based on multiple discussions on



© Andrea Molinari

the denominations and labels applicable to Mediterranean waters within the framework of international, regional and sub-regional instruments, it was decided to provide an analysis of these labels with details of their level of constraint. A similar approach could be conducted to examine labels at the national level.

4) Marine Species, Ecosystems and Habitats in the Mediterranean

Following the creation of the Red List assessment of cartilaginous fishes in 2007, as well as overviews of the status of marine mammals in 2008, and of the conservation status of the marine fish in 2011, the Red List assessment of the Anthozoans of the Mediterranean will be published before the end of 2015.

The IUCN-Mediterranean Marine Programme has also been involved in the preparation of a regional approach for the Red list of Mediterranean Marine Habitats. This activity was supported by EU financing in order to consider the EUNIS list of habitats at the sub-regional seas level.

Finally, the public Mediterranean Marine Invasive Species application for iPhone has been further developed and rolled out for all Mediterranean MPAs.

For more information, please contact Alain Jeudy (alain.jeudy@iucn.org).

Building Transboundary Marine Protected Areas in Southeast Asia using ecosystems and flagship species

Coral reefs and coastal dolphins

© Waran Suwanno



© Petch Manopawitr

Consisting of more than 800 islands surrounded by coral reefs and diverse marine resources, the Myeik Archipelago in the Andaman Sea has emerged as a priority area for marine conservation in its own right and for its potential role in replenishing coral reefs across the countries throughout the Andaman Sea. The area has been identified as a key region to address issues affecting transboundary coastal and marine ecosystems within the broader Bay of Bengal Large Marine Ecosystem.

Between February 2014 and January 2015, a series of four live-aboard surveys were undertaken as part of a cooperative effort by IUCN's Asia Regional Office in partnership with Fauna and Flora International (FFI) and supported by the Bay of Bengal Large Marine Ecosystem Project (BOBLME). The team conducted a Rapid Socio-Eco-

logical Assessment with the goal of evaluating the condition of marine habitats and establishing baseline biodiversity in a variety of sites. The team also examined certain socio-economic aspects with the aim of investigating the livelihoods, patterns of resource use, and attitudes on resource condition and conservation within the coastal communities in the archipelago.

The data from the joint operations contributes to the first comprehensive marine ecosystem map and analysis of current socio-ecological systems for this large marine area.

The findings from the surveys reveal good coral reef biodiversity in many areas, which should be recognized and valued as biodiversity reservoirs. However, the surveys also reveal that ecosystem functioning is seriously threatened in many areas, owing to the cumulative and successive impacts of destructive and unsustainable

resource extraction activities. The absence of sharks, large pelagic species and large-sized fish is a clear sign of overharvested fish stocks. The number of fishers in the archipelago has already declined by up to 60% during the past decade, as smaller or less efficient operators no longer find it economically viable to fish in the region.

However, the archipelago can recover with appropriate management, including mosaics of protected areas, partnerships between the tourism industry and local people, and government efforts to cease Illegal, Unreported and Unregulated (IUU) fishing. Many coral reefs in the archipelago have been assessed as having a high level of resilience and have withstood the severe mass coral bleaching that occurred throughout the Andaman Sea in 2010. It is therefore in the best interest of all stakeholders to develop a more connected, well-represented and effective Marine Protected Areas

network in the Myeik Archipelago.

To promote the concept of MPAs and to achieve the most suitable and effective management plan for the archipelago, two national workshops were undertaken in collaboration with the Department of Fisheries (DoF), Ministry of Livestock, Fisheries and Rural Development (MLFRD) and the Forest Department (FD), Ministry of Environmental Conservation and Forestry (MoECAF). The Marine Protected Area Workshop in Myeik on 2-3 October 2014 provided an understanding of the prevailing situation of the Myeik Archipelago. The workshop also offered an introduction to MPA concepts, features and approaches, and gave an opportunity for participants to advocate MPA management as a viable option.

