



Looking
ahead with
optimism

2021 - Reasons to be cheerful

by Christopher Barrio Froján, GOBI Secretariat

Let's face it, 2020 hasn't exactly been the brave new start to a decisive decade long anticipated. But if there's one silver lining to cling to, the enforced global hiatus has allowed a period of rare contemplation and appraisal amidst the first-world pressures of decluttering, home schooling, step counting and soufflé baking. The pandemic has also thrown into sharp relief both the Achilles' heel and the resilience of our support systems, a resilience that is not infallible should we continue to pursue economic progress with little regard to the natural world that underpins it. Prolonged prosperity relies on predictable stability, and it is that stability that is becoming less predictable – particularly in the ocean – as the unprecedented effects of man-made climate change and biodiversity loss become apparent.

Fortunately, we are still at a stage where the environmental damage already done can be broadly alleviated, but it will take concerted effort and enduring willpower by all of society to redefine our toxic concept of prosperity and reverse the current trend of environmental decline. To help us on this path, an up-to-date and attainable narrative aimed at preserving and expanding options and opportunities for future generations and a healthier planet has been proposed by the International Programme on the State of the Ocean¹, in which it makes six scientifically informed points that everyone can understand and act upon. Importantly, collaborative early action will be more successful and less costly.

At the forefront of the charge for change are the tireless scientists, law-makers, diplomats, financiers, advocates and

influencers involved in high-level international negotiations for a cross-cutting post-2020 global biodiversity framework, spearheaded by the Convention on Biological Diversity (CBD; see page 4). Discussions at the various global, regional and virtual consultation workshops across the world have necessarily had to incorporate provisions to tackle some of the societal inequalities the pandemic has highlighted. The late inclusion of such unforeseen provisions in the post-2020 framework can only strengthen its purpose to deliver a roadmap to a future that is fair, sustainable and attainable for all. The official launch of the post-2020 global biodiversity framework at the CBD's COP 15 in Kunming, China (rescheduled to 2021) is highly anticipated.

Hand in hand with CBD COP 15, the UN Climate Change COP 26 to be held in Glasgow, UK (rescheduled to November 2021) offers an opportunity for States to collaborate and commit to accelerate progress towards the goals of the Paris Agreement: reduce CO₂ emissions as soon as possible, help societies adapt to climate change, and invest in renewable energy technologies. As emphasised by the six narrative themes for reactivating conservation efforts post pandemic, humans, the ocean, biodiversity and climate are inextricably linked, and ocean and climate action must be undertaken together. Protecting ecosystems most resilient to climate change as biodiversity refuges, and promoting the restoration of degraded ecosystems that sequester CO₂ should be a priority.

Informing the negotiators and conservation managers with actionable facts and figures are the networks of research

leaders and their countless collaborators whose findings are vital for improving our understanding of the natural world. Advances in knowledge and the facilitation of interdisciplinary collaboration enable more effective action (a point clearly demonstrated by the extraordinarily swift development of COVID-19 vaccines across the world), as well as an assessment of whether existing action is working as predicted². Recent notable contributions to the advancement of actionable knowledge include the results from marine protected area prioritisation exercises, and the recognition of the importance of connectivity^{3,4,5} for the maintenance of ecological networks⁶. GOBI and its partners are at the forefront of contributing significant knowledge and tools to advance both fronts; for example, BirdLife International's seabird tracking and distribution modelling to future-proof MPA design under climate change scenarios⁷(page 5) and its investigation into MPA network design to protect Antarctic biodiversity (page 10). Regulation of remote or hard-to-reach places for the protection of biodiversity (e.g., the poles, the deep sea, areas beyond national jurisdiction; page 6), will be one of the key challenges for the decade ahead^{8,9}.

An integral yet seldom considered (by non-specialists) aspect to all this work and the challenges ahead is financing

the transition from an unsustainable *status quo* to a sustainable future benefitting all levels of society. Thankfully, experts in this field continue to develop innovative financing structures and investment opportunities to make such a transition economically favourable, mitigating the inevitable losses and enabling progress towards a sustainable ocean economy¹⁰ centred largely on nature-based and nature-positive solutions¹¹.

The 2020s may not have got off to the most auspicious start, but in a similar vein to the optimism and prosperity that emerged out of hardship during the Roaring Twenties of the previous century, the upcoming UN Decade of Ocean Science for Sustainable Development 2021-2030 – bolstered by our heightened awareness of the consequences of inaction and the commitments by CBD COP 15 and Climate Change COP 26 – will deliver transformative change by harnessing natural solutions, enhanced technology and shared information systems brimming with trustworthy data. Most importantly, decisions and actions should take into consideration all human societies, as well as our fellow symbionts on this precious living planet. "Happy New Year!" never sounded so good.

² Kühl et al. (2020) Effective biodiversity monitoring needs a culture of integration. DOI: 10.1016/j.oneear.2020.09.010

³ Cabral et al. (2020) A global network of marine protected areas for food. DOI: 10.1073/pnas.2000174117

⁴ Cashion et al. (2020) Shifting seas, shifting boundaries: dynamic marine protected area designs for a changing climate. DOI: 10.1371/journal.pone.0241771

⁵ Maxwell et al. (2020) Area-based conservation in the twenty-first century. DOI: 10.1038/s41586-020-2773-z

⁶ Hilty et al. (2020) Guidelines for conserving connectivity through ecological networks and corridors. DOI 10.2305/IUCN.CH.2020.PAG.30.en

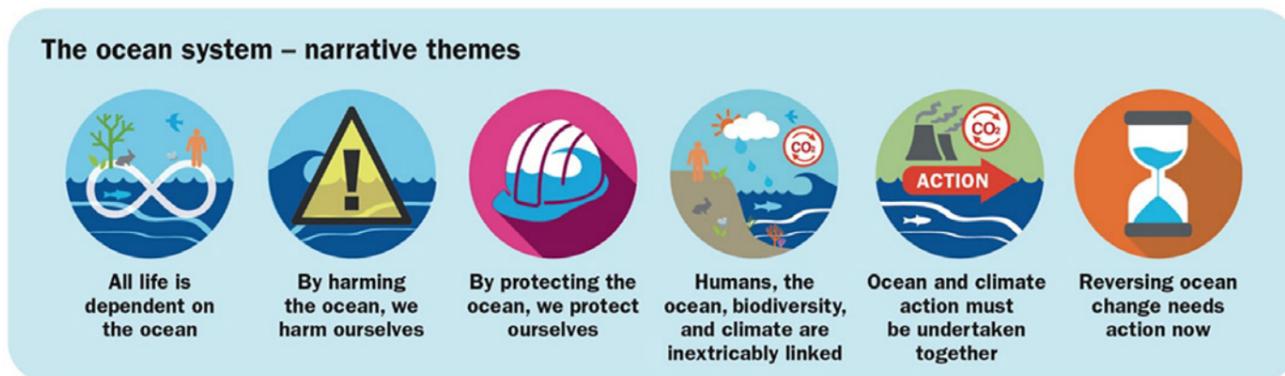
⁷ Hindell et al. (2020) Tracking of marine predators to protect Southern Ocean ecosystems. DOI: 10.1038/s41586-020-2126-y

⁸ Howell et al. (in press) A blueprint for an inclusive, global deep-sea Ocean Decade field programme. DOI: 10.3389/fmars.2020.584861

