INTERNATIONAL CONFERENCE

MPA IN MSP

09–12 JULY 2025

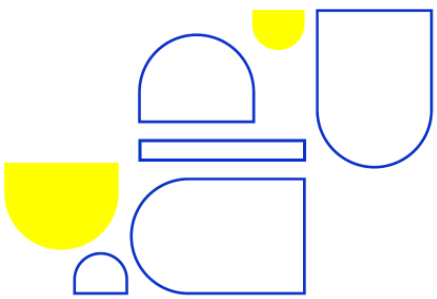
Bodø, Norway

INTERNATIONAL CONFERENCE

MPA IN MSP

Table of Contents

This booklet serves as your guide to the *International Conference Marine Protected Areas in Marine Spatial Planning (MPAinMSP)*, providing key information about the sessions speakers and events. We hope it helps you navigate the exciting opportunity.



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Welcome to the International Conference
Marine Protected Areas in Marine Spatial Planning (MPAinMSP)

Countries worldwide are promising to protect 30% of the ocean by 2030. Scientists and specialists in marine spatial planning are working to support society in achieving these goals. For example, the *MPA Europe* project is designing an optimal network to protect marine biodiversity in all European seas, and the project is mapping organic carbon stores in seabed sediments to inform policies to avoid releasing this carbon back into the sea and atmosphere. Not only is good science required to plan where it is best to locate Marine Protected Areas (MPAs), but also to show wider society and stakeholders how these will affect other uses of the ocean, including fisheries.

A particular challenge is that countries do not mean protection of biodiversity when they call areas protected. The scientific committee has proposed a **Conference Statement** calling on countries to focus on full protection of areas because this has been repeatedly shown to have benefits to biodiversity and fisheries, in contrast to variable benefits from partially protected areas (see MPAinMSP Conference Statement).

The international conference MPAinMSP focuses on MPA science and planning, bringing together invited speakers from around the world and offered talks and posters covering the spectrum of issues that need to be addressed to protect some of the ocean from human impacts. Speakers will share experiences before and after MPA establishment, including recovery of biodiversity and fishery effects. International panels of experts will discuss issues around funding, governance, stakeholder engagement, and climate change considerations.

The ~200 attendees at this conference are working to reverse the decline of marine biodiversity and so helping to save the planet from human stupidity. Thank you!

We earnestly hope that this conference will serve as the inaugural event in a long-standing series for the years ahead. Once again, we warmly welcome you and wish you a fruitful and engaging experience.

Mark Costello,
MPA Europe Coordinator
Professor at Nord University

Anna M Addamo,
MPA Europe Postdoctoral Researcher &
MPA Europe Project Manager at Nord University

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MPAinMSP CONFERENCE STATEMENT

Marine Protected Areas should prohibit people from killing marine life and damaging their habitats.

The scientific evidence is that fully and strictly protected MPA, i.e., areas with no extraction of natural resources, show recovery of species, habitats and food webs that benefit fisheries (see Further Reading). In contrast, numerous partially protected areas do not show consistent benefits. Thus, nature conservation and fisheries management should focus on establishing fully protected areas.

We are concerned about the widening gap between MPA that aim to fully and partially protect biodiversity, and MPA that do not aim to protect biodiversity (e.g., 86% in European Union countries). We are concerned that countries may claim they have achieved the 30×30 target by false labelling and advertising areas as MPA that cannot qualify as such, hence failing to achieve long-term protection of biodiversity and benefit fisheries. At present, in Europe, only 0.03% of the ocean is fully protected.

By spending effort in partially protected areas, countries may be wasting their time and effort in establishing MPA that will not meaningfully benefit biodiversity or fisheries. In contrast, establishing fully protected areas has been repeatedly shown to benefit biodiversity, and in many cases around the world, also benefit fisheries (see Further Reading).

We call on governments to abide by the simple principle that we do not protect marine wildlife by killing it or damaging its habitat (e.g., by trawling or dredging the seabed).