The second workshop on Conservation Strategy for the Myeik Archipelago: "Consolidated findings and recommendations in Dawei", on 27 February 2015, served

as a platform for information sharing and institutional build up at different levels among various stakeholders working in marine conservation. Results from the four surveys were presented and policy recommendations were primary outcomes of this workshop.

The two workshops highlighted the importance of cooperation between the DoF, the FD and a range of non-state actors, including local and international NGOs and universities, for improved coastal and marine management in the archipelago. Transboundary cooperation between Myanmar and Thailand

is highly recommended to more effectively combat illegal fishing and promote the protected areas network.

The concerted efforts and dialogue on marine conservation have provided the basis for the Tanintharyi Regional Administration to identify a short- and long-term vision and road map for developing capacity and drafting resource management guidelines for the region, and as a reference for developing transboundary MPAs.

For more information, please contact Petch Manopawitr (petch.manopawitr@iucn.org).



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Transboundary Dolphin Conservation along the Thai-Cambodian Border



© Jirayu Ekkul

Until recently, little had been known about the abundance and distribution of Irrawaddy Dolphins (*Orcaella brevirostris*) in the Eastern Gulf of Thailand and along the Thai-Cambodian border. However, in recent years, considerable research efforts have been undertaken by Thailand's Department of Marine and Coastal Resources (DMCR) in collaboration with an international team of researchers, notably in response to an increasing number of stranded dolphins found in the area.

In Trat Province, Thailand, which borders Koh Kong Province in Cambodia to the East, the Irrawaddy dolphin population is estimated to be around 200 individuals. As in other parts of the world, dolphins in Trat are vulnerable to a variety of human activities including unsustainable fishing practices, coastal development leading to pollution and the destruction of habitat, and climate change. Irrawaddy dolphins live near the coast, and thus their feeding grounds largely overlap with people's fishing grounds. Although in many cases the cause of death cannot be established, entanglement in fishing gears, especially gillnets, appears to be one of the major threats to these dolphins.

On the other side of the border, similar challenges exist and, although less data are available,

recent boat surveys conducted by IUCN in collaboration with the Fisheries Administration and the Department of Environment of Cambodia suggest that a significant number of dolphins inhabit the area especially in open waters just outside the mouths of waterways leading in and out of the mangrove forest of Peam Krasop Wildlife Sanctuary. Apart from fishing activities, dolphins in this area are affected by the degradation of habitat caused by sand dredging.

To respond to the urgent need to protect the remaining dolphin populations in this area, IUCN and partners are implementing an 18-month transboundary dolphin conservation project along the coastline of the Thai-Cambodian border, funded by the Swedish Postcode Lottery. The project aims to address main threats to dolphin populations by improving fishing practices (for example, through a zoning approach), addressing habitat degradation and pollution, strengthening existing local dolphin conservation networks, and sharing local knowledge and experience on dolphin conservation between the two countries.

Transboundary collaboration can support this process in a number of ways:

- A network of contiguous Marine Protected Areas or Dolphin Management Zones provides larger areas of conservation;

- The sharing of research findings can improve knowledge on both sides of the border;
- Experience can be used to build capacity, such as the recent joint first response trainings for stranded dolphins and photo ID surveys conducted in Trat Province;
- Joint research and capacity building can be more cost-effective;
- Collaboration can help promote ecotourism and dolphin watching tourism;
- Transboundary cooperation in priority areas can carry more weight with authorities in each country.

Government agencies, local administrations and communities have shown great support for transboundary collaboration. Though individual steps need to be taken on each side of the border, cooperation can help draw the necessary attention to the importance of protecting dolphins and marine conservation more generally.