⁹ Olsen et al. (2020) Future oceans under multiple stressors: from global change to anthropogenic impact (Editorial). DOI: 10.3389/fmars.2020.606538

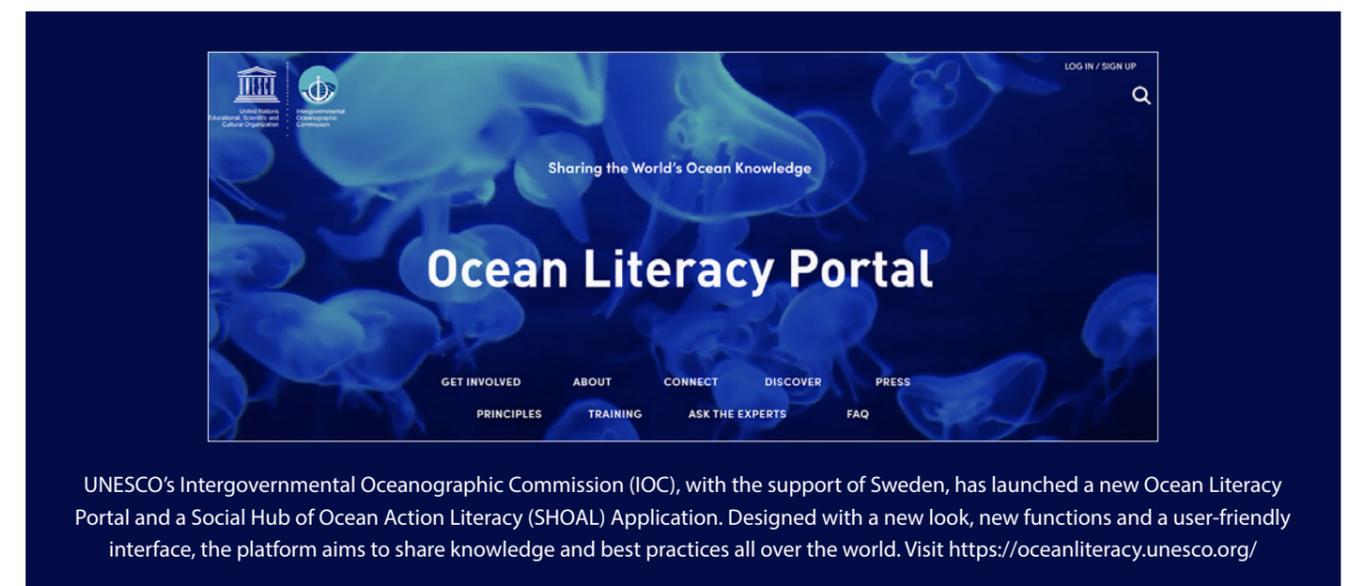
¹⁰ Sumaila et al. (2020) Ocean finance: financing the transition to a sustainable ocean economy. Blue Paper commissioned by the High Level Panel for a Sustainable Ocean Economy. www.oceanpanel.org/bluepapers/ocean-finance-financing-transition-sustainable-ocean-economy

¹¹ Stuchtey et al. (2020) Ocean solutions that benefit people, nature and the economy. Report commissioned by the High Level Panel for a Sustainable Ocean Economy. www.oceanpanel.org/ocean-action/people-nature-economy-report



Above: The six-point post-COVID-19 narrative, developed by leading marine scientists and presented in Laffoley et al. (2020)

¹ Laffoley et al (2020) Evolving the narrative for protecting a rapidly changing ocean, post COVID-19. DOI: 10.1002/aqc.351



UNESCO's Intergovernmental Oceanographic Commission (IOC), with the support of Sweden, has launched a new Ocean Literacy Portal and a Social Hub of Ocean Action Literacy (SHOAL) Application. Designed with a new look, new functions and a user-friendly interface, the platform aims to share knowledge and best practices all over the world. Visit <https://oceanliteracy.unesco.org/>

Developing the post-2020 global biodiversity framework in the midst of a pandemic

by Joseph Appiott, CBD Secretariat

2020 was set to be the “Super Year for Oceans and Biodiversity”, with various global negotiations expected to culminate in this landmark year. But COVID-19 had other plans. And, sadly, 2020 has become a landmark year for an entirely different reason.

Under the CBD, major efforts have been underway to develop the post-2020 global biodiversity framework, which was set to be adopted at the 15th meeting of the Conference of the Parties to the CBD at its originally-scheduled dates in October 2020.

The post-2020 framework will contain a new set of global goals and targets for biodiversity, as the successor to the Aichi Biodiversity Targets, which were adopted by the CBD COP in 2010 and are reaching their 2020 deadline.

The framework is being negotiated in the Open-ended Working Group on the Post-2020 Global Biodiversity Framework, led by the Working Group co-chairs Mr Francis Ogwal (Uganda) and Mr Basile van Havre (Canada). The Working Group has met twice thus far and is expected to meet once more prior to COP 15. Consultations and thematic workshops have been held for all regions, as well as on specific thematic issues, to solicit views and input on potential goals, targets and indicators for the post-2020 framework.

The process to develop the post-2020 framework was started following CBD COP in 2018 and was on track when the COVID-19 pandemic hit. Just as the pandemic has impacted nearly every aspect of our lives, it has also drastically impacted multilateral processes, forcing the cancellation or postponement of CBD meetings to negotiate and finalise the post-2020 framework.

The 5th Global Biodiversity Outlook (GBO-5) found that, despite progress in some areas, we have not fully achieved any of the Aichi Biodiversity Targets. This outlines the urgency of developing the new framework to put the world on a track to a sustainable future for the planet.

So, the CBD Secretariat and CBD Parties have been grappling with how to advance the negotiations on the post-2020 framework in this unprecedented time, while also ensuring to maintain an inclusive, participatory and transparent process.

There remain critical discussions to be held in the lead-up to CBD COP 15, in particular:

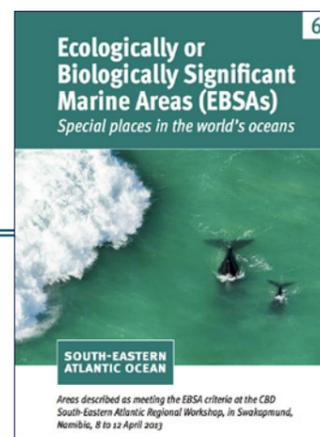
- The 24th meeting of the Subsidiary Body on Scientific, Technical and Technological Advice, which will include discussions on indicators and monitoring frameworks for the post-2020 framework
- The 3rd meeting of the Subsidiary Body on Implementation, which will include discussions on support and review implementation, including implementation support mechanisms, enabling conditions, responsibility and transparency and outreach and awareness for the post-2020 framework
- The 3rd meeting of the Open-ended Working Group on the Post-2020 Global Biodiversity Framework

The exact timing and modalities of these meetings remain to be seen, but hopefully will be decided soon so that we can urgently put in place the new global goals and targets that we need to collectively raise our ambition and reverse trends in global biodiversity loss.

Fresh out of the box

The sixth booklet in the series illustrating EBSAs in various regions around the world is just out. This edition covers EBSAs in the South-Eastern Atlantic Ocean, described at the workshop held in Swakopmund, Namibia in April 2013.