*Sign the conference statement **here***

Further reading

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PROGRAMME

INTERNATIONAL CONFERENCE
MPA IN MSP

WEDNESDAY 9TH JULY

12:00	**REGISTRATION OPENS; POSTERS SET UP**
14:00 14:05	**MASTER OF CEREMONY** Introductions
14:05 14:20	**VIDAR HELGESEN** Opening Comments by the Executive Secretary, Intergovernmental Oceanographic Commission, UNESCO
14:20 14:30	**MADDALENA VISSER** Opening Comments by DG Env European Commission
14:30 14:50	**MARK COSTELLO** MPA science, myths and need for strict protection; and the Conference Statement and Proceedings
14:50 15:30	Keynote **RASHID SUMAILA** Leveraging MPAs to balance trade-offs in living and non-living ocean blue economy sectors
15:30 16:00	**AFTERNOON BREAK**
16:00 16:10	1 **NILS KRUECK** MPA planning needs to account for individual fish movements
16:10 16:20	2 **FRANCISCO BORGES** How has ecological modelling integrated MPA, human uses, and threats to species in the Southern Ocean?
16:20 16:30	3 **CHIARA SILVESTRINI** Small-scale fishery is a driver of habitat loss also in MPA
16:30 16:40	4 **MARTINA MARTORELL-BARCELÓ** The role of MPA in preserving the behavioural diversity of Atlantic cod

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16:40 – 16:50 | 5 GRAHAM EDGAR
The value of MPA as seen by fish

16:50 – 17:00 | QUESTIONS

17:00 – 18:00 | PANEL 1 MPA FUNDING

1. Emma McIntosh - Arcadia
2. Tanja Lieuw - Caribbean Biodiversity Fund
3. Rui Martins – Azores Regional Government

Q&A Session: 10 Min

18:00 – 19:30 | WELCOME RECEPTION AND POSTER SESSION

19:30 – 21:00 | *OCEAN* WITH DAVID ATTENBOROUGH

THURSDAY 10TH JULY

08:30 | REGISTRATION OPENS

09:00 – 09:40 | Keynote BARBARA HORTA E COSTA
MPAs and their conditions for success at local and global scales

09:40 – 09:50 | 6 LAURIANE RIBAS DEULOFEU
Taiwan coral ecosystem status and MPA effectiveness

09:50 – 10:00 | 7 ASTA AUDZIJONYTE
Assessing MPA effectiveness using fish length observations and size-based rules

10:00 – 10:10 | 8 FREDERICO MESTRE
Assessing the MPA effectiveness with increasing maritime traffic

10:10 – 10:20 | 9 SUSAN GALLON
Assessing the progress and effectiveness of MPA in the Mediterranean: a decade of insights

10:20 – 10:30 | QUESTIONS

MPA Europe, Horizon Europe Grant Agreement no. 101059988 and UKRI Grant Numbers 10067934 JNCC and 10069750 SAMS

10:30 – 11:00 **MORNING BREAK**

11:00 – 11:10 10 **RICK STUART-SMITH**
Why are we chasing 30% coverage of mostly ineffective MPA?

11:10 – 11:20 11 **JORGE ASSIS**
Integrating climatic connectivity into the global prioritization of MPA

11:20 – 11:30 12 **JOSIE ANTONUCCI DI CARVALHO**
Challenges for a successful protection: the case of German MPA

11:30 – 11:40 13 **CESC GORDÓ VILASECA**
The effect of 10% no-take MPA in the French metropolitan EEZ

11:40 – 11:50 14 **PER JACOBSEN**
The truth behind Denmark's 31.7% MPA

11:50 – 12:00 **QUESTIONS**

12:00 – 13:00 **PANEL 2** **GOVERNANCE, STAKEHOLDERS AND PARTICIPATORY ENGAGEMENT**

1. Mauro Randone – WWF
2. Sebastian Kopf - Blue Mission AA
3. Eirini Apazoglou - EuroMarine Network

Q&A Session: 10 Min

13:00 – 14:00 **LUNCH**

14:00 – 14:40 Keynote **DONAL GRIFFIN**
Ireland's Fair Seas: Building a Movement of Ocean Stewardship

14:40 – 14:50 15 **ERIKA FABBRIZZI**
Assessing the ecological connectivity of MPA at a regional scale

14:50 – 15:00 16 **VANESSA STELZENMÜLLER**
Building MSP scenarios for conservation and restoration targets with the MarinePlan decision support system

MPA Europe, Horizon Europe Grant Agreement no. 101059988 and UKRI Grant Numbers 10067934 JNCC and 10069750 SAMS

15:00 – 15:10 — 17 **SOPHIE VAN SCHOUBROECK**
Social values and ecosystem services in MPA: insights from the Danish Wadden Sea

