



The ocean:
biodiversity's social network



CBD COP15: We've done it all in Montreal, no matter what they say (well, not quite)

by David Johnson, GOBI Coordinator

Media hype for the prospects of CBD COP15 created an added expectation for the critical 15th meeting of Parties to the Convention on Biodiversity, which took place in Montreal on 7-19 December 2022. The juxtapositioning of COP15 with the Climate Conference (UNFCCC COP27, held in November 2022) helped raise public awareness of intergovernmental processes and the ocean-climate nexus. But expectation turned to frustration at the pace of negotiations mid-way through the Conference. Enter the ministers. Normally, the ministerial segment of these meetings is carefully choreographed, allowing time for well-crafted diplomatic interventions – usually signalling a modicum of intent, ambition and new initiatives. At this conference, the Chinese Presidency requested selected ministers to drive efforts to secure consensus where hitherto little had been found. The outcome, the Kunming-Montreal Global Biodiversity Framework (GBF), with its goals, targets, monitoring framework and associated indicators, is heralded by some as “groundbreaking” and “historic”. At face value it is a much-needed international instrument that will guide and inform what many foresee as a last chance to halt and reverse biodiversity loss.

Signing off the GBF was always the priority for COP15, achieved in Decision CBD/COP/15/L.25 and associated

supporting Decisions. Already two years late (due to Covid but benefitting from intense intersessional workshops prior to COP15), the new framework replaces the Strategic Plan for Biodiversity and its Aichi Biodiversity Targets, which concluded in 2020. Elements of what has now been agreed in the GBF have important similarities to the climate debate. For example, the GBF target to protect 30% of the planet by 2030 (“30x30”) is akin to the net-zero ambition in the fight against climate change, and the already well-established National Biodiversity Strategic Action Plans (updates of which will enable national interpretation of the GBF based on national priorities) can be likened to Nationally Determined Contributions. Two major shortcomings of the Aichi Biodiversity Targets have also been addressed, namely funding and monitoring. The former proved to be the most controversial aspect of these negotiations. Parties expressed significant differences about the yearly total of funding needed, how much developed countries should support developing countries, and about who will manage and distribute resources. The outcome – a tripling of existing aid – commits rich countries to pay developing countries \$30 billion a year by 2030 (Decision CBD/COP/15/L.29). Positives can also be noted in terms of commitments to requirements for corporate disclosure, shrinking harmful subsidies, respect

for indigenous rights, and nature-based solutions (activities that restore or conserve biodiversity whilst at the same time benefiting human lives).

The GBF’s four overarching Goals supported by 23 Targets up to 2030 and its monitoring framework form an integrated package. However, as usual the devil is in the detail and so-called success of the negotiation comes with a string of concerns. The GBF is complex, onerous and not legally binding. For some countries it may be just too difficult and expensive to implement. Initial funding actually pledged by rich countries falls well short of the GBF’s aspirational targets. 30x30 is a catchy strapline but, whilst it might be an achievable milestone, science suggests it is not enough in itself to save the one million plant and animal species facing extinction. How will protected areas be effectively managed? Will these protected networks be ecologically coherent, connected and representative? Significant capacity building challenges remain. The long-term strategic framework for capacity building and development to support implementation of nationally determined priorities could provide a new direction for GOBI’s capacity building efforts, perhaps in partnership with the Sustainable Ocean Initiative, building on past efforts (Decision CBD/COP/15/L.32). The GBF stresses full and effective participation of IPLCs and makes detailed reference to developing countries’ needs (see Decision CBD/COP/15/L.28). Annexes to this Decision provide mechanisms to strengthen technical and scientific cooperation in support of the GBF.

For GOBI, other key agenda items concerned the CBD’s marine and coastal biodiversity portfolio. Three related Decisions were adopted as follows:

i. Decision CBD/COP/15/L.13 finalised the North-East Atlantic Ocean and adjacent areas EBSA Workshop results, adding a further 17 EBSAs to the CBD Repository (now offering a total of 338 EBSAs; see page 6).

ii. Decision CBD/COP/15/L.14 reflects that the COP failed to resolve the issue on modalities to amend and/or describe new EBSAs in different jurisdictions. The Decision requests the Secretariat to convene expert workshops, develop draft terms of reference for a relevant expert advisory body, and develop voluntary guidelines on peer-review processes for the description of areas meeting the EBSA criteria for consideration by SBSTTA prior to COP16.

iii. Decision CBD/COP/15/L.15 provides an explicit link to relevant assessments and highlights the critical importance of the marine environment to the GBF, making specific reference to marine spatial planning, other effective conservation measures and the BBNJ Implementing Agreement upon its adoption.

UN Secretary-General Antonio Guterres summed up the challenge of COP15 as having “the urgent task of making peace with nature”. The key question remains: can this be achieved equitably and effectively? The proof will be in the (post-Christmas 2022) pudding!

A COP15 Final Earth Negotiations Bulletin Vol. 9 No. 796 dated 22 December 2022 provides a useful summary of the Conference and its outcomes online at: enb.iisd.org/un-biodiversity-conference-owwg5-cbd-cop15



GOBI at COP15

The COP15 fortnight was a busy one for the GOBI team too, with involvement in three side events...

Ecologically or Biologically Significant Marine Areas (EBSAs): Describing the special places of the ocean in a changing world

9 December 2022; Co-organisers: CBD Secretariat & GOBI

A decade ago, the CBD community embarked on an epic journey around the world to map and describe the 'special places' of the ocean and seas – places that are the most important to the healthy functioning of the global marine ecosystem – known as ecologically or biologically significant marine areas, or EBSAs. After more than 10 years, the regional EBSA workshop process has examined around 75% of the global ocean and has yielded a portfolio of EBSAs that encompasses a wide range of species, habitats, ocean features and biogeographic provinces. This process has generated positive outcomes and co-benefits, not only describing and mapping out the special places in the ocean, but also catalysing partnerships and enhancing political attention on the most important parts of the ocean.

Over time, new information has emerged all over the ocean, including for EBSAs. This side event reviewed new information that has emerged in various EBSAs around the world, and the implications of this for the use of EBSA information and the future of the EBSA process.



From Aichi Target 11 to 30x30: Marine ecosystem connectivity and science-driven processes in support of decision making

10 December 2022; Co-organisers: OFB & GOBI

This side event focused on efforts to recognise critical habitat and pathways for migratory species in the context of Goal A of the Global Biodiversity Framework (GBF). Ecosystem connectivity also has relevance for a broader range of species

and their survival. Target 3 of the GBF (as drafted) maintains continuity with Aichi Target 11, specifically referring to well-connected systems or networks of marine protected areas and other effective area-based conservation measures. This event showcased recent efforts that can contribute to ensuring and enabling Parties to achieve a higher percentage of protected areas and that also support objectives of the Convention on Migratory Species.

The Sustainable Ocean Initiative: Learning from the past to better build capacity to achieve global ocean goals into the future

13 December 2022; Co-organisers: CBD, MOF Korea, JBF, OFB

The Sustainable Ocean Initiative (SOI), a capacity-building programme coordinated by the CBD Secretariat, celebrated its 10-year anniversary in 2020, reflecting on numerous achievements in building improved capacity to achieve global ocean goals, as highlighted in the 10-year SOI Impact Study (www.cbd.int/marine/soi/booklet-soi-10years-en.pdf).

Through activities such as the SOI Global Dialogue with Regional Seas Organizations and Regional Fishery Bodies, regional and national capacity building workshops and training of trainers, SOI has worked to provide a holistic and strategic framework through which to catalyse partnerships, build on lessons learned and knowledge gained, and facilitate improved coordination to address the capacity needed for achieving global, regional and national objectives for the ocean.

The heightened ambition of the Kunming-Montreal Global Biodiversity Framework (GBF) calls for expanded and accelerated action for conservation and sustainable use of marine and coastal biodiversity. This makes the work of SOI even more urgent, as achieving the goals of the GBF will require robust capacity for implementation.

This side event reflected on the history and achievements of SOI, considered what the GBF will mean for ocean-related capacity building, and highlighted potential future directions for SOI.



Connectivity in the Kunming-Montreal Global Biodiversity Framework



Ecological connectivity is a fundamental requirement for functioning ecosystems and for migratory species. Parties to the CBD recognised the importance of connectivity in Aichi Biodiversity Target 11 of the Strategic Plan for Biodiversity 2011-2020 and it is now also recognised across the newly adopted Kunming-Montreal Global Biodiversity Framework.

Here follows the exact connectivity-related language adopted as part of the framework:

GOAL A: *The integrity, connectivity and resilience of all ecosystems are maintained, enhanced, or restored, substantially increasing the area of natural ecosystems by 2050;*

Human induced extinction of known threatened species is halted, and, by 2050, extinction rate and risk of all species are reduced tenfold and the abundance of native wild species is increased to healthy and resilient levels;

The genetic diversity within populations of wild and domesticated species, is maintained, safeguarding their adaptive potential.

...

TARGET 2: *Ensure that by 2030 at least 30 per cent of areas of degraded terrestrial, inland water, and coastal and marine ecosystems are under effective restoration, in order to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity.*

TARGET 3: *Ensure and enable that by 2030 at least 30 per cent of terrestrial, inland water, and of coastal and marine areas, especially areas of particular importance for biodiversity and*

ecosystem functions and services, are effectively conserved and managed through ecologically representative, well-connected and equitably governed systems of protected areas and other effective area-based conservation measures, recognizing indigenous and traditional territories, where applicable, and integrated into wider landscapes, seascapes and the ocean, while ensuring that any sustainable use, where appropriate in such areas, is fully consistent with conservation outcomes, recognizing and respecting the rights of indigenous peoples and local communities, including over their traditional territories.