Available in English and French at www.cbd.int/marine



Projecting how climate change will impact albatross migrations

by Marius Somveille, Maria Dias and Tammy Davies, BirdLife International

Anthropogenic climate change is affecting how species distribute on Earth. Highly mobile species are likely to respond to changing climatic conditions by modifying their movement patterns and shifting their geographical distributions. Conservation actions and ecosystem management measures need to consider where species are likely to move to in the future in order to remain effective in the long term.

Pelagic seabirds, such as albatrosses, are highly threatened by human activities, notably fisheries. With climate change, these species are likely to have an increased overlap with fisheries and thus at greater risk of being accidentally caught by fishers. Predicting future shifts in distribution and seasonal movements of seabirds could help regional fisheries management organisations (RFMOs) to adapt their strategies for implementing seabird bycatch mitigation measures.

Projecting changes in species’ distributions under climate change scenarios is a challenging problem to address. It has traditionally been done using ecological niche models and habitat models, which are statistical approaches that relate empirical occurrence data for the species of interest with climate data. However, such an approach has limitations for predicting how highly mobile pelagic species will distribute outside of their breeding season, because it does not account for the movement behaviour of species. It also relies on tracking data that are highly auto-correlated (i.e., they reinforce self-mimicking trends that may be spurious) and only available for a small proportion of the population.

As an alternative approach, we used a mathematical model that simulates migratory movements explicitly to predict how climate change might affect the large-scale non-breeding distribution of albatrosses in the southern Indian Ocean. This model is based on two environmental factors: attraction to resources (using chlorophyll-*a* concentration as a proxy for food supply; albatrosses feed primarily on plankton-eating fish and squid) and wind. It is able to generate migration patterns that closely match empirical tracking data for several species of albatrosses breeding on Amsterdam, Kerguelen and Crozet Islands.

We calibrated the model to best match the empirical tracking data in the present day, and used the best-fit model to simulate migration patterns of the albatrosses in

the future using predicted environmental conditions for 2100 based on a high CO₂ emissions scenario. Our future projections suggest that by the end of the century, changes in wind patterns and resource supplies will not affect significantly the broad-scale distribution of non-breeding albatrosses in the southern Indian Ocean. In particular, our model predicts limited change in the latitudinal use of the ocean by albatrosses and that these species will overlap with fisheries in a largely similar fashion at the end of the century compared to today. Our results suggest that large-scale bycatch mitigation measures within RFMOs will continue to be a key component of albatross conservation for the next hundred years of climate change.

However, some noticeable changes are predicted by the model for Amsterdam albatross, the largest albatross in this study. This species was found to be particularly affected by wind and therefore by changes in wind patterns under climate change. Our model predicts that, at the end of the century, this species will tend to migrate further eastwards (towards New Zealand) than it currently does and will see its non-breeding distribution generally shifting slightly poleward. These changes might affect how such threatened species should be managed in the future.

Using simulation-based models of migratory movement, calibrated using tracking data, has a strong potential for predicting the impact of climate change on highly mobile species. Future work could explore how such an approach can be combined with traditional statistical approaches in order to refine future prediction and inform conservation decision-making at finer scales.



Somveille et al. (2020) Projected migrations of southern Indian Ocean albatrosses as a response to climate change. *Ecography*. DOI: 10.1111/ecog.05066

The ocean's "twilight zone": climate risks at the next fisheries frontier

by Glen Wright, Institut du développement durable et des relations internationales (IDDRI)

Little light reaches the mesopelagic zone, the waters of the open ocean at a depth between approximately 150 and 1,000 metres. Most of the world's fish live there, alongside a diverse range of crustaceans, cephalopods and gelatinous zooplankton ("jellies"), yet our scientific knowledge of this vast midwater realm remains limited.

Many mesopelagic organisms make a daily journey through the water column (up in the evening, down at first light), a phenomenon known as "diel vertical migration". This massive migration to access food under the cover of darkness transfers energy from the highly productive surface waters to the austere depths below and acts as a "biological pump"

that locks away huge quantities of carbon as waste products sink to the ocean floor.

Lanternfish (*myctophids*), a family of about 250 species of small fish, are particularly abundant. They are a key link in marine food webs, feeding on plankton before themselves falling prey to tuna and other commercially important species.

The possibility of harvesting these fish has been known since the 1970s but few concerted efforts have been made to exploit them. Not only were lanternfish hard to catch and process, they are unpalatable and may contain harmful

toxins. Recent technological advancements have made it easier to process these fish for use in aquaculture and nutritional supplements.

The international community has often been particularly slow to regulate new fisheries on the high seas, i.e. the waters beyond the national jurisdiction of any one country. As mesopelagic species and ecosystems play a critical role in the carbon cycle and marine food webs, their mismanagement could have profound global ramifications.

The UN Convention on the Law of the Sea (UNCLOS, 1982), the "Constitution for the Ocean", accorded all States the right to fish in international waters but included little guidance on how they should discharge their environmental obligations. The UN Fish Stocks Agreement (1995) provided further detail on how States should cooperate on the management of highly migratory and jurisdiction-straddling fish stocks, such as tuna, resulting in the creation of a plethora of Regional Fisheries Management Organisations (RFMOs). These organisations, essentially groups of States with an economic interest in a fishery, have generally focused on managing a handful of stocks¹ and have long been criticised for opaque decision-making² processes and failure to address biodiversity concerns.

International law requires a State to seek approval for a new high seas fishery from the relevant regional management body, but a proposal would not be subject to a thorough environmental assessment, nor would stakeholders have an opportunity to object or provide input. This effectively leaves the governance of mesopelagic fisheries, and the fate of the globally significant ecosystem services they provide, in the hands of a few fishing States.

Negotiations for a new agreement on high seas biodiversity³ are currently ongoing, providing an important opportunity to reinforce existing environmental obligations and stimulate closer cooperation. The agreement could strengthen the governance framework for mesopelagic fisheries by requiring comprehensive environmental assessments and providing for the designation of protected areas. But the negotiations have been delayed by the coronavirus pandemic and it will be years before an agreement has any impact on the water.



Above: Negotiations for a new agreement to protect high seas biodiversity have been delayed by the coronavirus pandemic. Image courtesy IISD.

A range of scientific projects is underway⁴ that aim to shed light on the twilight zone, and some deep-sea scientists are calling for a moratorium⁵ on mesopelagic fisheries to allow the science to advance before exploitation begins. There are many precedents for such a moratorium at the global level, most recently an international agreement to protect the Central Arctic Ocean⁶.

In the short term, a precautionary pause on the development of commercial fisheries in the mesopelagic zone is advisable. Opportunities to advance our scientific understanding and establish effective governance mechanisms are already on the horizon through the UN high seas biodiversity negotiations and Decade of Ocean Science. Now is the moment to understand and protect the twilight zone, before it is too late.