For more information, please contact Petch Manopawitr, (petch.manopawitr@iucn.org) or Brian Smith, Director, Asian Coastal Cetacean Program, WCS & Asia Coordinator, IUCN SSC Cetacean Specialist Group (bsmith@wcs.org). www.iucn.org/asia

Less planning and more action on Pacific Islands' *bêche-de-mer* fisheries

The Government of the Kingdom of Tonga was honoured to host the inaugural Regional Technical *bêche-de-mer* (BdM) meeting in Nuku'alofa in October 2015, alongside partners including IUCN, the Food and Agriculture Organization (FAO), WorldFish Centre, Secretariat of the Pacific Community (SPC) and the University of the South Pacific (USP). The Honourable Semisi Tauelangi Fakahau, Minister of Agriculture & Food, Forests and Fisheries expressed his concern at the failure to sustainably manage this fishery in Tonga and in the region as a whole.

Throughout the Pacific, sea cucumbers are the second most important harvest fishery after tuna. They are often harvested by local communities, then dried and finally sold as *bêche-de-mer* to largely Asian markets for up to US\$90/kg as wet weight and up to US\$840/kg dried. At its peak, it has brought US\$24 million worth of value to Pacific Islanders. It is an extremely important source of income in locations where there are few sources of revenue.

Despite two decades of investment in education and awareness, development of guidelines on harvesting sizes, research into the ecology of these animals and their potential for aquaculture, stocks have continued to decline, with many locations suffering through 'boom and bust' cycles.

In Tonga for example, the Minister stated that its *bêche-de-mer* resources are overfished and the stock is depleted through illegal fishing by using hookah and scuba equipment, fishing during the closed season and smuggling to overseas markets.

Three key aspects of the BdM fishery were addressed at the meeting: conservation, industry development and collective action. The meeting recognised that there is a genuine opportunity to increase the wealth derived from these resources and to overcome the boom and bust nature by value-adding to the product through high quality and more in-country processing of the sea cucumber.

This successful special meeting on *bêche-de-mer* resources was a follow on from the August 2014 "Call to Action" by Ministers and representatives of the seven countries in the region. There they reinforced that robust management measures and the establishment of a regional approach was needed to underpin the future management and sustainability of *bêche-de-mer* fisheries. Participants promised immediate and decisive action in their countries and invited their neighbours to join them. There is regional support already for their efforts – for example, alignment with key regional policies including the "New Song for coastal fisheries" and the regional Mela-



Sea cucumber, © Carl Gustaf Lundin

nesian spearhead group Fisheries Roadmap.

These decisions reflect how very important Pacific Islanders consider their *bêche-de-mer* fishery and their commitment to effective national management strategies, regulatory frameworks, monitoring and enforcement. Through stronger management, countries aim to sustain livelihoods and revenue-earning opportunities for coastal communities from this fishery. If real progress is to be made to sustainable and profitable fisheries, it is necessary to convene partnerships to assist countries in developing national standards and processes for developing local and national industry, to help work on 'branding' and marketing opportunities to maximize value in global BdM markets, and most importantly to improve and build necessary capacity to take action.

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Marine Protected Areas for the management of fisheries in West Africa



From the beginning of the early 2000s, there has been an increasing amount of discussions on the implementation of Marine Protected Areas for the sustainable management of fisheries on an international level and in West Africa in particular.

Member states of the Sub-Regional Commission of Fish (better known by its French acronym, CSRP), who in 2003 adopted a sub-regional strategy for MPAs, have benefitted from a number of initiatives implemented by a group of technical and financial partners. These partners seek to create a better understanding of the impacts of established MPAs on fisheries, in particular, artisanal fisheries.

A number of recommendations have arisen from discussions, in particular (i) the creation of a geographic information system common to MPAs and fisheries, (ii) the standardisation of reference systems and the implementation of simple and permanent monitoring systems within MPAs, (iii)

the facilitation of inter-institutional dialogue and (iv) the improvement of government frameworks and management systems.

The Marine and Coastal Program of IUCN for Central and West Africa (IUCN-MACO), with the financial support of IUCN France, is working alongside the West African regional network of marine protected areas (RAMPAO) to implement the aforementioned recommendations.