...

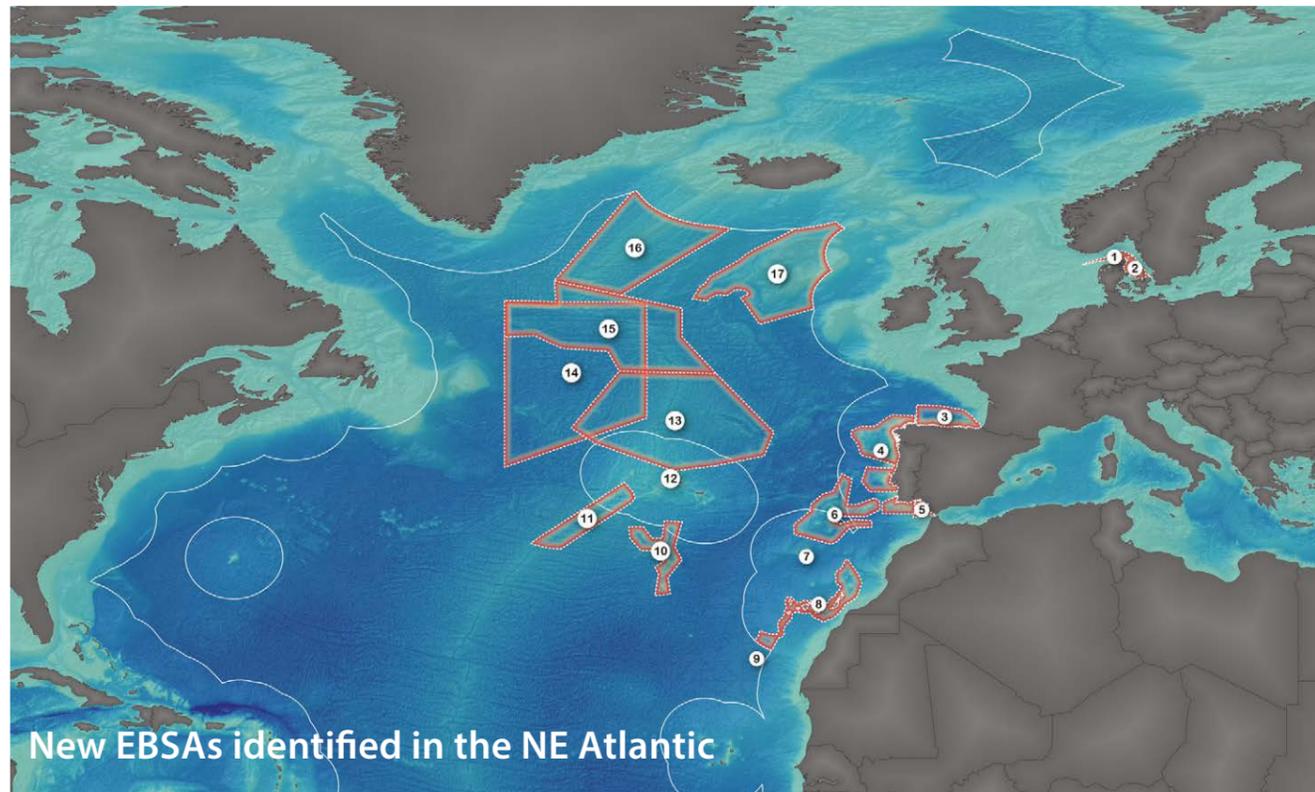
TARGET 12: *Significantly increase the area and quality and connectivity of, access to, and benefits from green and blue spaces in urban and densely populated areas sustainably, by mainstreaming the conservation and sustainable use of biodiversity, and ensure biodiversity-inclusive urban planning, enhancing native biodiversity, ecological connectivity and integrity, and improving human health and well-being and connection to nature and contributing to inclusive and sustainable urbanization and the provision of ecosystem functions and services.*

Ecological connectivity and its measurement are now elevated in importance and focus. Key goals and targets of the new framework have an enhanced acknowledgement of the fundamental contribution that ecological connectivity makes to functioning ecosystems and species.

Slow and steady wins the race... or at least makes it to the finish line!

The 17 North-East Atlantic EBSAs described in the Regional EBSA Workshop held in Stockholm in 2019, and considered by SBSTTA 23, were finally formally identified by COP15. Ironically, this region – which boasts the world’s first network of High Seas MPAs and has access to relatively rich, long-term datasets – is almost the last to have its EBSAs placed in the CBD Repository. As a consequence, many of the areas described already have some form of management measures in place that aim to protect their associated biodiversity. Some might see the EBSAs as a retrofit.

Certainly they reinforce the area-based management tools in place, but at the same time – as with other regional EBSA exercises – the most recent information has been brought together and peer-reviewed by workshop participants. Some new areas, such as the Tropic Seamount, have been identified. And, perhaps most importantly, the information is now available for consideration for Parties implementing the BBNJ Implementing Agreement once it is ratified.



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|---|--|
| 1. Danish Skagarrek | 10. Atlantis-Meteor Seamount Complex |
| 2. Danish Kattegat | 11. Ridge South of the Azores |
| 3. Cantabrian Sea (Southern Bay of Biscay) | 12. Graciosa |
| 4. Western Iberian Canyons and Banks | 13. North Azores Plateau |
| 5. Gulf of Cádiz | 14. Mid-North-Atlantic Frontal System |
| 6. Madeira - Tore | 15. Charlie-Gibbs Fracture Zone |
| 7. Desertas | 16. Southern Reykjanes Ridge |
| 8. Oceanic Islands and Seamounts of the Canary Region | 17. Hatton and Rockall Banks and Basin |
| 9. Tropic Seamount | |



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GOBI at IMPAC5 – relevant events and sessions

GOBI has an exhibition stand in the OceanExpo hall at IMPAC5, in collaboration with the Secretariat of the Convention on Biological Diversity. Scheduled interventions by GOBI and its partners are spread across the IMPAC5 programme of events. Below is a list of sessions in which GOBI partners will be presenting their research and sharing their insights and expertise. Building to a crescendo, the dedicated GOBI session will be on Wednesday 8 February at 1pm in Room 215-216. See you there!

- Saturday 4 February 2023, 11:30am–1:30pm: A 30 by 30 hurdle race: science-based conservation in the Eastern Tropical Pacific. 90-minute symposium, Ballroom B-D.
- Saturday 4 February 2023, 2:00–3:30pm: Building a network of MPAs in the Atlantic: Reflecting on success, and identifying next steps. 90-minute symposium, Room 109-110.
- Sunday 5 February 2023, 2:00–3:30pm: Engaging marine protected areas to protect whales for biodiversity conservation and climate change solutions. Knowledge sharing session, Room 208.
- Monday 6 February 2023, 5:30–7:30pm: An ocean of hope - Mission Blue side event. Venue TBC.
- Monday 6 February 2023, 2:00–3:30pm: From Saguenay-St. Lawrence to the Salish Sea: Lessons learned to managing vessel-based activities in MPAs with whales. 90-minute symposium, Room 116-117.
- Tuesday 7 February 2023, 2:00–3:30pm: Building blocks of your MPA: Identifying collaborative opportunities for decision-makers to conserve globally important sites for marine megafauna. Knowledge sharing session, Room 208.
- Tuesday 7 February 2023, 2:00–3:30pm: Important Shark and Ray Areas: What are the conservation benefits? How do they improve collaborative partnerships for improved spatial planning? Knowledge sharing session, Room 202.
- Wednesday 8 February 2023, 4:00–5:30pm: Navigating high seas MPAs and other ABMTs in 4 dimensions: Integrating horizontal, vertical and temporal connectivity. Knowledge sharing session, Room 204.
- **Wednesday 8 February 2023, 2:00–3:30pm: Recognising migratory connectivity as essential to a global MPA network. 90-minute symposium, Room 215-216.**

Full conference programme online at www.impact5.ca/congress-details/program

GOBI international workshop on EBSAs in ABNJ



On 6-9 November 2022, GOBI convened an expert workshop on Ecologically or Biologically Significant Marine Areas (EBSAs) in Areas Beyond National Jurisdiction (ABNJ) in Santa Cruz, California. The workshop took place at an inspirational venue – the Seymour Marine Discovery Center – a community-supported marine science education center of the University of California Santa Cruz. During breaks participants could walk beside the sea, watch whales close inshore and admire squadrons of pelicans patrolling the surf. Due to a combination of geological features and currents, Monterey Bay is one of the richest marine environments in the world and the Monterey Bay National Marine Sanctuary was designated in 1992.

Experts attended (in person and online) by invitation in their personal capacity at a critical time for the EBSA process. The first day was a chance to take stock of the EBSA portfolio – how we got to where we are. Participants were split between those immersed in EBSAs and the Convention on Biodiversity (CBD) agenda (including representatives of both technical teams involved in all the CBD Regional EBSA Workshops), those with some experience of EBSAs, and those with little or none. This made for a healthy and constructive ‘self-critical’

mix of scientific and technical talent, giving the workshop a collective chance to explain and reflect on how and why the current coverage of EBSAs in ABNJ came about.