Read the full article:

Fishing in the twilight zone – illuminating governance challenges at the next fisheries frontier, by Glenn Wright and colleagues, in IDDRI 2020, Study No.6/20. ISSN: 2258-7535. www.iddri.org/en/publications-and-events/study/fishing-twilight-zone-illuminating-governance-challenges-next



Above: A selection of mesopelagic lanternfish. Light-producing photophores are visible on the side and belly, which may be used for camouflage and communication. Image courtesy Paul Caiger, Woods Hole Oceanographic Institute

1 Crespo, G.O. et al. (2019) High-seas fish biodiversity is slipping through the governance net. DOI: 10.1038/s41559-019-0981-4

2 Fischer J. (2020) How transparent are RFMOs? Achievements and challenges. DOI:10.1016/j.marpol.2020.104106

3 Wright, G. et al. (2018). The long and winding road: negotiating a treaty for the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction. IDDRI, Studies N°08/18, 82 pages

4 <https://jetzon.org>

5 Martin et al. (2020) The oceans' twilight zone must be studied now, before it is too late. DOI 10.1038/d41586-020-00915-7

6 <https://arctic-council.org/ru/news/exploring-the-arctic-ocean-the-agreement-that-protects-an-unknown-ecosystem/>

Reaping rewards: Identified IMMAs are leading to real protection

By Erich Hoyt, Co-chair of the IUCN Marine Mammal Protected Areas Task Force

For the past four years, a group of experts from the IUCN Marine Mammal Protected Areas Task Force has dedicated its time to refining and launching a new tool for the benefit of marine mammal conservation, namely Important Marine Mammal Areas (IMMAs). The IMMA tool highlights areas that are important for one or more marine mammal species, and which have the potential to be managed for conservation.

IMMAs are modelled on the concept of BirdLife International's Important Bird and Biodiversity Areas (IBAs), but with criteria specially tailored to marine mammal species. Marine mammals include 90 species of whales, dolphins and porpoises (cetaceans), 35 species of seals and sea lions (pinnipeds), and not forgetting sea otters, manatees, the dugong, and the polar bear. These charismatic megafauna are ideal indicators of the biodiversity and health of the vast ocean.

Part of the Task Force's job has been organising intensive week-long regional workshops with groups of 20-40 marine mammal scientists, who bring their expertise and knowledge

to the task of defining areas important for marine mammals in a particular region. Candidate IMMAs (cIMMAs) are described during the workshops using a standardised format, which is submitted to an independent review panel. Following review, the panel either approves the candidate sites as full IMMAs, or concludes that there is insufficient evidence to support approval. Approved IMMAs are placed on the IMMA e-Atlas, the central open-access online repository for all results from this process. The cIMMAs that do not make the grade at the time of review typically acquire the lesser status of Areas of Interest (Aoi), while a few may remain as cIMMAs if they fail to be approved on an easily rectified technicality (e.g., lack of access to existing data or failure to respond in time to the review panel's comments).

In February 2020, the Task Force delivered the sixth regional IMMA workshop (the fourth of five supported by GOBI and IKI) in Perth (Australia), which covered Australia, New Zealand, and the Southeast Indian Ocean. From 45 cIMMAs described during the workshop, 31 have been approved as IMMAs following review, recognising resident Australian and

New Zealand species, many of them endemic or placed in one of the IUCN threatened categories. In addition to the Australia-New Zealand IMMAs, 13 IMMAs were approved in the Southern Ocean around Antarctica in August 2020.

In total, 159 IMMAs now cover the ocean across most of the southern hemisphere and the Mediterranean Sea — an area of 15,672,267 km², equal to one-third of the ocean surface. In addition, 24 areas remain as cIMMAs and 130 sites are retained as Aoi. Both cIMMAs and Aoi are useful for monitoring and stimulating further research, potentially leading to their becoming IMMAs in the future.

Implementing IMMAs

The IMMA tool is worth little if it is not used. As of early 2020, the Task Force had received 78 requests for IMMA shapefiles and metadata, which hints at the potential conservation value to a wide range of users around the world, including governments, intergovernmental organisations, NGOs, industry, the wider ocean-focused scientific community, and the general public.

IMMAs are already leading to conservation results:

- The creation of IMMAs has helped shape MPA proposals in Vietnam and Bangladesh, e.g., contributing to the declaration in June 2019 of the Nijhum Dwip MPA and National Park in Bangladesh. The Task Force's expert international scientists and the robustness of the IMMA process lent authority to those proposing the MPAs, giving both specific boundaries and attention to the species used for IMMA identification.
- In November 2019, the Task Force co-chairs travelled to Mozambique to see the recently approved Bazaruto Archipelago to Inhambane Bay IMMA, and to talk to government officials and stakeholders. This IMMA is a biodiverse haven for the last viable East African population of dugong, as well as endangered Indian Ocean humpback dolphins and humpback whales. A South African energy and chemical company held rights to explore and develop two ocean blocks in the middle of the IMMA. However, after the visit to Mozambique, and following media coverage and appeals to government and the company, it returned the blocks to the government. The Mozambique government is now being asked to expand the remit of the Bazaruto Archipelago National Park to include the full IMMA.
- In 2019, the US Navy adopted IMMAs as areas where low frequency sonar use would be curtailed to avoid killing or seriously harming vulnerable whale species.
- The International Whaling Commission has agreed to use IMMAs and shipping traffic data to examine and address the threat to cetaceans from ship collisions.

In addition to the above, the Task Force has forged agreements with the UN Convention on Migratory Species and Convention on Biological Diversity — and held discussions with the International Maritime Organization — to utilize IMMAs in conservation planning.

Future plans for IMMAs

Under the current support structure from GOBI and IKI, the Task Force has one more regional IMMA workshop region to deliver, covering the southeast temperate to tropical Pacific, from Mexico to Chile. The workshop has been postponed due to COVID-19 travel and meeting restrictions, but it is tentatively planned for later in 2021 in Costa Rica. Additional funding to support the application of the IMMA process in the remaining 10 regions across the northern hemisphere and the South Atlantic is being sought.

Updating regions as marine mammal research continues to expand into new areas, particularly on the high seas, will also be necessary in the future. The Task Force is hopeful that new technologies – satellite photographs, environmental DNA (e-DNA), wave gliders that can move across the ocean listening to marine mammals, and remote passive acoustic recorders, among other devices – will enable better access to data from oceanic areas beyond national jurisdiction. These technologies can greatly add to our knowledge of which areas are important for marine mammals and thus provide more robust data to inform indicators for biodiversity conservation.



A network of marine protected areas for Antarctic wildlife: implications for penguin populations

by Jonathan Handley, BirdLife International



Image courtesy Christian Aslund

Just over 200 years ago, explorers set eyes on Antarctica for the first time. Today, a network of large MPAs has been designed, capable of supporting many important populations of Antarctic wildlife in the Southern Ocean. Yet, despite nearly a decade of negotiations, the majority of these MPAs have yet to be formally approved, as two of 26 member States – in a management framework where consensus matters – argue that there is still insufficient evidence supporting their design. In an international collaboration, scientists from seven countries are embarking on an effort to identify some of the most important places for an iconic group of Antarctic wildlife, the penguins. These remarkable birds are one of the few animals in Antarctica uniquely linked between land and sea. Key threats these birds face in Antarctic waters are competition with fisheries and climate change. Results from the team's study aim to offer additional guidance as to where decision-makers should act before further perturbation occurs in the Antarctic marine ecosystem.