The first international conference on this issue, "Ecosystem approaches to the management of fisheries and the marine environment in West African waters", was organised by the CSRP with the support of the Institut de recherche pour l'environnement (IRD) and established a Task Force within the RAMPAO to manage the relationship between MPAs and fisheries. This Task Force, consisting of a pool of multidisciplinary experts in the fishing industry, are intervening now at the request of members of the RAMPAO to offer more practical support to the managers of

MPAs and fishermen engaged in the project. This includes monitoring and surveillance of fisheries resources, improving inter-sectional dialogue and achieving a balance between managing the MPA and maintaining active fisheries. The IUCN is also working alongside the RAMPAO secretariat to expand knowledge on MPAs in West Africa by building a data bank of maps, regulatory texts and management plans to create a solid base of information and improve interactions with the fishing industry.

These initial activities allow the RAMPAO to strengthen its role as a technical support mechanism to its members and thus create solid partnership links with the CSRP. These activities also allow for the preparation of a common regional program RAMPAO/CSRP to reinforce the role of MPAs in the management of fisheries in West Africa.

For more information, please contact Idriss Deffry (idris.deffry@iucn.org).

So much more than spectacles: Massive marine gatherings



Camouflage groupers in a spawning aggregation in French Polynesia. Tens of thousands of animals spawn over just a few hours each year – at other times only a handful of groupers live on the site.

The gathering of massive numbers of animals in particular places and at specific times each year is among the most exciting of all wildlife events to witness. These temporary gatherings, which can number as many as hundreds of thousands of animals and may last for just a few hours each year, form for many reasons.

Some of the most spectacular are reproductive aggregations. While amazing to see, these wildlife events are far more than just spectacles of nature; they are significant ecosystem components, critically important sources of global fisheries and represent a large part of our marine biodiversity. They are also proving to be particularly challenging to manage and conserve.

Animals that spawn in aggregations, irrespective of body size, taxon or form, can move long distances to spawn, from hundreds of metres to thousands of miles. Demersal egg layers, as diverse as horseshoe crab, squid, flying fish, herring or triggerfish head for the substrate they need to locate mates and deposit their eggs. Pelagic spawners, such as many reef fishes, opt for outer reef slopes, channels and promontories. Seamounts, estuaries

and other coastal habitats are destinations for deep water and coastal species, from croakers to orange roughy, cod to haddock. A tiny handful of special large ocean patches are the preferred spawning grounds for highly mobile pelagics, such as certain tunas and marlin.

Massive marine gatherings have diverse and important ecosystem roles. The predictable mating aggregation of the horseshoe crab in Delaware Bay is an important food source for the migrating Atlantic red knot, while brief annual snapper aggregations in Belize are the stopping places for migrating whale sharks that evidently time their movements to gorge on the massive numbers of eggs produced. The egg 'boons' generated by high numbers of predictably concentrated adults are an exceptionally nutrient-rich trophic injection into the marine food web, while large biomass fluxes across tropical reefs characterize the seasonal movements of hundreds to thousands of tonnes of ripe reef fishes.

Large wildlife gatherings have evolved as phenomena that thrive on the abundance of animals coming together, and the reproductive or anti-predator benefits those numbers confer. However, abundance and predictability also

make them particularly vulnerable to unmanaged commercial exploitation. Damage to critical spawning habitat could be particularly devastating for some species. Indeed, the congregatory (the term used in Red List assessments) habit is one characteristic associated with many threatened marine fish species.