Subsequent days addressed gaps. New EBSA template suggestions were used to take a deep-dive into and showcase features that might merit future consideration and to illustrate the technical complexities of interpreting EBSA criteria in ABNJ. This underlined the need to add information to the existing suite of EBSAs to reflect advances in scientific understanding and maintain relevance of EBSAs in ABNJ. Not least this is seen as critical for implementing the forthcoming



Right: Dan Costa leads workshop participants on a tour of the UCSC marine facilities. Far right: scenes from the workshop. Images D. Johnson, V. Gunn & G. Ortuño Crespo.

international legally-binding implementing agreement for the conservation and sustainable use of biodiversity beyond national jurisdiction. Participants did not shy away from jurisdictional or sectoral competence complications but at the same time recognised that best science must feed into a policy context with political sensitivities.

The workshop brainstormed a detailed set of challenges that face the EBSA process in general and those that apply to ABNJ in particular. Finally, small group discussions scoped

ways to improve the utility of EBSAs and considered threats from both the impacts of human activities on the marine environment and from possible stagnation of the EBSA process if Parties cannot find a way forward at CBD COP15. Our thanks to all those who participated and to the staff of the Seymour Marine Discovery Center who provided us with such a unique venue to exchange views and rekindle a spirit of collective impetus to understand and care for our high seas biodiversity.



Third Sustainable Ocean Initiative Global Dialogue: Forging a new era of regional leadership in the post-2020 world



Hosted by the Ministry of Oceans and Fisheries of the Republic of Korea on 25-28 October 2022, the third Sustainable Ocean Initiative (SOI) Global Dialogue brought together Regional Seas Organisations (RSOs) and Regional Fishery Bodies (RFBs). SOI is a global platform for capacity building and partnerships, acknowledging that regional organisations are key players in achieving global goals. The latter can be achieved through translating global commitments, facilitating implementation, and reporting on progress, challenges and gaps.

This hybrid (in-person and online) meeting received updates from various regions on cross-sectoral cooperation at the regional scale and inputs to relevant global processes. The evolving global ocean policy-scape has implications for emerging initiatives related to strengthening regional ocean governance. Managing pressures interacting with the effects of climate change, controlling pollution, area-based management and protection of threatened species

and habitats were prominent discussion topics. Regions provided examples of where cross-sectoral cooperation and coordination has been tailored to specific regional circumstances.

Critically, ahead of CBD COP15, the Dialogue examined the state of play of the post-2020 Global Biodiversity Framework (GBF), particularly translating global goals to the regional level and supporting implementation on the ground. Working groups sought to identify where and how improved cooperation and coordination can help regional organisations to better fulfill their mandates and support achievement of global, regional and national objectives, including the 22 action-orientated Targets of the draft GBF.

In addition to consideration of the GBF, the Dialogue took note of emerging tools and processes, including: progress on FAO Guidelines on Other Effective Conservation Measures, negotiations to finalise a legally-binding agreement on the conservation and sustainable use of biodiversity beyond national jurisdiction, and the roadmap towards a UN Plastics Treaty. These discussions can also help inform revision of National Biodiversity Strategic Action Plans, updating of the CBD marine Programme of Work, and associated indicators.

The formal conclusion is a 'Busan Outcome' text reporting on the meeting and reaffirming the core objectives of the SOI Global Dialogues, extolling the merits of regional leadership. It will reflect an emphasis placed in the later discussion phase of the meeting on consolidating regional roadmaps and priority actions to advance collaboration and coordination between RSOs and RFBs. Busan is well known as a major centre of marine science and port operations. It is also an education to wander around Jagalchi Market, Busan's world-famous international fish market.



Above, top: GOBI representatives Adelaide Ferreira and David Johnson (image courtesy IISD/ENB). Above: the SE Atlantic working group discussing GBF goals and targets (image courtesy David. Johnson). Main image: Busan waterfront (image courtesy David. Johnson).





Important Marine Mammal Areas (IMMAs) – a tool for making good MPAs and much more

by Erich Hoyt, IUCN Marine Mammal Protected Areas Task Force and Whale and Dolphin Conservation

A decade ago, at the third International Marine Protected Areas Congress (IMPAC3) in Marseille, co-chair Giuseppe Notarbartolo di Sciara and I launched the IUCN Task Force on Marine Mammal Protected Areas within the Species Survival Commission and the World Commission on Protected Areas. Three years later, in late 2016, with a core team of five people eventually to expand to nine, we began the Important Marine Mammal Area (IMMA) programme with regional workshops to work with local scientists to map the habitats for the 132 marine mammal species across the ocean.

The goal was to access the masses of data on marine mammals to create a robust yet handy spatial tool for conservation. The IMMA tool could be used to design, revise, zone and/or expand MPAs and other spatial tools to help conserve marine mammals, their ecosystems and associated biodiversity.

The MAVA Foundation helped with the first regional IMMA workshop for the Mediterranean, and that was followed by sustained support from GOBI, funded by the German government's International Climate Initiative (IKI) for seven more regional IMMA workshops across the southern hemisphere and one in the Black and Caspian seas. A further regional workshop in the Southern Ocean around Antarctica was funded mainly by the French government's Biodiversity Agency. The overall project has been administered through the Tethys Research Institute in Italy with assistance from Whale and Dolphin Conservation in the UK.

The most recent region completed was the South East Tropical and Temperate Pacific Ocean in late November 2022, where the Task Force's IMMA Secretariat, after peer-review, approved 36 new IMMAs and five candidate IMMAs (IMMAs still in development) spanning from Mexico to Chile. These new IMMAs identify habitats for the ocean's most productive populations of blue whales, along with endangered vaquita, Burmeister's porpoises, Chilean dolphins and Galapagos sea lions, all endemic to this region. With these new additions, there is now a total of 209 IMMAs, 30 cIMMAs and 152 areas of interest (AoI) on the global IMMA e-Atlas, ready to be used for conservation, research and marine spatial planning. These results also mark the completion of the examination of 67%, or two thirds, of the global ocean, including nearly all of the southern hemisphere.

Shortly after, in December 2022, seven members of the Task Force's IMMA Secretariat travelled to Praia do Forte, Brazil, to join more than 30 scientists for the seventh GOBI-sponsored IMMA regional workshop, covering the Southwest Atlantic Ocean, from the Guyanas to Tierra del Fuego, Argentina. After a full week of gathering the evidence, the workshop submitted 36 candidate IMMAs (cIMMAs) for peer-review. That review is currently underway, and pending approval, it is expected that in July 2023 the new Southwest Atlantic IMMAs will be made available on the global IMMA e-Atlas.

Main image: Rough-toothed dolphin. Image courtesy David Palacios-Alfaro.

Today, the IMMA e-Atlas has become the portal for accessing spatial information about the world's whales, dolphins, porpoises, seals, sea lions, manatees, dugong, sea otters and the polar bear. To date, more than 400 sets of shapefiles for mapping IMMAs have been requested and the monthly number of requests has steadily increased. Many IMMAs are being put to work for conservation, as detailed in the Summer 2022 edition of the GOBI Newsletter and in our recent paper in *Frontiers in Marine Science*. Other IMMAs have already become threatened, notably the four IMMAs identified for unique subspecies of bottlenose and common dolphins and harbour porpoises found in the Black Sea waters of Ukraine. These IMMAs have been subjected to mines, bombs, wartime ship traffic and blockades with unknown impact and no accessibility for monitoring or further research.

Next up for the Task Force's IMMA Secretariat are meetings in late February 2023 to be held in Karachi, Pakistan, to highlight the importance of coastal IMMAs to government, tourism, environmental groups and scientists. One IMMA in Pakistan

was described for the endangered Arabian humpback whale, an isolated, genetically distinct subpopulation, as well as Bryde's whales, spinner and Indo-Pacific bottlenose dolphins. Two other IMMAs were identified for endangered Indian Ocean humpback dolphins as well as vulnerable Indo-Pacific finless porpoises. In May 2023, the IMMA Secretariat will travel to Hamburg, Germany, to host the regional IMMA workshop for the Northeast Atlantic, adding a vital piece of the Atlantic puzzle to the IMMA portfolio.

To find out more about the IMMA work of the IUCN Marine Mammal Protected Areas Task Force and upcoming workshops, please have a look at our website (www.marinemammalhabitat.org), which has news, reports and papers to read or download. Members of the IMMA Secretariat of the Task Force will be in Vancouver for the whole of IMPAC5 and speaking in various sessions (see page 7). You can arrange to meet us and leave messages at the GOBI exhibition stand in the OceanExpo hall.

Networks to inform networks: MiCO releases over 100 models describing how migratory species connect the world by Daniel Dunn, University of Queensland



For five years, researchers from the University of Queensland (UQ) and Duke University have been reading and reading and... reading. Poring over literature, searching for information on how satellite tagging studies of migratory marine species might inform our understanding of how they connect the globe. That might seem like an obvious and easy task, but most tracking studies are not undertaken or written with the intent of describing migrations. More frequently these studies investigate local movements, biological limits or functioning, interaction with prey species or the environment, or just general movement characteristics (e.g., dive behaviour). So, the process of teasing out information on migratory connectivity (the geographical linking of individuals and populations throughout their migratory



Waved albatross. Image courtesy Daniel Dunn.