Twenty-five countries together with the European Union send delegations to the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), the body responsible for managing the marine environment of Antarctica. The objective of CCAMLR is to conserve Antarctic marine life while also allowing for sustainable harvesting. To support this objective, several MPAs have been designed that allow for a range of protective measures for species in areas that fisheries can operate. Despite an abundance of evidence supporting the MPAs designs, CCAMLR members have not been able to reach consensus on the formal

designation of the MPAs. Two countries argue insufficient evidence has been provided.

Outside the Antarctic, BirdLife International has been providing evidence of some of the most important places for birds and their associated biodiversity through the Important Bird and Biodiversity Areas Programme for over four decades. These are areas established against an internationally agreed set of criteria. In the Antarctic, identifying these areas for penguins requires two things: knowing how many birds there are and where they go. Fortunately, the exploration of Antarctica and recent advances in satellite imagery have allowed us to determine approximately how many birds there are at different breeding colonies across the continent. The main species we focused on were Adélie (*Pygoscelis adeliae*), Chinstrap (*Pygoscelis antarcticus*), Gentoo (*Pygoscelis papua*) and Emperor penguins (*Aptenodytes forsteri*). Satellite tracking devices have also given us estimates of the birds' general and core at-sea distributions during key times of year. With this information, we can determine where some of the most important at-sea areas for penguins breeding in Antarctica are: marine Important Bird and Biodiversity Areas (marine IBAs). We will then assess how these important areas overlap with the current network of adopted and proposed MPAs surrounding Antarctica.

CCAMLR does an amazing job of recording where licensed fishers operate and how much they catch; vital information for better management of the marine system. This information will support us in assessing what level of fishing is occurring

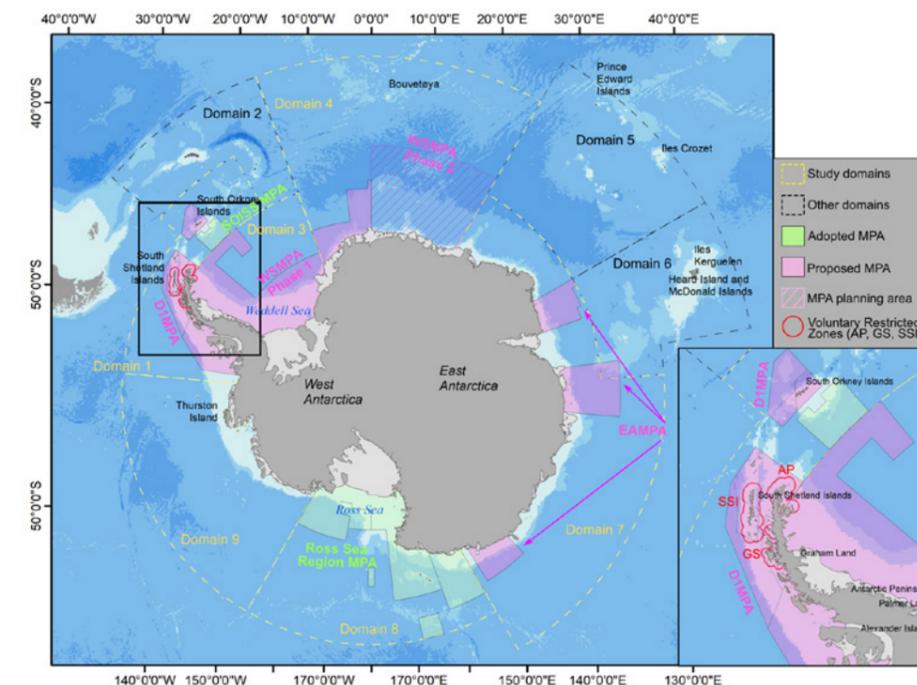
within or beyond the bounds of the important areas we identify for penguins, and whether these levels might be disproportionately high inside marine IBAs or not. Several recent studies have highlighted the likely impacts that localised krill fisheries are having on penguin populations in certain parts of Antarctica. Therefore, this study focuses on catches by the krill fishery; krill is a major prey item for three of the four penguin species we use to identify marine IBAs, Adélie, Chinstrap and Gentoo Penguins, krill is also an important diet component for Emperor penguins.

Ultimately, there is a growing body of knowledge showcasing how spatial management surrounding Antarctica could contribute to the prosperity of numerous Antarctic marine wildlife. Examining the full body of evidence will be critical. Acting on climate change will require efforts from CCAMLR member states and individuals far beyond the bounds of Antarctica. However, even without a complete understanding of how climate change will alter Antarctica in the future, acting on the potential consequences of

overexploitation, the primary driver of biodiversity loss across the planet, is well within reach. Solutions exist and have been showcased several times across different ecosystems. Importantly, individuals also have the power to act from afar, by questioning and querying where food comes from, how it was produced, and what social or environmental standards are in place for its production.

Antarctica and the waters that surround it are a key area where we have a great opportunity to implement best practice solutions for harvesting and protection of marine biodiversity. CCAMLR and its members have already played a leading role toward achieving this objective. Now, they have an unprecedented opportunity to further their position as leaders in marine conservation by designating some of the largest MPAs on earth, enhancing the conservation and preservation of this globally connected ecosystem.

Support for this project was provided by The Pew Charitable Trusts.



Left: CCAMLR MPA planning domains in which the identification of marine IBAs for penguins is underway (Domains 1, 3, 4, 7, 8 and 9). Adopted MPAs within the planning domains include, the Ross Sea Region MPA and the South Orkney Islands Southern Shelf MPA (SOISS MPA). Proposed MPAs include the Domain 1 MPA (D1MPA), Weddell Sea MPA Phase 1 (WSMPA Phase 1) and the East Antarctica MPA (EAMPA). Also shown are the Weddell Sea MPA Phase 2 Planning Area (WSMPA Phase 2) and the Voluntary Restricted Zones (VRZs) in which a majority of krill fishing fleets have limited their operations in certain regions during parts of the summer (AP: Antarctic Peninsula: 1 Oct – 1 Feb, GS: Gerlache Strait: 15 Oct – 15 Feb, SSI: South Shetland Islands: 1 Nov – 1 Mar). Inset map area indicated by black bounding box



Contributing to hybrid governance to protect and manage remarkable areas on the high seas: Tropical East Pacific and Northwest Atlantic Oceans

by Teresa Mackey (Sargasso Sea Commission) and Katherine Arroyo (MarViva Foundation)

In Spring 2020, the fourth session of the Intergovernmental Conference on an International Legally Binding Instrument under the UN Convention of the Law of the Sea on the conservation and sustainable use of marine biological biodiversity of areas beyond national jurisdiction was postponed due to the coronavirus pandemic. Despite this delay, many organisations continue to envision possibilities for the future of high seas governance.