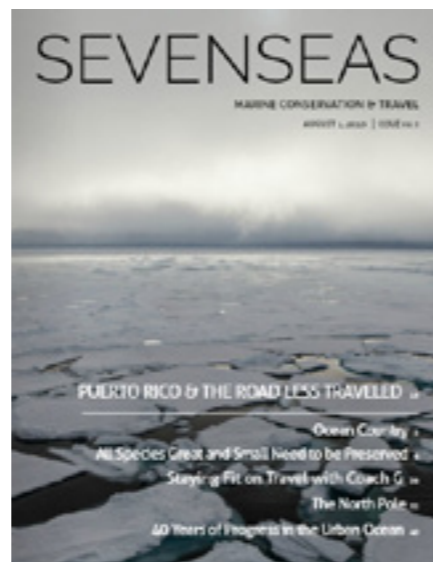
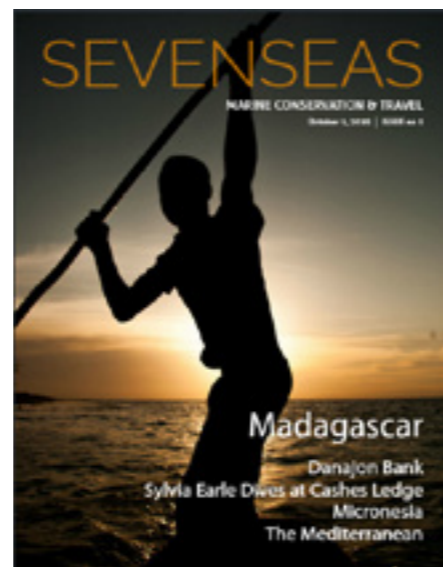
Unfortunately, in a world where it is crisis rather than caution that prompts action, it is particularly challenging to preserve large and intact natural gatherings while they are still large. Because of their importance and vulnerabilities, the IUCN SSC Marine Conservation Sub-Committee highlights the fragility of many marine animal congregations. Some merit conservation attention as Ecologically or Biologically Significant Marine Areas or Key Biodiversity Areas and many of these gatherings need truly precautionary management.

For more information, please contact Yvonne Sadovy de Mitcheson, Co-Chair MCSC (yjsadovy@hku.hk) and see www.SCRFA.org as well as the IUCN website. Information about the MCSC can be found under the Species Survival Commission (SSC) section.

Staying Connected: SEVENSEAS and Global Marine Community

If you haven't already stumbled upon it, SEVENSEAS is a new free publication aimed to bridge the gap between marine conservation and tourism. I got the idea for the magazine in May of 2015 when I realized marine conservation and travel were not only two of my passions, they were also the passions of hundreds of thousands of other people. Marine conservation and travel are intimately connected and absolutely dependent on each other. Working closely with the IUCN Global Marine Community, the magazine and website serves the community by focusing on conservation issues, stories

from the field, news, campaigns, travel destinations, expeditions, and opportunities to help or get involved. Though it was only launched a few months ago, SEVENSEAS has readers in 126 countries and draws the attention of new subscribers every day. The magazine itself has evolved into a well-respected conservation photography publication with contributions from the top scientists, photographers, and explorers around the world. To check-out the magazine, contribute, and to subscribe for free visit www.sevenseastravelmagazine.com



I signed-up with the IUCN Global Marine Community to stay connected. How about you?

As marine professionals we understand the connectivity between mountaintop removal and sedimentation on coral reefs, or how overfishing in some spawning grounds can have catastrophic impacts on fisheries an ocean away. Unfortunately sometimes we manage to misplace that same connectivity between accomplishments of colleagues in the field, opportunities at home, or news from a partner organization that can offer a unique opportunity for collaboration. For over eleven years, the IUCN Global Marine Community (formerly the DCMC) has served the marine conservation community by connecting YOU with announcements and opportunities every week with a newsletter delivered to your inbox. There, for free, you can find a

weekly round-up of international meetings and conferences, events, webinars, announcements, funding opportunities, and most popular, the weekly jobs list. To subscribe or submit to the IUCN Global Marine Community weekly newsletter email dcmc@iucn.org The IUCN Global Marine Community has also created a number of more informal ways for everyone in the community to connect, we covered social media with our presence encouraging everyone to reach out to tell their story, share their cause, and display their photography for the world to see. To connect please find us at facebook.com/GlobalMarineCommunity on twitter @iucn_marine and look at stunning photos from across the community and the globe at www.instagram.com/iucn_marine

For more information please contact Giacomo Abrusci (giacomo.abrusci@gmail.com).