15:10 – 15:20 — 18 **FABRICE STEPHENSON**
Validation of a new seafloor community classification for informing MSP in Aotearoa New Zealand

15:20 – 15:30 — **QUESTIONS**

15:30 – 16:00 — **AFTERNOON BREAK**

16:00 – 16:10 — 19 **BENTE LILJA BYE**
Digital twins of the ocean - tools for holistic MSP

16:10 – 16:20 — 20 **LINDSAY GRANT**
Optimising the UK MPA network for biodiversity, climate and food security

16:20 – 16:30 — 21 **FREDDIE WATSON**
How a self-governing island has successfully utilised MSP for marine protection

16:30 – 16:40 — 22 **JEAN-LUC SOLANDT**
Progressing marine conservation in the UK after leaving the European Union

16:40 – 16:50 — 23 **ELIZABETH OH**
Scaling up our understanding of fish-habitat associations on shallow reef

16:50 – 17:00 — **QUESTIONS**

17:00 – 18:00 — **PANEL 3** **INTERNATIONAL MPAinMSP**

1. Fanny Douvere – UNESCO
2. Adriano Quintela – Blue Azores/Oceano Azul Foundation
3. Dmitry Frank-Kamenetsky – HELCOM Secretariat

Q&A Session: 10 Min

18:30 – 20:45 — **CONFERENCE DINNER**

MPA Europe, Horizon Europe Grant Agreement no. 101059988 and UKRI Grant Numbers 10067934 JNCC and 10069750 SAMS

FRIDAY 11TH JULY

08:30 REGISTRATION OPENS

09:00 – 09:40 Keynote **ADRIANO QUINTELA AND RUI MARTINS**
Establishing the largest MPA network in the north Atlantic in the Azores

09:40 – 09:50 24 **CATARINA FRAZAO**
MSP is not MPA planning: both are key for the sustainability of a rapidly changing ocean

09:50 – 10:00 25 **HANNAH TRUTER**
MSP: lessons learned in Algoa Bay, South Africa

10:00 – 10:10 26 **CHHAYA CHAUDHARY**
Prioritization of Atlantic protection areas in international waters

10:10 – 10:20 27 **ANDREJ ABRAMIC**
ReMAP's approach for assessing compatibility of marine conservation and MSP in Europe

10:20 – 10:30 QUESTIONS

10:30 – 11:00 MORNING BREAK

11:00 – 11:10 28 **ADELA BELACKOVA**
Reviewing MPA design based on mapping activities: the case of southwest Portugal

11:10 – 11:20 29 **MANDY LOMBARD**
South Africa's 20 new MPA paved a path for ecosystem-based MSP

11:20 – 11:30 30 **DÉBORA GUTIERREZ**
Stakeholder engagement in the Blueconnect project: bridging gaps in marine conservation/

11:30 – 11:40 31 **ELIZA FRAGKOPOULOU**
Global connectivity assessment and priority areas for MPA expansion

MPA Europe, Horizon Europe Grant Agreement no. 101059988 and UKRI Grant Numbers 10067934 JNCC and 10069750 SAMS

11:40 – 11:50 — 32 **JULIE MARTY**
Urban typology of MPA: a framework applied to the Western Mediterranean Sea

11:50 – 12:00 — 33 **QIANSHUO ZHAO**
How much species' biodiversity could area targets protect globally?

12:00 – 12:10 — **QUESTIONS**

12:10 – 13:00 — **PANEL 4** DESIGNING NETWORKS FOR PROTECTING BIODIVERSITY AND CARBON STORES

1. Mark Costello (NORD)
2. Anna Addamo (NORD)
3. Silas Principe (UNESCO)
4. Thanos Smanis (CLIMAZUL)
5. Belinda Bramley (CLIMAZUL)

Q&A Session: 10 Min

13:00 – 14:00 — **LUNCH**

14:00 – 14:40 — **Keynote** **JENN CASELLE**
California's network of MPA: lessons learned from design to monitoring

14:40 – 14:50 — 34 **ALESSIA RIZZI**
3D climate velocity as a tool for climate-smart MSP and biodiversity conservation

14:50 – 15:00 — 35 **SILVIA RAYO LUENGO**
A climate change vulnerability assessment tool for MPA managers: evidence from the Mediterranean Sea