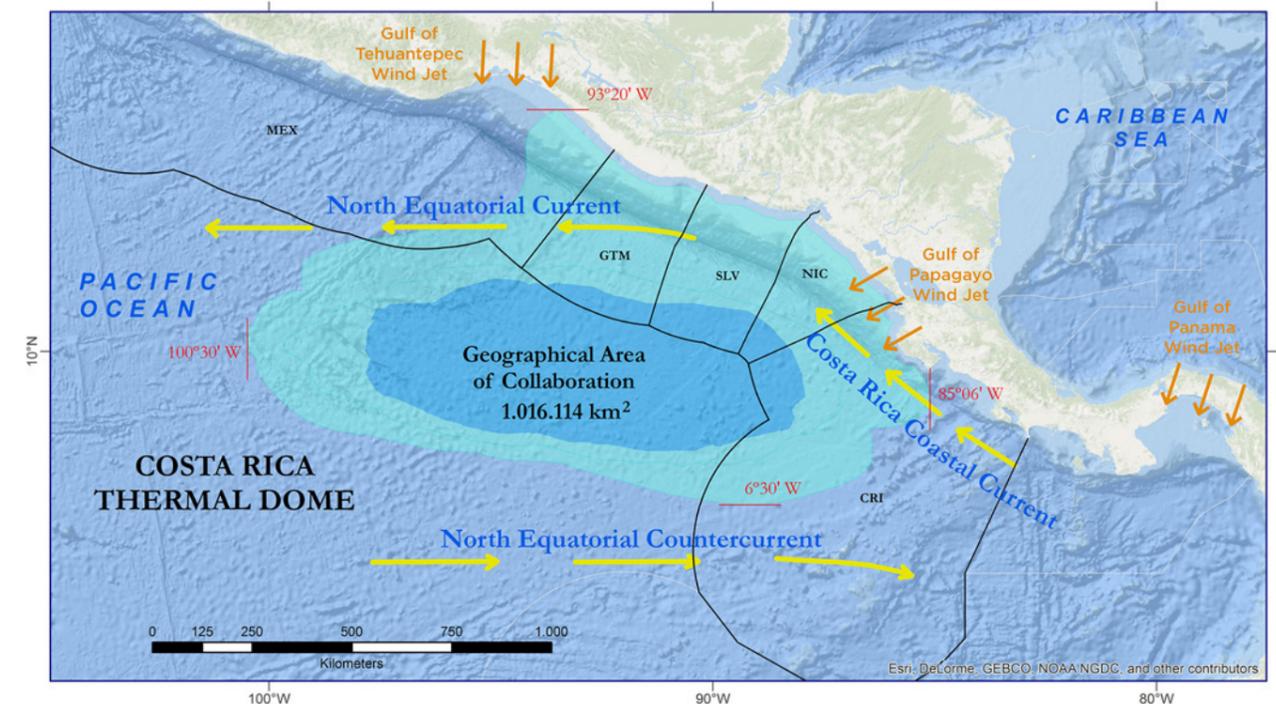
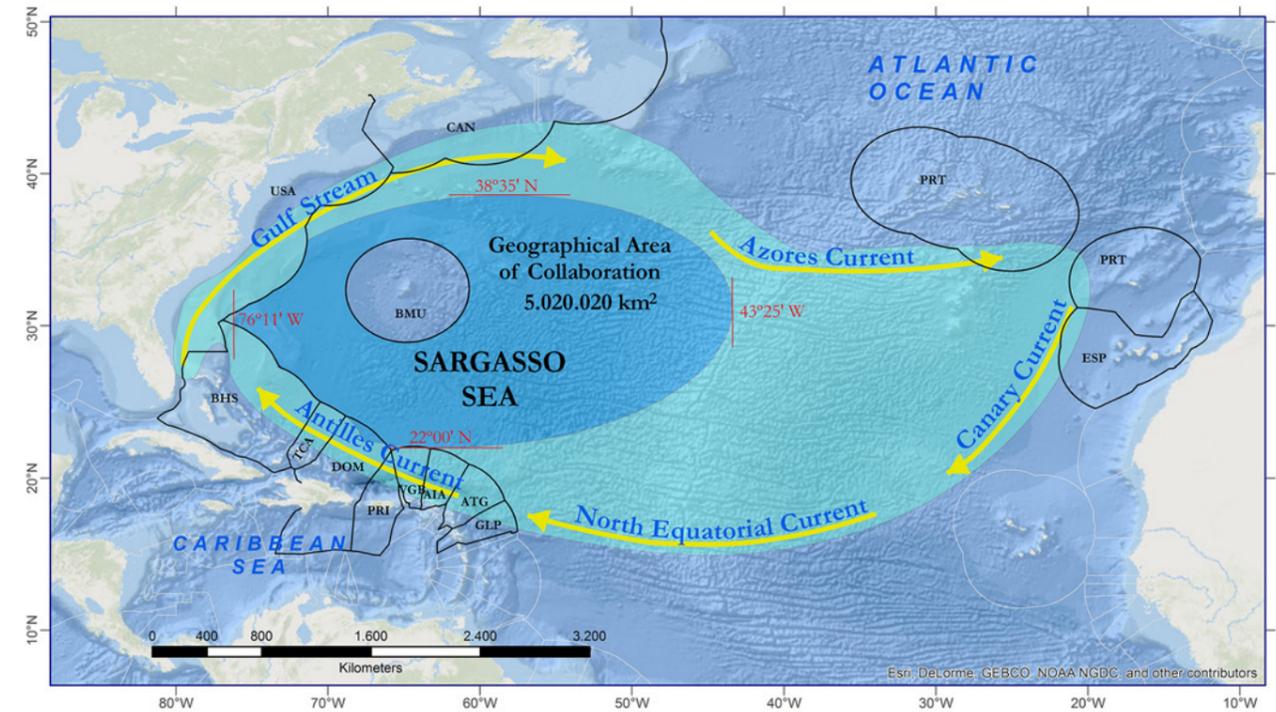
With support from the French Office for Biodiversity, the French Global Environment Facility Secretariat has approved €3 million of funding for a joint proposal from the Sargasso Sea Commission, the Thermal Dome project (overseen by the MarViva Foundation), and the Ocean University in Brest. This project, titled *Contributing to hybrid governance to protect and manage remarkable areas on the high seas: Tropical East Pacific and Northwest Atlantic Oceans*, is scheduled to begin during the first quarter of 2021 and will continue over the next five years.

The project will use an innovative overarching strategy based on the DPSIR (Driving Force-Pressure-State-Impact-Response) framework for each site, and will conduct a review of the current governance of each site and recommendations for its improvement and establishment of conservation and management measures in these sites. The project is divided into four components: (i) coordination and steering, (ii) a socio-ecosystem analysis-diagnosis, (iii) governance models for ecosystem-based management, and (iv) capacity building and communication.

The first component will involve coordination between the three project beneficiaries (Sargasso Sea Commission, MarViva, and the Ocean University in Brest), as well as a project coordinator, implementation teams for each site, a Steering Committee (including project partners, co-funders, and key allies), and an Advisory Board. The socio-ecosystem analysis-diagnosis will leverage stakeholder engagement and consultation to define the ecosystem, identify sustainability issues, characterise pressures and their associated impacts, and propose strategies to improve the overall sustainability of the ecosystems. This component will also include data acquisition using new observation

technologies and data management. The third component will use the data gathered under the analysis in component two to build a hybrid governance model for each site. For the Thermal Dome, the expected result is a multisectoral proposal for the governance and regulation of the high seas, with an emphasis on fisheries and navigation. For the Sargasso Sea, it will be a Strategic Action Programme submitted to the signatories of the Hamilton Declaration on Collaboration for the Conservation of the Sargasso Sea. The last component will be led by the Ocean University in Brest, and will include a distillation of the lessons learned from both the Sargasso Sea and the Thermal Dome, and will include the development and implementation of a multilingual online training programme on high seas governance.