Supporting emerging marine conservationists The IUCN WCPA Marine Young Professionals Task Force

Considering the global challenges that the world's ocean ecosystems continue to face, there is a growing interest from young people around the world to step up and make a difference. Marine conservation is often regarded as an exciting career choice by young people seeking to gain professional opportunities with academic institutions, government and/or non-government organisations (NGOs). There are however, very few global networks dedicated to supporting and simultaneously harnessing the excellent potential of emerging leaders for marine conservation.

In early 2015, the IUCN World Commission on Protected Areas Marine Group (WCPA Marine), in partnership with the WCPA Young Professionals Group, launched the WCPA Marine Young Professionals Task Force, a new global task force for young professionals aged 35 years and under showing leadership in marine conservation.

This Task Force acknowledges the dynamic synergies that occur when networks of inspired young professionals work together with one another and in intergenerational partnerships for social transformation and effective conservation of marine environments. The Task Force

supports the conservation work of WCPA Marine, whilst also providing a stronger profile for a growing global network of young professionals working to fulfil the Commission objectives on marine conservation worldwide. First established at the 2014 IUCN World Parks Congress (WPC) in Sydney, Australia, the Task Force was formally recognised in April 2015.

The Task Force is led by Co-Vice Chairs Mariasole Bianco and Katherine Zischka, active members of WCPA Marine and the WCPA Young Professionals Group. They are supported by the senior WCPA Marine leader, Professor Dan Laffoley, with the contribution of Dr Rebecca Koss, marine scientist and co-leader for the IUCN Task Force on the Intergenerational Partnership for Sustainability (IUCN IPS).

The Work of the Task Force - Engaging in collaborative partnerships

The Task Force membership embraces a wide multinational representation drawing on expertise from marine science, management, policy, law, governance, communication, education and outreach.

The initial focus of the Task Force is to progress innovative communication strategies for marine conservation and to facilitate intergenerational collaboration

by connecting young professionals with thematic work within WCPA Marine. The Task Force currently manages the online and social media presence of WCPA Marine via Facebook and the Protect

Planet Ocean MPA Blog, resulting in a significant increase in online outreach and engagement with a diverse public audience.

The Task Force is also working closely with partners from leading marine conservation initiatives such as #OceanOptimism, the Terra Mar Project, One More Generation, Seven Seas, and the IUCN Panorama Blue Solutions platform of the Inspiring Protected Area Solutions project, amongst others.

The UNFCCC's 21st conference of the parties (COP21)

The Task Force will be present at COP21 to emphasise the importance of MPAs in preserving biodiversity and the active role that YP can play in addressing climate change issues.

The IUCN World Conservation Congress

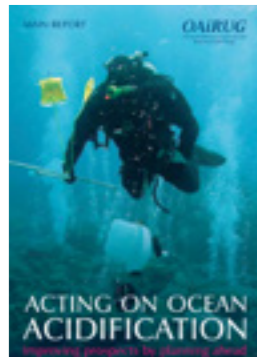
The Task Force is currently preparing for the world's largest global environmental conference - the IUCN World Conservation Congress in Hawai'i in September 2016. A series of activities will showcase the work of the Task Force (e.g. via poster presentation and networking events); will support the IUCN Global Marine and Polar Programme at the Marine Pavilion; and will facilitate opportunities for intergenerational networking and partnership between emerging and senior marine leaders to discuss innovative collaboration initiatives for progressing marine conservation globally.

Riding the Growing Swell of Inspiration

Find out more about the vision, mission, objectives and planned activities of the Task Force in the [Terms of Reference](#) or contact the Co-Vice Chairs at wcpamarine-yp@gmail.com.



From the left: Kathy Zischka, Mariasole Bianco, Rebecca Koss



Acting on Ocean Acidification: Improving prospects by planning ahead

Ocean Acidification poses a great threat to our future. This report details the level of current scientific knowledge on this topic, focusing in particular on the negative impacts of ocean acidification. It then turns to make six key recommendations to be implemented within the next ten years: including improved forecasting systems, generating risk awareness and increasing scientific cooperation. The report concludes by identifying the mismatch between current initiatives and future requirements, underlining the shortcomings of the existing system and offering practical advice on what needs to be done to create valuable change.