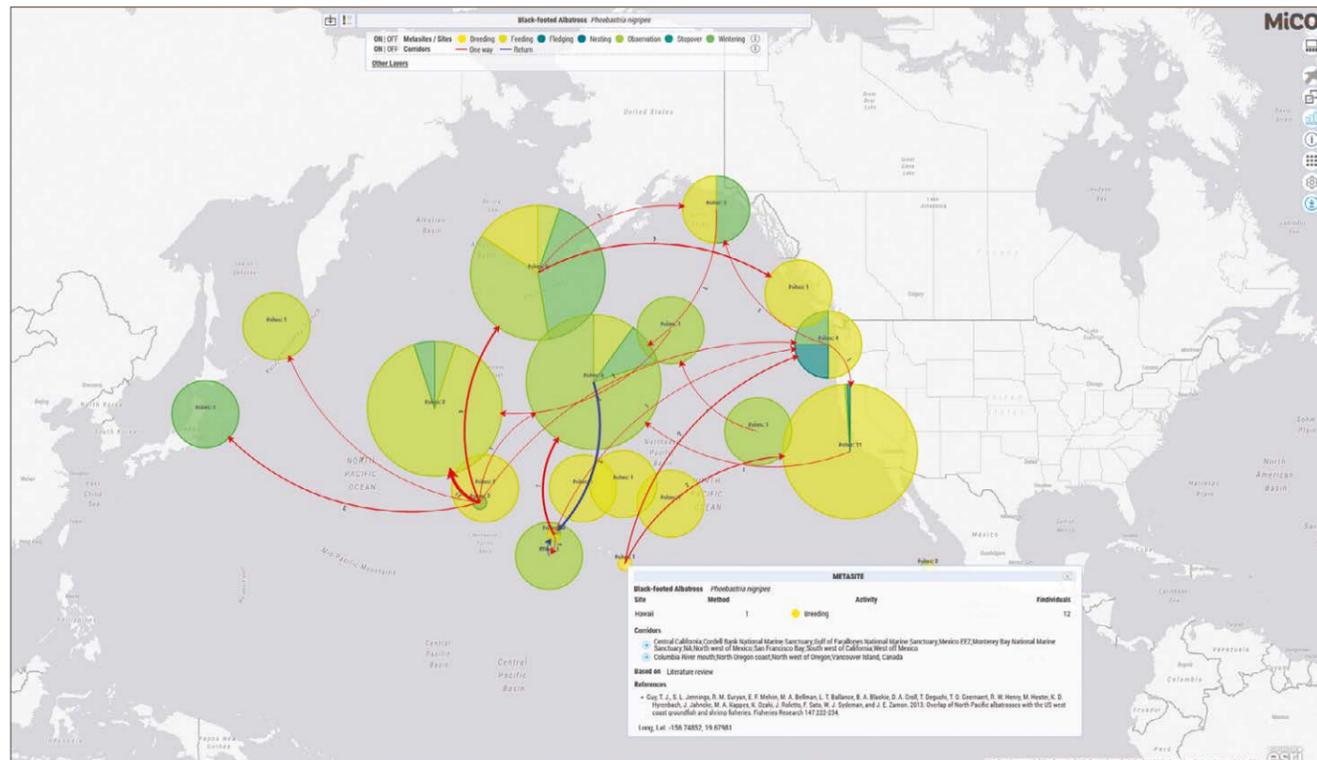
cycles) can be... tedious. For five years, 18 researchers combed through more than 12,000 papers that potentially contained information on connectivity generated by 174 species of marine mammals, sea turtles, seabirds and fish that used areas beyond national jurisdiction (ABNJ).

But words are words, and what the world needs now is not more words, but actionable knowledge. To better conserve these species, we need easily and freely accessible information that can be directly integrated into conservation planning and management. From those papers, the researchers derived over 5,000 sites used by these species, and more than 3,800 connections between them. Many of those sites describe the same location, or ones very close by. Other sites may be derived from the same data used in different papers. A rigorous and repeatable process of removing duplicate data and aggregating sites was applied to generate a final suite of 1,785 metasites (summary sites made up of sites). When stitched together with the aggregated information on connections, these form network models describing the migratory behaviour of hundreds of thousands of animals.

To get this type of information out to policymakers, managers, industry and researchers, UQ and Duke are working with a consortium of more than 50 international organisations to develop the Migratory Connectivity in the Ocean (MiCO) System. The MiCO System is a freely available, open-access, web-based mapping and knowledge system

that seeks to provide actionable knowledge on migratory connectivity for hundreds of marine species to inform worldwide conservation and sustainable use efforts. As part of the activities around the 5th International Marine Protected Area Congress, MiCO will release more than 100 network models describing connectivity in every ocean basin and across all major taxonomic groups.

Area-based management of migratory species in ABNJ is at a critical phase. New targets for greater protection of terrestrial and marine ecosystems in the Kunming-Montreal Global Biodiversity Framework have stoked even greater focus on the development of area-based management tools, including networks of marine protected areas and other effective area-based conservation measures. Through the release of these free, easily accessible network models, we hope to allow migratory connectivity to be appropriately factored into area-based planning processes intergovernmental organisations, and inform implementation of any new treaty for biodiversity beyond national jurisdiction. Only by integrating and scaling up our efforts and providing actionable knowledge, through systems such as MiCO, can we make the step-change necessary to conserve marine migratory species. For further information on how migratory behaviour of marine mammals, seabirds, sea turtles and fish connect the world, please see <http://mico.eco>.



Screenshot of the new network model for Black-footed albatross on the MiCO System - one of many new network models released at <http://mico.eco>

Integrating connectivity into high seas conservation: a case study of the Salas y Gómez and Nazca ridges

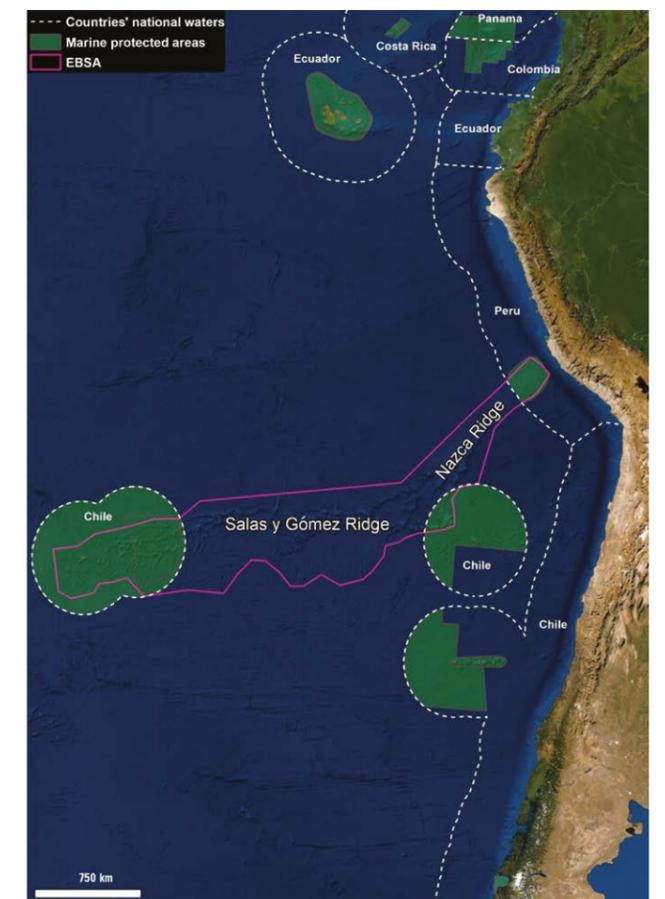
by Ben Boteler, Institute for Advanced Sustainability Studies Potsdam

Connectivity is essential to consider in area-based marine conservation measures because it greatly impacts vital ecological processes (e.g., recycling nutrients, regulating temperature, sequestering carbon, and supporting the life cycle of species). However, it is generally not well studied or integrated into conservation measures, particularly in the Southeast Pacific. This region is home to the Salas y Gómez and Nazca ridges, two adjacent seamount chains that stretch between the Peruvian coast and Rapa Nui (i.e., Easter Island). The area has been recognised for its exceptional natural and cultural significance as well as one of the most important global areas to protect. However, over 73% of the ridges are in areas beyond national jurisdiction, where they are unprotected and under threat. Marine conservation efforts in this region are generally focused on either coastal areas in the continental margins, or waters surrounding offshore islands under the jurisdiction of South American countries. However, there is little information about connectivity between these coastal areas and offshore islands, thus hindering conservation efforts, particularly in areas beyond national jurisdiction (ABNJ).

Current knowledge on connectivity in the Salas y Gómez and Nazca ridges has been compiled and synthesised in a recent review, providing practical recommendations for integrating this knowledge into conservation and management measures for the region. While data on connectivity is still limited, it should not constrain the development of conservation measures, which should be co-designed and co-developed, leveraging the expertise of international working groups throughout the region. Due to their high rates of species endemism, as well as the area's importance as a migratory corridor, enacting large-scale conservation measures would address important conservation considerations for both connectivity and endemism. Enacting such large-scale conservation measures

would not only elevate the Salas y Gómez and Nazca ridges as an exemplary case study, providing lessons for other marine regions seeking to implement similar measures, but could also help raise awareness on the severity of externally originating threats like climate change and plastic pollution to global audiences.

More detailed information on the findings and conclusions of the review can be found in the article: Borderless conservation: Integrating connectivity into high seas conservation efforts for the Salas y Gómez and Nazca ridges, by Boteler and colleagues in *Frontiers in Marine Science*, 2022. DOI: [10.3389/fmars.2022.915983](https://doi.org/10.3389/fmars.2022.915983)



Map showing the location of MPAs around the Salas y Gómez and Nazca Ridges. More than 73% of the Salas y Gómez and Nazca ridges lie in ABNJ where they are unprotected. Map reproduced with permission from Boteler et al. (2022).