The Sargasso Sea and the Thermal Dome were selected because of the influential role each of the partners already plays in discussions of governance on the global level. These discussions dovetail well with the progress made on negotiating a high seas treaty at the United Nations, and will have a broader impact for other remarkable high seas areas. Using the Sargasso Sea and the Thermal Dome as dual exemplary sites in the Atlantic and Pacific Oceans respectively, the project will highlight the importance of biodiversity in high seas ecosystems and the unique challenges of governance on the high seas. The project will contribute to the ongoing BBNJ negotiations by considering possible implementation models for regional and international cooperation. The two sites will serve as pilot cases to facilitate the design of hybrid governance approaches – that is, modes of governance that take both a regional and a global outlook, including processes for identifying area-based management tools.



Top: Location and major oceanographic features of the Sargasso Sea. Based on Sargasso Sea Commission website (map by Duke Marine Geospatial Ecology Lab). www.sargassoseacommission.org/about-the-sargasso-sea/where-is-the-sargasso-sea-area-of-collaboration

Bottom: Location and major oceanographic features of the Costa Rica Thermal Dome. Based on Salazar E.R. et al. (2019) *The Thermal Dome of Costa Rica - Atlas*. MarViva Foundation, San José, page 14.

Maps elaborated by MarViva Foundation 2019 (M.Castro)

Operating in a virtual world to advance work on conserving real-world marine biodiversity

The GOBI Webinar Series

Since most, if not all, of the major scientific conferences scheduled for 2020 have been thwarted by travel restrictions imposed during the COVID-19 pandemic, the scientific community, alongside the rest of the world, has turned to the internet for solutions. Online webinars, workshops and conferences have exploded onto social media feeds, competing for clicks, followers and bandwidth. GOBI is no exception, zooming the zeitgeist with gusto, expediting a pre-pandemic plan to share results and inform ocean management professionals.

A six-webinar series is underway to showcase each of the research strands active under GOBI's current five-year grant from the International Climate Initiative. Four of the webinars have already taken place in the latter months of 2020, with two remaining webinars to be delivered in January 2021.

Each webinar presents the significant achievements from the four and a half years of research to date. Considering that the work programme is nearing its scheduled end (2016-2021), there are substantial results to be showcased.

The first webinar – *Introducing Important Marine Mammal Areas* – by the co-chairs of the IUCN SSC-WCPA Marine Mammal Protected Area Task Force, presented the concept of IMMAs and the process by which they are identified, leading to the designation of 159 IMMAs to date, mostly in the southern hemisphere. The uptake and utility of IMMAs as a tool for conservation was also described, as well as the short and longer-term plans, momentarily frustrated by the pandemic, for the IMMA description process to continue across the remaining ocean basins.

Connectivity was the subject of the second webinar – *Here, there and everywhere: migratory connectivity in the ocean* – by colleagues at the University of Queensland and Duke University. After setting the scene and highlighting the magnitude of man-hours dedicated its development, the innovative and ingenious MiCO system (www.mico.eco) was demonstrated. While much work remains to augment its utility, MiCO is likely to be a game-changer in scientists' ability to provide actionable knowledge to decision-makers.

Webinar three – *The utility of seabird tracking data to inform marine conservation* – was presented by partners BirdLife International. It illustrated the power of synthesizing decades' worth of tracking data to visualise how seabirds use the ocean, converging or dispersing over the same areas year after year, depending on their life stage. Overlapping the distribution of threats to seabirds adds an important dimension to how risks to seabirds can be mitigated (e.g., by devising appropriate MPAs or bycatch prevention measures), now and under future climate change scenarios.

The fourth webinar, courtesy of Piers Dunstan (CSIRO) focused on the *Bioregionalisation of the Indian and southern Pacific Oceans*. Using as many of the biological and physical datasets currently available, state-of-the-art models have been developed and trained to delineate and map the

boundaries of distinct 'large marine regions' and smaller 'provinces' nested within. This information can now be used to provide relevant natural context to all human activities in each province, and a more accurate assessment of risk to wildlife from single or multiple activities.

With two webinars to go at the time of writing – webinar five on International cooperation for the *Governance of the Costa Rica Thermal Dome* and the sixth on *Protecting biodiversity at deep-sea hydrothermal vents* – the series is on track to be a resounding success. Online attendance to date has been strong and diverse, with representation from a range of sectors including researchers, IGOs and NGOs. Lively engagement during the Q&A sessions at the end of each webinar has also been encouraging, with interest in the cross-application of methodologies to other species and regions. Whilst online events are unlikely to substitute in-person meetings in the future – where much progress is made over informal interactions in the sidelines – they have no-doubt proven an essential lifeline for the rapid dissemination of information, and for maintaining a sense of community spirit during times of enforced isolation.

Recordings of all webinars in the GOBI series are available to view shortly after the live event on the GOBI website (www.gobi.org/webinars).



GOBI WEBINAR SERIES
www.gobi.org/webinars

- Introducing Important Marine Mammal Areas - IMMAs**
 WEDNESDAY 28 OCTOBER 2020
 2pm GMT / 3pm CET
 Presentations by Erich Hoyt and Giuseppe Notarbartolo di Sciara, Co-chairs of the IUCN SSC-WCPA Marine Mammal Protected Areas Task Force
- Here, there and everywhere: migratory connectivity in the ocean**
 THURSDAY 12 NOVEMBER 2020
 12pm GMT / 1pm CET
 Presentations by Daniel Dunn of University of Queensland and Duke University
- The utility of seabird tracking data to inform marine conservation**
 THURSDAY 26 NOVEMBER 2020
 2pm GMT / 3pm CET
 Presentations by Maria Dias and Tammy Davies of BirdLife International
- Bioregionalisation of the Indian & southern Pacific Oceans**
 THURSDAY 10 DECEMBER 2020
 9am GMT / 8pm AEDT
 Presentation by Piers Dunstan of CSIRO
- The Costa Rica Thermal Dome – international cooperation in ABNJ**
 WEDNESDAY 13 JANUARY 2021
 4pm GMT / 10am CST
 Presentation by Jorge Jiménez of Fundación MarViva
- Protecting biodiversity at deep-sea hydrothermal vents**
 THURSDAY 28 JANUARY 2021
 4pm GMT / 11am EST
 Presentations by Cindy Van Dover of Duke University and colleagues

COncference VIDEo fatigue? The limitations of digital progress

Whilst the deadly seriousness of the COVID-19 pandemic cannot be ignored, there's a feeling of frustration rising from the ranks of participants engaged in the newly imposed reality of virtual intergovernmental conferences and online fora. It seems that only a return to the informality and soft diplomacy afforded by in-person meetings can alleviate such digital fatigue and boost hindered progress, yet that's a prospect still just beyond reach. Enduring and overcoming those frustrations over the coming months will take time, patience and determination, as evidenced by the recent CBD Virtual SBSTTA-24 and SBI-03 Special Virtual Session.

There is no doubt that online platforms have been a lifeline to communication for countless communities, but what they have also demonstrated is that there is no substitute for in-person meetings to achieve meaningful progress on multiple levels simultaneously. Filling in the details around the interim agreements achieved during lockdown will take time, as these details require the establishment of trust, integrity, delicate negotiations and a common understanding not easily transmitted digitally. Despite this, actors have had no choice but to embrace virtual opportunities and forge synergies, as time passes and crucial decisions cannot wait, especially on ways to recover from the pandemic in partnership with nature.