Bridging the Gap Between Ocean Acidification Impacts and Economic Valuation

A second international workshop on Ocean Acidification was held in November 2012, involving 55 experts from 19 countries alongside other international organisations. The findings of this workshop are published in the report, divided into regional reports on the specificities of the region and then predicted biological and economic impacts, as well as relevant policy recommendations. This comprehensive report provides an up-to-date picture of the current situation across different regions.



Keep it Fresh or Salty: An introductory guide to financing wetland carbon programs and projects

In recent years, governments, international actors and local communities have begun to look to the role of wetlands conservation and restoration in climate change mitigation. Though the motivation is there, it can be difficult to find appropriate funding source to set up a wetland carbon program or project. This report provides guidance for developers in developing countries on the various funds and finance mechanisms that can enable them to implement wetland carbon conservation and restoration programs or projects.



Guidance on Port Biological Baseline Surveys (PBBS)

Port Biological Baseline Surveys are inventories of the existing marine life in and around commercial ports. These surveys are an essential part of Ballast Water Management (BWM), which aims to prevent the introduction of Non-Indigenous Species (NIS), which can be carried from one marine environment to another via the ballast water of ships. The baseline of biological data helps inform policy makers what measures are effective in preventing NIS introductions into the marine environment. This report details the benefits of PBBS, then provides guidance on how a PBBS should be designed and carried out, including how to manage data and cooperate with other countries.

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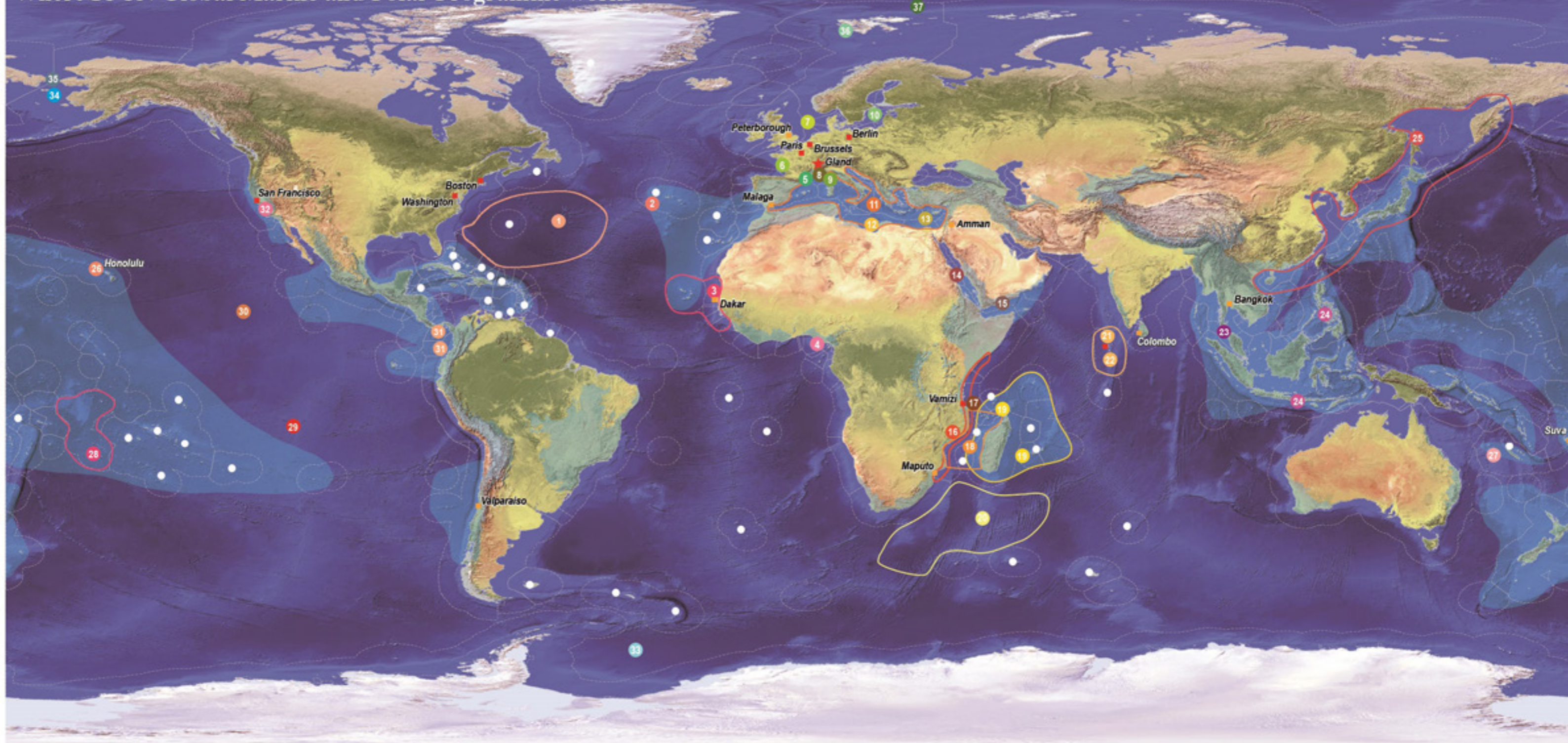
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MAJOR PROJECTS