Ongoing scientific and planning efforts towards protecting the Southern Ocean

by Cassandra Brooks and Sarah Becker, University of Colorado Boulder



Adelies penguins on the march, Antarctica.
Image courtesy Tam Minton/unsplash

Antarctica is exceptional. The coldest, windiest, iciest, driest, and most remote of continents is widely celebrated for its rich history of exploration, science and diplomacy and for its exceptional beauty. It's also critically important. Since its discovery, scientists have documented how the Antarctic is vital to Earth systems. And despite the extreme environment, life thrives in incredible abundance. The freezing Southern Ocean that surrounds the Antarctic continent teems with whales, seals, penguins, toothfish and krill. This frozen seascape harbours some of the last remaining great wildernesses on the planet. However, fishing pressure – mostly for krill (*Euphausia superba*) and toothfishes (*Dissostichus eleginoides* and *D. mawsoni*) – combined with cumulative impacts of climate change, jeopardises the future of Antarctic life in the Southern Ocean. The multinational

Commission for the Conservation of Antarctic Marine Living Resources (or CCAMLR) holds the great responsibility of managing Southern Ocean fisheries now and into the future.

Extensive research supports that protected areas – areas that are off-limits to fishing and other human activities – can conserve biodiversity, and perhaps most importantly in the case of the Southern Ocean, can enhance resilience to climate change impacts. In 2002, CCAMLR committed to establishing a network of marine protected areas (MPAs) to meet targets set by the 2002 United Nations World Summit on Sustainable Development. By 2005, CCAMLR began working towards identifying priority areas for protection and compiling the best available science to guide development of an ecologically representative network of Southern Ocean MPAs.

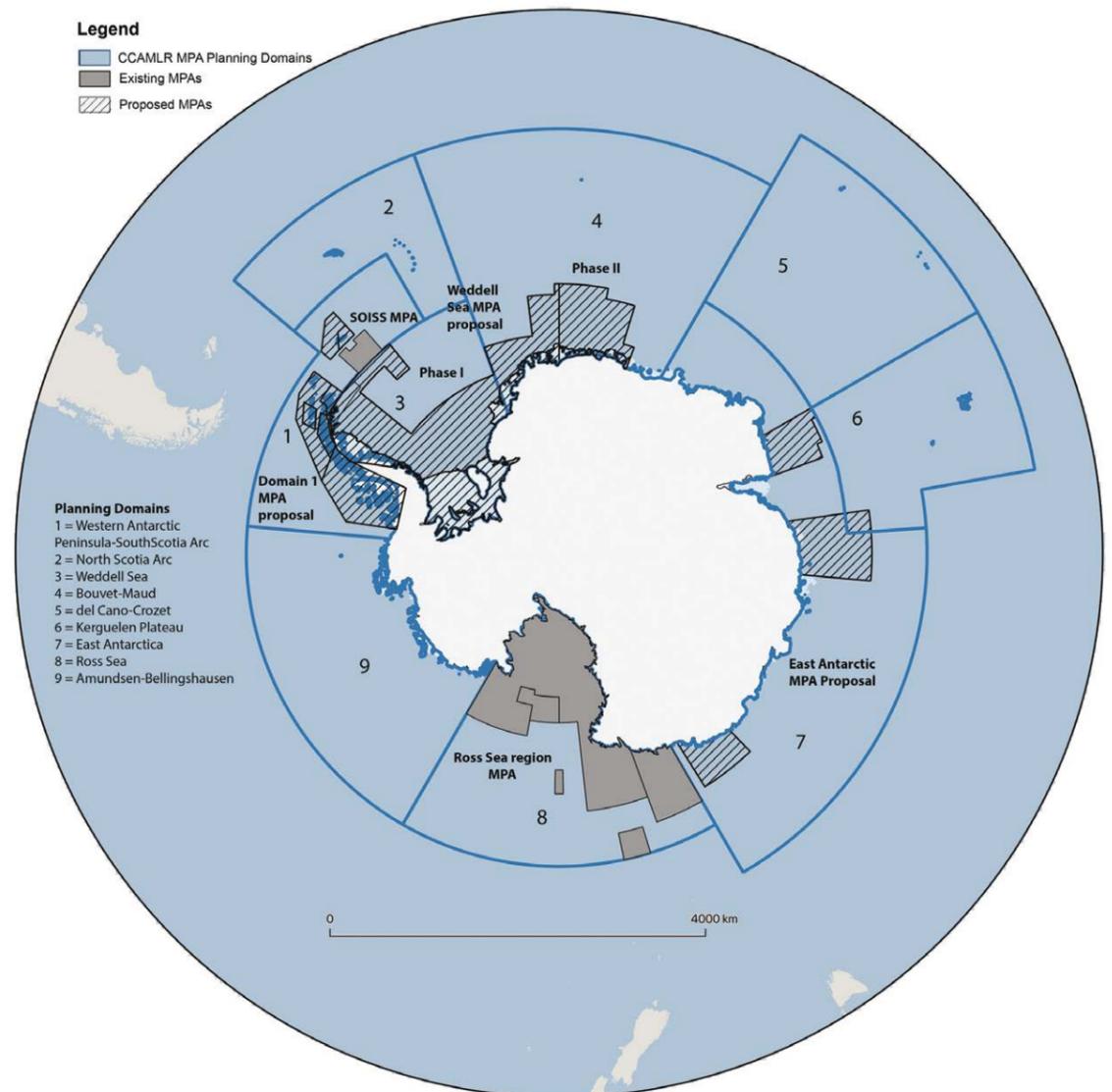


Figure 1: CCAMLR's MPA planning domains, MPAs and proposals. Existing MPAs (South Orkney Islands Southern Shelf (SOISS) and Ross Sea region) shown in gray. Proposals for MPAs (Domain 1 – western Antarctic Peninsula, Weddell Sea and East Antarctic) shown by hashed lines. MPA planning domains illustrated by numbers 1-9.

In 2009, CCAMLR adopted its first MPA – and the world’s first international MPA – south of the South Orkneys Islands which protects around 94,000 km² as a no-take reserve (Figure 1). In 2011, the Commission adopted a framework to guide the MPA process and multiple CCAMLR members began developing MPA proposals across the Southern Ocean guided by nine Planning Domains (Figure 1). In 2016, CCAMLR made history by adopting one of the world’s largest MPAs in the Ross Sea, Antarctica conserving about 2M km² with over 70% being fully off-limits to fishing (Figure 1). The Ross Sea is one of the healthiest large marine ecosystems in the world, and is the most productive stretch of the Southern Ocean, supporting a disproportionate array of marine life (Figure 2).

Currently there are three potential MPAs still under negotiation, including in the Weddell Sea, East Antarctic

and the western Antarctic Peninsula – all of which would contribute to a representative network of Southern Ocean protected areas (Figure 1). The proposed East Antarctic MPA has been designed as a representative network, containing three areas (MacRobertson, Drygalski, and D’Urville Sea-Mertz) which are incredibly important for mammals and birds, including vulnerable penguin colonies which have experienced breeding failure in recent years, likely due in part to climate change. The Weddell Sea is among the least disturbed marine ecosystems in the Southern Ocean, home to a vast array of wildlife and exceptional biodiversity and the MPA proposal has been designed to protect vulnerable marine ecosystems on the seafloor, fish species, birds and mammals. The Weddell Sea MPA proposal is currently being developed in two phases - Phase 1 including the western

Figure 2. The Ross Sea region biodiversity and ecosystem, including (from top left to bottom right) Ross Sea killer whales, Emperor penguins, Adélie penguins, Antarctic Minke whale, Emerald Rockcod, Weddell seal, isopod on a glass sponge, and the benthic seafloor (images courtesy John B. Weller, with permission).



King penguins and seal pup, Antarctica. Image courtesy Rod Long/unsplash.

region and Phase 2 the eastern region (Figure 1). Phase 1 is currently under negotiation and Phase 2 is scheduled to come to CCAMLR as a formal MPA proposal in 2023. Finally, the Antarctic Peninsula (also known as Domain 1) is significant for its outstanding environmental values, including harbouring the majority of Antarctic krill and large populations of penguins, seals and whales. However, it is also the region of Antarctica most impacted by human activities (including research and fishing) and environmental change. Additional important regions that would contribute to a representative network of MPAs across the planning domains, such as in the Amundsen Sea, will be developed in the future.

Despite many years of scientific planning and ongoing diplomatic discussions at CCAMLR, progress on adopting MPAs has slowed. This has been largely due to difficulty negotiating during the Covid-19 pandemic, conflicting economic interests, and most recently, geopolitical barriers. CCAMLR had been forced to meet remotely during scientific and diplomatic discussions between 2020-2021, making decision-making slow and difficult. Fishing interests have continued to grow in the most remote reaches of the Southern Ocean and some CCAMLR Members see MPAs as a threat to current and future economic and food securing opportunities. Furthermore, global international tensions – including the ongoing war in Ukraine (both Russia and Ukraine are members of CCAMLR) – influence negotiations and have acted as a barrier to adopting MPAs. The 41st meeting of CCAMLR took place in person between 24 October and 4 November 2022, and was an opportunity for face-to-face

negotiations after two years of meetings online. While no new MPAs were adopted at this meeting, CCAMLR agreed to hold a special intersessional meeting of the Commission focused explicitly on advancing MPA implementation. This meeting is scheduled to commence in Chile in the first half of 2023. Further, this year marked the first five year reporting since the adoption of the Ross Sea region MPA. Hundreds of studies conducted through collaborations between 20 of the 26 CCAMLR Member States have been completed or are ongoing in support of research and monitoring of the MPA. Thus, the MPA appears to be actively managed, with active research, monitoring and enforcement and thus is exemplary of CCAMLR’s ability to design, adopt and manage large-scale Southern Ocean MPAs.