Eventually, as in-person intergovernmental processes resume post-pandemic and vie for attention, it will be necessary to recognise that a potential logjam of important unresolved details may cause all kinds of tensions. To pave the way towards this recognition and avoid any potential pitfalls, the Marine Regions Forum is holding a (still unavoidably virtual) workshop on *Ocean Governance and COVID-19 – Building resilience for marine regions* (28 January 2021). The aim is to explore possible pathways to address the effects of the pandemic in marine regions by bringing together actors from different marine regions to: (i) discuss the socio-economic and environmental impacts of COVID-19 in marine regions, (ii) explore options for immediate responses and longer-term recovery, and (iii) discuss impacts on regional cooperation and possible consequences for ocean governance. Participation in the workshop is by invitation only, and interested parties are encouraged to contact the Marine Regions Forum project team for more information (MarineRegionsForum@iass-potsdam.de).

GOBI and its partners are eager and looking forward to re-engaging in person with the various processes postponed or frustrated by the pandemic, including the evolution of the EBSA concept, finalising the BBNJ negotiations, and helping to shape the post-2020 global biodiversity framework.

Hot off the press



Post-2020 biodiversity targets need to embrace climate change, by Almut Arneth and colleagues, in PNAS 2020, 117(49):30882-30891. DOI:10.1073/pnas.2009584117.

Recognising that the CBD's post-2020 framework offers an opportunity to address the interactions between climate change and biodiversity by better aligning targets with the United Nations Framework Convention on Climate Change Paris Agreement and the Sustainable Development Goals, this paper identifies existing and proposed post-2020 global biodiversity targets that risk being severely compromised due to climate change, and calls for the adoption of more flexible and dynamic approaches to conservation, rather than static goals.

Integrated ocean management for a sustainable ocean economy, by Jan-Gunnar Winther and colleagues, in Nature Ecology & Evolution 2020, 4:1451-1458. DOI:10.1038/s41559-020-1259-6.

Here, a case is made for integrated ocean management as an overarching approach for achieving a sustainable ocean economy. It is presented as a holistic, ecosystem-based and knowledge-based approach that aims to ensure the sustainability and resilience of marine ecosystems while integrating and balancing different ocean uses to optimize the overall ocean economy. Examples are given from broadly differing areas, and six universal opportunities for action are identified that can help achieve a sustainable ocean economy.



Birds and biodiversity targets: what do birds tell us about progress to the Aichi Targets and requirements for the post-2020 biodiversity framework? A State of the World's Birds report by BirdLife International 2020, Cambridge, UK. ISBN no. 978-1-912086-67-2.

This report synthesises data from birds to examine to what degree each Aichi Target was met, and to identify examples of positive trends and successes. It also provides insights for the development and implementation of more effective goals and targets of the post-2020 global biodiversity framework, as well as a suite of metrics and indicators for measuring progress.



Strengthening the global network for sharing of marine biological collections: recommendations for a new agreement for biodiversity beyond national jurisdiction, by Jane E Collins and colleagues, in ICES Journal of Marine Science 2020. DOI:10.1093/icesjms/fsaa227.

This article examines both existing capacity and regional gaps in marine collections, which are a fundamental resource for marine scientific research and the understanding of biodiversity at various scales. It proposes the strengthening of a distributed network of marine biological collections, building on existing initiatives and emphasising best practices to bridge regional gaps.



Challenges to the sustainability of deep-seabed mining, by Lisa Levin and colleagues, in Nature Sustainability 2020, 3:784-794. DOI:10.1038/s41893-020-0558-x.

This review focuses on whether the emerging industry of deep-seabed mining aligns with the sustainable development agenda, and suggests that slowing the transition from exploration to exploitation while promoting a circular economy may have regulatory, technological and environmental benefits.

Capacity building and technology transfer for improving governance of marine areas both beyond and within national jurisdiction, by Marjo K Vierros and Harriet Harden-Davies, in Marine Policy 2020, 122:104158. DOI:10.1016/j.marpol.2020.104158.

This article analyses areas where synergies are possible for implementing capacity building and technology transfer, and those areas where additional capacities – particularly in ABNJ – will need to be mainstreamed for holistic ocean management. It argues that such capacity building efforts are more meaningful, effective and resource-efficient when they correspond with the ecological realities of an interconnected ocean and across jurisdictions.



The ocean genome and future prospects for conservation and equity, by R Blasiak and colleagues, in Nature Sustainability 2020, 3:588-596. DOI:10.1038/s41893-020-0522-9.

This review addresses three questions: What are the benefits to the biosphere, to humanity and to other living organisms that arise from the ocean genome? What are the threats eroding genetic diversity in the ocean? How can the ocean genome be conserved and used in a more sustainable, fair and equitable manner? It highlights an urgent need to build capacity, promote inclusive innovation and increase access to affordable technologies.



A transition to sustainable ocean governance, by Tanya Brodie Rudolph and colleagues, in Nature Communications 2020, 11:3600. DOI:10.1038/s41467-020-17410-2.

This article sets out a demonstration of how current economic and social systems can adapt to existing pressures and shift towards ocean stewardship through incorporation of niche innovations within and across economic sectors and stakeholder communities. The authors discuss current barriers to sustainable ocean governance and suggest pathways forward.



Farewell to a Friend

Dr Biliana Cicin-Sain (1945-2020) was a friend to so many in the ocean community – on a personal, organisational and political level. A gorgeous tribute to her legacy and a full obituary written by her daughter Vanessa can be found on the IUCN website and the links it contains at: www.iucn.org/news/marine-and-polar/202009/passing-dr-biliana-cicin-sain-international-leader-integrated-coastal-and-ocean-governance

With great style and panache, Biliana was adept at driving agendas, bringing together decision-makers and

stakeholders, igniting passion for ocean stewardship and recognising policy gaps. GOBI worked with and alongside her Global Ocean Forum, at the UN and its meetings on ocean and climate governance. The conferences she organised and the information she published and shared over the years continue to inspire and resonate. We have lost a guiding light, someone who epitomised great passion and endless optimism. She will be very much missed.



Image courtesy IISD



Global Ocean Biodiversity Initiative

Providing the scientific basis for conserving
biological diversity in the global ocean

The Global Ocean Biodiversity Initiative is an international partnership of organisations committed to advancing the scientific basis for conserving biological diversity in the marine environment. In particular, GOBI contributes expertise, knowledge and data to support the Convention on Biological Diversity's efforts to identify ecologically and biologically significant marine areas (EBSAs) by assisting a range of intergovernmental, regional and national organisations to use and develop data, tools and methodologies.

GOBI also undertakes research to generate new science that will enhance the value of EBSAs and their utility for promoting environmental protection and management for specific areas of the world's oceans. The intention is ultimately to reduce the rate of biodiversity loss through the application of ecosystem approaches to the management of human activities, and to support the establishment of networks of representative marine protected areas in national and international waters.

The GOBI partnership and activities are coordinated by a Secretariat team, provided by Seascape Consultants Ltd. GOBI is funded by the International Climate Initiative (IKI). The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) supports this initiative on the basis of a decision adopted by the German Bundestag.

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