15:00 – 15:10 — 36 **CAITLIN LAMB**
Evaluating the resilience of the Scottish MPA network in response to marine heatwaves

15:10 – 15:20 — 37 **DAVID BARNES**
Importance of polar seas protection to climate change and nature-loss crises

15:20 – 15:30 — **QUESTIONS**

MPA Europe, Horizon Europe Grant Agreement no. 101059988 and UKRI Grant Numbers 10067934 JNCC and 10069750 SAMS

15:30 – 16:00 **AFTERNOON BREAK**

16:00 – 16:40 Keynote **TOM LETESSIER**
Considering pelagos and benthos in MPA spatial planning

16:40 – 16:50 38 **TEGAN CARPENTER-KLING**
Incorporating climate change in MPA design for the Indian sub-Antarctic High Seas

16:50 – 17:00 39 **STELIOS KATSANEVAKIS**
Marine conservation futures: scenario-based planning for MPA in MSP

17:00 – 17:10 40 **CLAUDIA SCIANNA**
Integrated assessment of ecological and socio-economic dimensions of small-scale fisheries management in MPA

17:10 – 17:20 41 **TERESA AMARO**
Black coral and gorgonian assemblages of Santo Antão (Cabo Verde) conservation through regulation, community action, and proposed MPA

17:20 – 17:30 42 **LAURA MARTÍN GARCÍA**
The importance of deep benthic biodiversity in special areas of conservation in the Canary Islands

17:30 – 17:40 **QUESTIONS**

17:40 – 18:30 **PANEL 5** **BIODIVERSITY INCLUSIVE AND CLIMATE SMART MSP**

1. Fabrice Stephenson - IUCN WCPA
2. Catarina Fonseca – MSP Global
3. Oliver Ó Cadhla - Department of Housing, Local Government and Heritage Ireland

Q&A Session: 10 Min

18:30 – 19:00 **CLOSING EUROPEAN STAKEHOLDER WORKSHOP CEREMONY - MoC**

MPA Europe, Horizon Europe Grant Agreement no. 101059988 and UKRI Grant Numbers 10067934 JNCC and 10069750 SAMS

SATURDAY 12TH JULY

09:00 09:40	Keynote	**SUSAN STEELE** The European Fisheries Control Agency
09:40 09:50	43	**ALVISE DABALÀ** Safeguarding climate-resilient mangroves requires a small increase in the global protected area
09:50 10:00	44	**MARTINA BOCCI** Enhancing biodiversity protection in MSP: the ecological-socio-economic management framework
10:00 10:10	45	**SARAH BLANCHARD** Marine natural capital approaches to MPA conservation advice
10:10 10:20	46	**PETER J.S. JONES** Diversity is key to the more effective and equitable governance of MPA
10:20 10:30		**QUESTIONS**
10:30 11:00		**MORNING BREAK**
11:00 11:10	47	**EMMA MCINTOSH** Funder collaboration to accelerate marine protection
11:10 11:20	48	**IVANA STOJANOVIC** Integrating MPA and MSP processes
11:20 12:00	Keynote	**DANIEL PAULY** Fifty years of MPAs: from enhancing marine fisheries and biodiversity to proclaiming 'Paper Parks' and Back
12:00 12:30		**MARK JOHN COSTELLO** Closing Ceremony, Conference Statement and Proceedings
17:30 20:15		**EXCURSION** RIB Safari to Saltstraumen (for those who signed-up only)

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KEYNOTE BIOGRAPHIES

Dr Rashid Sumaila

Rashid Sumaila is a Professor and Canada Research Chair (Tier 1) in Interdisciplinary Ocean and Fisheries Economics at the Institute for the Oceans and Fisheries, and the School of Public Policy and Global Affairs, University of British Columbia. His research focuses on bioeconomics, marine ecosystem valuation and the analysis of global issues such as fisheries subsidies, marine protected areas, illegal fishing, climate change, marine plastic pollution, and oil spills. Sumaila has experience working in fisheries and natural resource projects in Norway, Canada and the North Atlantic region, Namibia and the Southern African region, Ghana and the West African region and Hong Kong and the South China Sea. Dr Sumaila received his Ph.D. (Economics) from the University of Bergen and his B.Sc. (Quantity Surveying) from the Ahmadu Bello University. Sumaila is widely published and cited. He won the 2017 Volvo Environment Prize and was named a Fellow of the Royal Society of Canada in 2019. His interest in the environment started early in life when his grandfather used to say people should "walk as if the ground feels pain" – this is sophisticated environmentalism! His specific interest in ocean and fisheries was picked in Norway. Sumaila enjoys exploring novel ideas and mentoring future thinkers. He loves waking up each day thinking of how best to contribute to ensuring that we bequeath a healthy ocean to our children and grandchildren so they too can have the option to do the same.