Antarctica has long been a beacon of international diplomacy, including in globally difficult times. The Antarctic Treaty was signed at the height of the Cold War and banned nuclear and military activities and set aside the continent for peace and science. CCAMLR has demonstrated global leadership towards adopting large-scale protected areas in the Southern Ocean, achieving diplomatic consensus even in difficult times, to conserve Antarctic marine life for future generations. Negotiations will resume in 2023 when CCAMLR has the opportunity to resume its work towards a Southern Ocean network of protected areas. Agreeing to protect further regions of the Southern Ocean would ensure Antarctic marine ecosystems thrive in the future.

The first year of SARGADOM: Success to build on

by Fae Sapsford and David Freestone, Sargasso Sea Commission

The Sargasso Sea Commission will receive €961,000 from the Fonds Français pour l'Environnement Mondial (FFEM) over five years as part of the 'SARGADOM' project. The objective of the project is to contribute to the protection of biodiversity and ecosystem services in the high seas, with a focus on the Sargasso Sea in the North Atlantic and the Costa Rica Thermal Dome in the Eastern Tropical Pacific. 'SARGADOM' combines the names of the project's two focus sites.

Project partners include Fundación MarViva, Université de Bretagne Occidentale (UBO) and Office Français pour la Biodiversité (OFB). Already this year, the project partners have made significant progress: putting expert management teams in place, beginning work on a DPSIR (drivers-pressures-states-impacts-responses) analysis that will provide an up-to-date picture of both natural and social factors at play in the two focus sites, and hosting numerous events at international fora to share and promote the work of the project.

The SARGADOM project hosted a side event at the UN Ocean Conference in Lisbon on 29 June 2022. This event was held aboard a riverboat on the Tagus river and brought together co-financiers, supporters, and other partners of the project. Presentations were given by Fundación MarViva and the Sargasso Sea Commission, and representatives from each organisation made calls to action. Haydée Rodríguez, Project Coordinator for Fundación MarViva, called for the formation of a technical working group focused on the Thermal Dome to be established as part of the High Ambition Coalition

for BBNJ, saying "let it be a blueprint for ocean governance in the future." The Honourable Walter H Roban, JP, MP, Deputy Premier of Bermuda and Minister of Home Affairs, called for more governments to become signatories to the 2014 Hamilton Declaration on Collaboration for the Conservation of the Sargasso Sea, saying "though we often feel as if they belong to no one, the high seas are the responsibility of everyone."

In addition, the SARGADOM project hosted a roundtable event titled 'Generating science for high seas conservation: the SARGADOM project' as part of the Congreso Latinoamericano de Ciencias del Mar (COLACMAR), held 19-23 September 2022 in Panama. Haydée Rodríguez acted as the facilitator for the event. Dr David Freestone and Dr Jorge Jiménez gave presentations on the context and conservation challenges for the Sargasso Sea and the Thermal Dome, respectively. Other speakers, presenting on different aspects of the SARGADOM project, included Dr Guillermo Ortuño Crespo, Mia Oenoto, Fae Sapsford, Dr Eric J Alfaro, and Dr Mariamalia Rodríguez Chavez. This roundtable was the only event focused on high seas issues at the COLACMAR congress, providing a valuable opportunity for networking amongst Latin American scientists dealing with the high seas.

On 17 October 2022, the Sargasso Sea Commission Secretariat, along with SARGADOM partners Fundación MarViva and UBO, convened the second annual SARGADOM Steering Committee meeting at the Villa Caletas hotel in

Costa Rica, as well as an expert data analysis group workshop for the Sargasso Sea and the Thermal Dome. During the Steering Committee meeting, the first annual project report was approved by the project partners. The data analysis workshop was a valuable opportunity for collaboration and coordination between the implementing partners of the project: Duke University Marine Geospatial Ecology Laboratory (MGEL), Imperial College London Centre for Environmental Policy, Bermuda Institute of Ocean Sciences, and the NASA COVERAGE project. The project will produce a DPSIR analysis for both focus areas, and the DPSIR framework was also discussed.

Lastly, the Sargasso Sea Commission's Inception Workshop for the separate but complementary GEF project, 'Strengthening the stewardship of an economically and biologically significant high seas area – the Sargasso Sea,' supported by implementing agency UNDP, and executing agency IOC-UNESCO, a child project of the FAO Common Oceans Programme, also took place in Costa Rica on 18 October 2022. It is envisaged that both projects will work closely to maximise the impact of their combined findings.



Clockwise from top left: Members of the SARGADOM team Joelle Richardson, Project Coordinator for UBO; Fae Sapsford, Marine Research Fellow for SSC; Charline Guillou, Communications Officer for UBO, and Haydée Rodríguez, Project Coordinator for MarViva. Sargasso Sea Commissioners with the Hon. Walter H. Roban (centre) JP, MP, Deputy Premier of Bermuda and Minister of Home Affairs. The GEF project inception meeting, Costa Rica (image courtesy Ronan Long). The Hon. Walter H. Roban, JP, MP, Deputy Premier of Bermuda and Minister of Home Affairs speaking at the SARGADOM side event during the UN Ocean Conference earlier this year. Opposite page: Humpback whale off Bermuda; image courtesy Fae Sapsford.

Sharing science from the deep sea

by Brandon Gertz, Deep-Ocean Stewardship Initiative (DOSI)

Who cares about the deep ocean?

If you've been keeping an eye on how environmental policies addressing the deep ocean have been designed over the past several decades, it can be tempting to answer that question with "almost no one cares." The lack of attention received by over 90% of our global ocean – the biggest environment on Earth – is such a concern for ocean scientists that entire conference sessions are dedicated to ideas for boosting the deep ocean's public image.

And yet, that view of the deep ocean as "out of sight, out of mind" may not be quite as true as it used to be. Recent years have seen the deep ocean's profile rise, if not to the top of policymakers' minds, then at least out of their darkest depths. International negotiations on Biodiversity Beyond National Jurisdiction (BBNJ) rely heavily on deep-sea science when

discussing topics like marine genetic resources. Side events on seabed mining at the 2022 UN Ocean Conference were forced to turn delegates away for lack of enough seats. As ideas for spurring the 'blue economy' swirl and the Decade for Ocean Science charges on, a light is finally starting to shine on the key role the deep ocean plays in the health of our planet.

While this is great news, being in the spotlight creates its own set of challenges for the deep. For new policies that target the deep ocean to succeed, its unique environments and their influence on humanity have to be understood. That's no simple task: the deep sea is huge, dark, and expensive to study. And while ocean researchers do amazing work to add to our ever-growing knowledge base, most policymakers don't have the years of training needed to draw conclusions

from the evolving research. But as those in positions of power shape our relationship with the ocean for years to come, they need clear answers to one key question: What does the deep ocean do for us?

The Role of Science Communicators

The Deep-Ocean Stewardship Initiative (DOSI) was founded to make those connections between science and policy. Our Working Groups bring ocean scientists and other experts together to review the latest research on topics like deep-sea minerals, fisheries, and pollution. We then identify the key takeaways that policymakers must understand to make informed decisions, transforming those points into policy briefs, information sheets, and comments to share where the science is most needed.

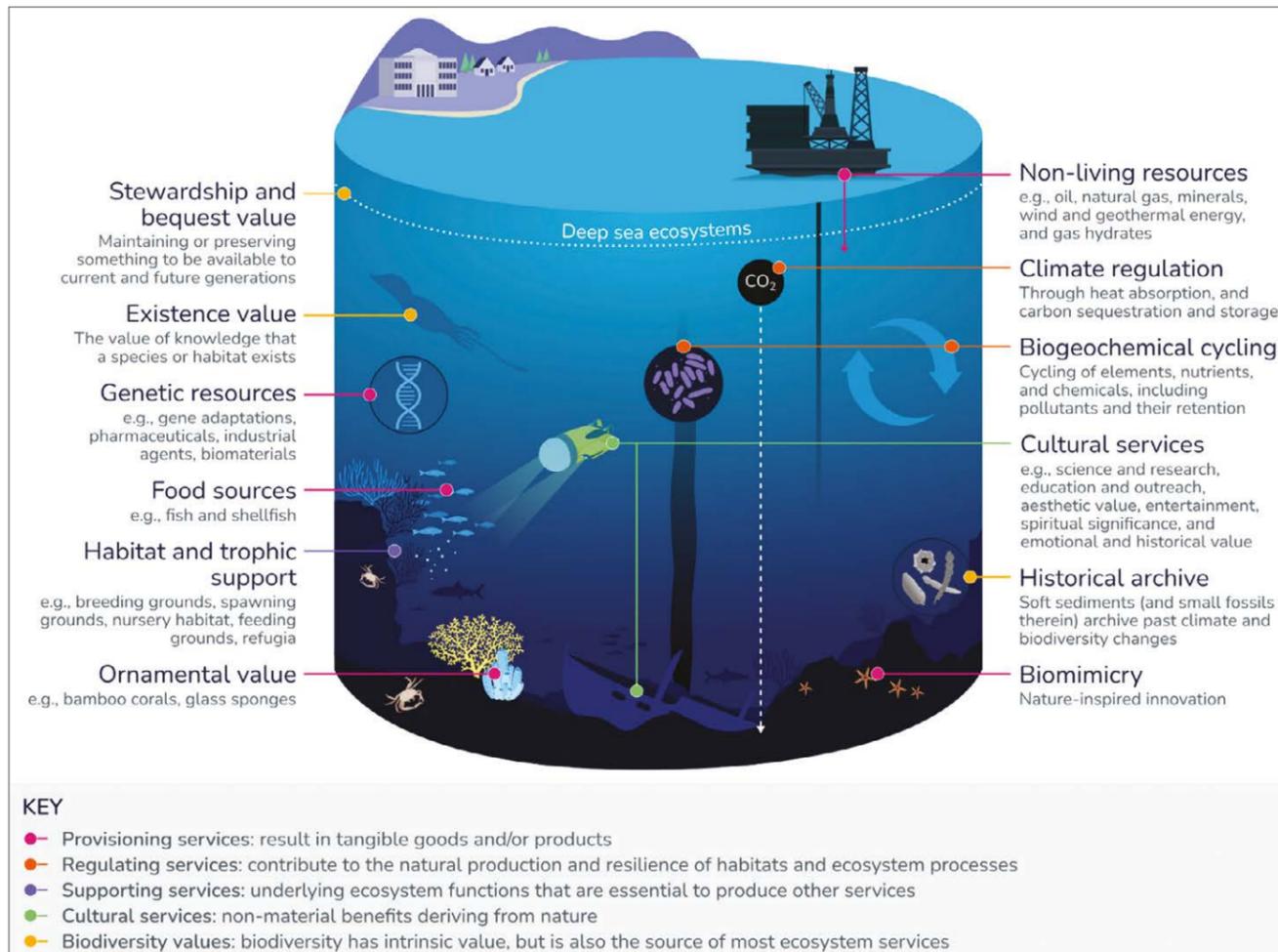
One of DOSI's newest programmes, our Biodiversity Task Force, has been especially active in this regard. Its recent policy brief *What Does the Deep Ocean Do for You?* takes on a complicated subject – the ecosystem services that the deep ocean provides to humans – and distills that topic into clear, understandable points ready to inform policy. The policy brief defines ecosystem services for those who may not know what they are and highlights the most important services the deep ocean provides: food sources, nutrient cycling, and genetic resources, for example. The brief then describes the ways in which human activities can change those benefits.