- BEST Initiative - Biodiversity and Ecosystem Services in Territories of European Overseas
- Caribbean & Atlantic**
 - 1 Sargasso Sea Commission
 - 2 Microplastics Initiative
 - 3 Marine Protected Area & Fisheries
 - 4 Niger Delta Panel
- Europe, Mediterranean & Red Sea**
 - 5 Sustainable Aquaculture Fish Feed
 - 6 Sea for Society
 - 7 North Sea Industry Engagement
 - 8 Ocean Acidification RUG - Monaco
 - 9 Marine Protected Areas & Aquaculture - Monaco
 - 10 Ocean Warming
 - 11 MPA Networks & Integrated Coastal Zones Management

- 12 Marine Monitoring & Indicators - Country legislation review and administration - North Africa
- 13 MPA Strategies, Networks Development and Fisheries - Eastern Mediterranean
- 14 Surveys of Ray and Sharks - Sudan
- 15 Yemen LNG Scientific Advisory Panel
- Indian Ocean**
 - 16 Fair Coasts - Mozambique
 - 17 Marine Research & Conservation Center - Vamizi
 - 18 Marine Spatial Planning - Mozambique Channel
 - 19 Connectivity of Loggerhead turtles - Mayotte Island
 - 20 South-Western Indian Ocean Deep Sea Ecosystems - Walters Shoal
 - 21 Whale Sharks and Manta Rays - Maldives
 - 22 Coral Reefs & Climate Change (REGENERATE) - Maldives

- Pacific**
 - 23 Total Foundation Seagrass - Haad Chao Mai Natural Park
 - 24 Blue Solutions - Philippines & Bali
 - 25 Western Gray Whale Range-wide Conservation Initiative
 - 26 World Conservation Congress - Hawaii
 - 27 South Pacific Regional MPA Network
 - 28 Cook Islands Marine Park
 - 29 Open Ocean Carbon
 - 30 Deep Sea Mining
 - 31 Blue Carbon - Panama & Colombia
 - 32 LME Google Layer & Toolkit
- Polar regions**
 - 33 Network of Antarctic MPAs
 - 34 Maritime Safety for Bering Strait Small Vessels Pilot Program
 - 35 Development of Voluntary Measures for Shippers to Ensure Safety & Stewardship - Bering Strait
 - 36 Ocean Acidification in Arctic Fjords
 - 37 Arctic Plastics Project

- EEZ (Marineregions)
- Marine Biodiversity Hotspots (CI)
- Land Biodiversity Hotspots (CI)



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