Dr Barbara Horta e Costa

Barbara Horta e Costa has been working in Marine Protected Areas (MPAs) and their relation to fisheries all her career. She is a marine biologist/ecologist working in marine conservation and management. She is particularly interested in marine ecology and the socio-ecological aspects of marine protection and management. She has been studying MPAs and their effects in marine assemblages but also in local users, such as artisanal fishers. She is very interested in the study of factors influencing MPA effectiveness - the enabling conditions for MPA success (so MPAs are really effective tools). These include MPA design and planning, protection levels, stakeholder engagement, management effectiveness and monitoring. She is very interested in the variety and potential outcomes of partially protected areas, the vast majority of MPAs. She is also very interested in MPAs networks, connectivity, marine biodiversity, marine habitats, species interactions, species behaviour, climate change, fisheries vulnerability, and fish assemblages' resilience to local and global impacts. She is dedicated to particular case-studies, but also to global or regional patterns of MPAs. She did her master thesis in Cuba (assessing potential ecological effects of the Punta Frances MPA), she then did her PhD in Portugal and California (UCSB), assessing socio-ecological effects of the Arrabida MPA as well as climate effects in fish assemblages. She then conducted different postdocs, in Portugal and France. She co-led a work package of a Biodiversa project (with various European collaborators) and was the leading author

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of a globally recognized regulation-based classification system (RBCS) of MPAs and zones, and the senior leader of a global meta-analysis on protection effects. She also run a diagnosis of Portuguese MPAs. She is collaborating with a variety of projects and studies related to MPAs and conservation (nationally and globally). This includes being co-PI of the MARSW project at CCMAR, aiming at mapping marine biodiversity, monitoring effects of different protection levels and contributing to the management of the marine park of PNSACV and to the monitoring of Portuguese MPAs. She is also part of the group leading the implementation process, through participatory methods, of the first Portuguese MPA of community interest (in mainland Portugal). Globally, she has been invited and is involved on global discussions on post-2020 targets for ocean conservation and on the relevance of informing about protection levels and other MPA indicators (invited by IUCN to several meetings). She is highly involved in the development of the MPA guide (she led the protection levels decision tree) and with the incorporation of the RBCS within the MPA Atlas, Blue parks and other platforms. She has an extensive network within the international MPA community. She is the co-founder of a Portuguese NGO related to ocean conservation and awareness, the Sciaena. She teaches MSc courses related to ocean governance and MPAs and has been supervising numerous students, thesis and internships (>30). She is currently a contracted researcher in the University of Algarve and CCMAR.

Dr Donal Griffin

Donal is the campaign coordinator and marine policy officer for the Fair Seas Campaign. With a strong background in marine biology and ecology, Donal also has a wealth of policy experience from the UK, including coordinating a coalition of environmental NGOs focusing on MPA management and implementation.

Dr Adriano Quintela

Adriano has a degree in Marine Biology and a Ph.D. in Geography specializing in integrated coastal zone management from the University of the Azores. With experience in coastal and watershed planning projects, he has worked as an environmental consultant and researcher at the University of Aveiro in maritime spatial planning and environmental impact assessment.

He joined the Blue Azores Program in 2021. A native of Aveiro, Adriano brings his scientific knowledge and experience in stakeholder participatory processes to the program.

Rui Martins

Born in Coimbra, he holds a degree in Pharmacy and is part of the Pharmaceutical Services staff at the Hospital da Horta. He has training as an Internal Quality Auditor and has developed a professional career focused on management and quality in healthcare services.

He served as a Member of the Legislative Assembly of the Autonomous Region of the Azores for two terms, actively participating in various parliamentary committees, particularly in the areas of economy, environment, social affairs, and oversight of European funds.

He maintains strong civic engagement and currently serves on the governing bodies of local institutions in the fields of social solidarity and urban development.

Since 2024, he has held the position of **Regional Director for Maritime Affairs**.