To overcome the challenge of explaining such an unfamiliar environment, the authors of the brief connect their information about ecosystem services to a helpful graphic that transforms the benefits provided by the deep ocean from abstract concepts into things that happen in a very real place on Earth (see figure, left). By sharing science effectively, hard but crucial concepts like the ocean's role in climate regulation can be used to help policymakers chart an informed course forward.

Looking ahead

So, who cares about the deep ocean? While the answer may still be fewer people than we would like, the deep ocean is a bigger topic now than ever before. And with international attention focused on climate change, biodiversity, and the blue economy, the intense need for policies to consider the deep ocean shows no signs of weakening. Throughout the process, decision-makers will need help from experts who can provide clear, understandable science. We're excited by the progress we have seen so far, and we look forward to helping the connections between deep-ocean science and policy grow.

If you would like to help communicate important deep-ocean knowledge, we would be delighted for you to join our efforts. You can sign up for DOSI's newsletter or find Working Groups to join on our website at dosi-project.org.



Planktonia by Erich Hoyt

The greatest migration on Earth happens twice each night in the ocean. Every evening at sunset, zooplankton, followed by predator fish, squid, octopus and other species that have acquired a taste for plankton, start moving up from the deep waters of the ocean. In this vertical migration to the surface, the zooplankton feast on plant plankton and other tasty morsels in the water as well as on each other. The feeding ends just before dawn when the plankton retreat to the depths of the ocean to hide during the day until, once again, the next evening, they migrate back up the water column.

Planktonia goes on a dive into the secret world of the nighttime ocean. Countless microscopic plankton – creatures such as the ornate ghost pipefish, left-handed hermit crabs and bony-eared assfish – are delicate and beautiful; some look terrifying. This massive vertical migration attracts larger creatures too, such as solitary 15 cm bigfin reef squid and the fierce and hungry 2 m female blanket octopus. Everyone joins the migration for the midnight feast, and they are all ravenously hungry.

Planktonia

The Nightly Migration of the Ocean's Smallest Creatures



ERICH HOYT

More details at: erichhoyt.com/books/planktonia/

FSO SAFER oil spill risk: tiptoeing on the brink of catastrophe

by David Johnson, GOBI Coordinator

Moored 4.8 km off the Red Sea coast of war-torn Yemen is one of the biggest oil tankers ever built. Storing an estimated 1.14 million barrels (48 million gallons) of crude oil, the former ultra-large crude carrier (ULCC) single-hulled tanker *SAFER*, converted to a floating storage and offloading unit (FSO) in 1986, is now rotting away. The long-standing conflict in Yemen has resulted in it not being inspected or maintained since 2015; it is uninsured and deteriorating rapidly.

The Red Sea coral reefs are 2,000 km long, collectively forming the longest continuous reef system in the world and covering 13,605 km². They are exceptionally diverse and relatively resilient to climate change: the southern Red Sea reefs live near their maximum temperature tolerance range, and the northern Red Sea reefs could provide climate refugia for heat-displaced species (Fine et al., 2019). Approximately 50% of live coral cover has been lost globally since the 1870s, attributed to diverse human pressures but climate change has become a primary concern. However, the Sixth Global Coral Reef Monitoring Network report (GCRMN, 2021) concluded that, if other pressures allow, reefs have the capacity to recover from mass bleaching events, potentially within a decade. Status and trends for coral reefs of the Red Sea and Gulf of Aden showed potential recovery from the global 1998 bleaching event from 2016 onwards; it is therefore imperative to safeguard Red Sea reefs against any impending harm to avoid further loss - to keep them as a habitat, carbon sink, source of food security, wonder and future medicines?

Within the CBD EBSA portfolio is the Southern Red Sea Pelagic Ecosystem EBSA, recognised as the most productive region of the entire Red Sea. It supports vulnerable marine mammals, whale sharks, manta and devil rays and seabirds. The Southern Red Sea Islands EBSA is also highly productive with many endemic species, providing a migratory corridor and a nesting and breeding ground for both turtles and birds. Djibouti's Seven Brothers Islands and Godorya EBSA is special for its mangroves, seagrasses, corals, fish species, charismatic megafauna and as a bird migration route – incorporating Ras Siyyan MPA, the largest marine protected area in Djibouti. GOBI partners have provided complementary data identifying Important Bird and Biodiversity Areas (IBAs) and Important Marine Mammal Areas (IMMAs) (see Figure 1).

So what impacts would result if the *SAFER* leaks, ruptures or explodes? A risk assessment undertaken by ACAPS in

2020 quantified the impacts of both an explosion and a fire onboard, plotting air and waterborne pollution trajectories (ACAPS, Catapult and Riskaware, 2020). Immediate socio-economic impacts could include extreme and exacerbated hardship for local communities, health risks, clean-up costs, and trade/port disruption. Coastal communities dependent on artisanal fishing will struggle and wider impacts could affect millions, jeopardising drinking water supplies and regional tourism income.

Acute crude oil spills impact species and habitats. Mortality of marine mammals, fish, turtles and seabirds is readily visible. Residual toxins, such as polycyclic aromatic hydrocarbons, persist in the marine environment with lasting effects on physiology, productivity and population dynamics. Oil exposure can kill coral on varying timeframes and impair both primary production and energy transfer. In 2020, the MV *Wakashio* grounding in Mauritius highlighted the vulnerability of tropical corals, mangroves and seagrass habitats, but this incident was orders of magnitude smaller than a *SAFER* spill might be. Damaged coral reefs can take decades to centuries to recover, and sensitive locations such as the Farasan archipelago IMMA (a refuge for threatened marine mammals including dugongs, Indian Ocean humpback dolphins and Indo-Pacific bottlenose dolphins, with known aggregation sites and extensive seagrass beds) and IBAs such as the islands north of Al-Hudaydah, Jaza'ir al-Hanish and Midi-Al-Luhayyah (important for Red Sea endemic, near-threatened White-eyed gulls) and Jaza'ir al-Zubayr (important for Brown boobys) are particularly at risk.

A worst-case scenario in the Red Sea would involve difficult trade-off decisions for oil spill response: active clean up with booms and skimmers will be fraught with difficulties, bringing into play other options such as *in situ* burning or use of oil dispersants. The environmental threat is not restricted to the coast of Yemen. The Red Sea is a semi-enclosed marginal sea, with a unique northward-flowing eastern boundary current and two seasonal vertical meridional overturning cells. Within three weeks spilled oil could drift north to Saudi Arabia and west and south to Eritrea and Djibouti (Huynh et al., 2021; Figure 1). The extent of the Southern Red Sea Pelagic Ecosystems EBSA reflects the whole region's critical importance for megafauna, particularly whale sharks and cetaceans (Bryde's whales, spinner dolphins, long-beaked common dolphins, pantropic spotted dolphins, Indian Ocean

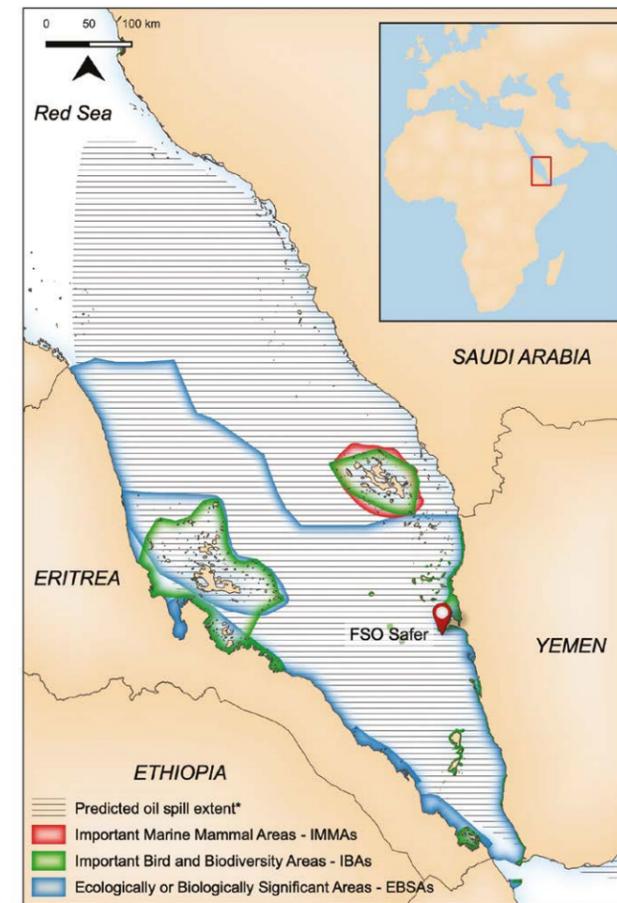


Figure 1: Areas identified for their biodiversity value that will be at risk if FSO SAFER ruptures.

humpback dolphins, false killer whales and bottlenose dolphins). The Red Sea area is used as a nesting, foraging and migratory corridor for sea turtles and Eritrea is home to five of the world's seven turtle species, all of which are threatened with extinction globally. Depending on seasonal monsoon conditions, contaminants could reach the Bab-el-Mandeb Strait that connects the Red Sea with the Gulf of Aden. This threatens not only Red Sea coral reefs but would impact on pelagic larval exchange dynamics between the coral reefs in the Southern Red Sea and the Indian Ocean (Wang et al., 2019) and mobile species using this region for feeding and as a migratory corridor. The Regional Organization for the Conservation of the Environment of the Red Sea & Gulf of Aden Region (PERSGA) has a clear mandate to conserve biodiversity and establish a network of protected areas. An evaluation of Regional Seas inputs to the CBD's post 2020 Global Biodiversity Framework noted proactive efforts by PERSGA towards a network of marine protected areas and work on coral conservation in partnership with the International Coral Reef Initiative, but stronger representative and coordinated ecologically coherent protection is needed.

In this situation, the environment has become a geopolitical bargaining chip and biodiversity conservation efforts based on years of knowledge building and supporting science are at risk of being wiped out. In April 2022 a UN-coordinated plan to address the threat was unveiled. The plan, to install a long-term replacement for the FSO *SAFER* and offload its cargo to an emergency interim temporary vessel, is costed at \$144m with the emergency operation estimated at \$80m. Finance has been pledged but not enough. On 13 June 2022 a social media crowd-funding campaign was launched in an attempt to find a further \$5m to finance the emergency operation. Thus, while the international community belatedly recognises the climate ocean nexus, articulates concerns on extinctions and sets new targets for the post-2020 Global Biodiversity Framework, key ecosystems of the southern Red Sea and their ecosystem services are on the brink of disaster.

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Dugong feeding on seagrass, Red Sea. Image courtesy Anett Szasz / Ocean Image Bank.

Hot off the press



Priorities for synthesis research in ecology and environmental science, by BS Halpern and colleagues, in *Ecosphere*. DOI: [10.1002/ecs2.4342](https://doi.org/10.1002/ecs2.4342).

This seminal publication examines, through extensive consultation with the research community, how and where synthesis can address key questions and themes in ecology and environmental science in the coming decade, and identifies seven priority research topics: (i) diversity, equity, inclusion, and justice, (ii) human and natural systems, (iii) actionable and use-inspired science, (iv) scale, (v) generality, (vi) complexity and resilience, and (vii) predictability. These topics provide a strategic vision for future synthesis in ecology and environmental science.

A global horizon scan of issues impacting marine and coastal biodiversity conservation, by JE Herbert-Read and colleagues, in *Nature Ecology & Evolution*. DOI: [10.1038/s41559-022-01812-0](https://doi.org/10.1038/s41559-022-01812-0).

For this marine and coastal horizon scan, 30 scientists, policymakers and practitioners with transdisciplinary expertise in marine and coastal systems were questioned to identify new issues that are likely to have a significant impact on the functioning and conservation of marine and coastal biodiversity over the next 5-10 years. Early identification of these issues and their potential impacts on marine and coastal biodiversity is intended to support scientists, conservationists, resource managers and policymakers in addressing the challenges facing marine ecosystems.



An evolution towards scientific consensus for a sustainable ocean future, by F Gaill and colleagues, in *npj Ocean Sustainability*. DOI: [10.1038/s44183-022-00007-1](https://doi.org/10.1038/s44183-022-00007-1).

This publication raises the notion and need for a knowledge consensus and integration platform exclusively for the ocean, along the lines of the IPCC for climate and the IPBES for biodiversity. The International Panel for Ocean Sustainability (IPOS) is introduced as a coordinating mechanism to integrate knowledge systems to forge a bridge across ocean science-policy divides collectively. The IPOS will enrich the global policy debate in the Ocean Decade and support a shift toward ocean sustainability.



Putting sharks on the map: a global standard for improving shark area-based conservation, by CA Hyde and colleagues, in *Frontiers in Marine Science*. DOI: [10.3389/fmars.2022.968853](https://doi.org/10.3389/fmars.2022.968853).

Spatial planning tools often fail to consider the habitat needs critical for the survival of sharks, rays and chimeras. The Important Shark and Ray Area (ISRA) approach is proposed as a response to the dire global status of these taxa. The ISRA Criteria presented in this article provide a framework to identify discrete, three-dimensional portions of habitat important for one or more shark, ray, or chimaera species, that have the potential to be delineated and managed for conservation.



Tracking marine megafauna for conservation and marine spatial planning, by JM Pereira and colleagues, in *Frontiers in Marine Science*. DOI: [10.3389/fmars.2022.11194](https://doi.org/10.3389/fmars.2022.11194).

This editorial piece fronts the research topic of the same name in its publication journal. The topic is intended to attract further manuscript submissions which highlight the multiple applications of tracking towards the prioritisation of conservation goals, including on different components of marine megafauna, addressing the use of tracking to guide conservation strategies and assist the development of marine spatial plans. There are already 35 articles included under this topic.

Progressing delineations of key biodiversity areas for seabirds, and their application to management of coastal seas, by JM Handley and colleagues, in *Diversity and Distributions*. DOI: [10.1111/ddi.13651](https://doi.org/10.1111/ddi.13651).

Using the KBA framework, and by developing a conservative protocol to identify sites, this article identifies globally important places for breeding seabirds throughout the coastal seas of the southwest Atlantic Ocean. It goes on to inform marine spatial planning by evaluating potential activities that may impact species and how a proposed network of Marine Management Areas (MMAs) overlap with important sites.



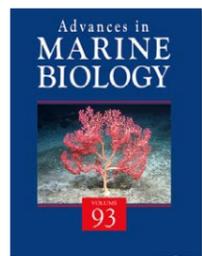
Pressing questions for science, policy, and governance in the high seas, by RM Jarvis and T Young, in *Environmental Science and Policy*. DOI: [10.1016/j.envsci.2022.11.001](https://doi.org/10.1016/j.envsci.2022.11.001).

This article presents the results of a horizon scan conducted through an online survey of high seas researchers who were asked to identify and prioritise important questions for the future of the high seas. The exercise identified the ten most pressing research questions for the future of the high seas, in the hope that they can increase research and policy attention to these areas and help prioritise research strategies during the International Decade of Ocean Science for Sustainable Development.



Mismatches in scale between highly mobile marine megafauna and marine protected areas, by MG Conners and colleagues, in *Frontiers in Marine Science*. DOI: [10.3389/fmars.2022.897104](https://doi.org/10.3389/fmars.2022.897104).

Using global tracking data from 36 species across five variably mobile taxa, this article demonstrates that most MPAs are too small to encompass complete home ranges of most species. It also demonstrates how benefits from MPAs are still likely to accrue by targeting seasonal aggregations and critical life history stages of species and through other management techniques.



Discovering marine biodiversity in the 21st century, by AD Rogers and colleagues, in *Advances in Marine Biology*. DOI: [10.1016/bs.amb.2022.09.002](https://doi.org/10.1016/bs.amb.2022.09.002).

This publication reviews the current knowledge of the biodiversity of the ocean as well as the levels of decline and threat for species and habitats. It goes on to explore a range of new complementary technologies and approaches for discovery of marine species and their detection and monitoring, concluding that integrated approaches represent the best way forwards for accelerating species discovery, description and biodiversity assessment.

Demystifying ecological connectivity for actionable spatial conservation planning, by M Beger and colleagues, in *Trends in Ecology and Evolution*. DOI: [10.1016/j.tree.2022.09.002](https://doi.org/10.1016/j.tree.2022.09.002).

The authors show how connectivity can be included in mathematically defining conservation planning objectives. They provide a path forward for linking connectivity to high-level conservation goals, such as increasing species' persistence, and propose ways to design spatial management areas that gain biodiversity benefit from connectivity.





Global Ocean Biodiversity Initiative

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 Seascope Consultants Ltd. GOBI is funded by the International Climate Initiative (IKI). The German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) supports this initiative on the basis of a decision adopted by the German Bundestag.

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