Dr Jennifer Caselle

By training I am a marine ecologist, with specific interests in the study of kelp forest and coral reef ecosystems. My research focuses on the ecology of coastal marine organisms, their role in nearshore ecosystems, and the response of these ecosystems to environmental change and human impacts.

Dr Tom Letessier

Dr Tom Letessier is a lecturer in marine conservation at the School of Biological and Marine Sciences, University of Plymouth.

My scientific interests are concerned with ways of improving conservation of marine species, habitats and ecosystems, through applied and fundamental research in ecology. Using empirical approaches at the intersection of the biological and social sciences, and technology, I aim to better understand environmental and anthropogenic pressures and impacts on biodiversity, wildlife and ecosystem processes.

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Dr Susan Steele

Dr Susan Steele is Executive Director of the European Fisheries Control Agency taking office on 1 September 2021. She has a solid background in fisheries management and control. She has been Executive Chair and CEO of the Sea Fisheries Protection Authority of Ireland since 2013. Before that, she was Head of Innovation at the Seafood Development Centre from 2009 to 2013 and Head of Aquaculture and Business Training in Ireland´s Seafood Development Board from 2006 to 2009.

Dr Steele was born in Ireland and has spent her entire career working with the oceans. Dr Steele studied undergraduate marine biology followed by a PhD in marine biology. She also has an MBA and a masters in Adult education. She is an international chartered director as well as holding an executive certificate in public leadership from Harvard.

Dr Daniel Pauly

Dr Daniel Pauly is a French and Canadian citizen who completed his high school and university studies in Germany; his doctorate (1979) and habilitation (1985) are in Fisheries Biology, from the University of Kiel.

After many years at the International Center for Living Aquatic Resources Management (ICLARM), in Manila, Philippines, Daniel Pauly became in 1994 Professor at the Fisheries Centre of the University of British Columbia, Vancouver, Canada, of which he was the Director for 5 years (Nov. '03-Oct. '08). Since 1999, he is also Principal Investigator of the Sea Around Us Project (see www.seaaroundus.org), funded for 15 years by the Pew Charitable Trusts, Philadelphia (currently by a number of foundations), and devoted to studying, documenting and promoting policies to mitigate the impact of fisheries on the world's marine ecosystems (see AMBIO, 34: 290-295, 2007).

The concepts, methods and software which Daniel Pauly (co-)developed, documented in over 1000 scientific and general-interest publications, are used throughout the world, not least as a result of his teaching a multitude of courses, and supervising students in four languages on five continents. This applies especially to the Ecopath modeling approach and software (http://sirs.agrocampus-ouest.fr/EcoBase/) and FishBase, the online encyclopedia of fishes (www.fishbase.org), the latter recently complemented by SeaLifeBase (www.sealifebase.org).

This work is recognized in various profiles, notably *Science* (Apr. '02); Nature (Jan. '03); New York Times (Jan. '03), in developing countries, and by numerous awards, among them honorary doctorates from four universities, being elected a Fellow of the Royal Society of Canada (Academy of Science; '03); and receiving the Award of Excellence of the American Fisheries Society ('04); the International Cosmos Prize, Japan ('05), the Volvo Environmental Prize, Sweden ('06), the Excellence in Ecology Prize, Germany ('07), the Ramon Margalef Prize in Ecology, Spain ('08), the Albert Ier Grand Medal in the Science category ('16) among others. Daniel was also knighted as Chevalier de la Légion D'Honneur ('17) by the French government on Bastille Day.

PANEL DISCUSSIONS

Panel Session 1 - MPA funding

Panellists: Emma McIntosh – Arcadia; Tanja Lieuw - Caribbean Biodiversity Fund; Rui Martins – Azores Governo Regional Azores

Marine Protected Areas (MPAs) are expanding in ambition—but not always in funding. This panel explores how to close the growing finance gap through smarter investment, better governance, and stronger alignment between public, philanthropic, and private capital. Speakers will discuss the political, legal, and structural challenges of scaling up ocean protection, and how to ensure that funding reaches the people and places that need it most.

Panel Session 2 – Governance, Stakeholders and Participatory Engagement

Panellists: Mauro Randone – WWF; Sebastian Kopf - Blue Mission AA; Eirini Apazoglou – EuroMarine Network

Effective marine spatial planning depends on more than maps and mandates—it requires trust, legitimacy, and shared ownership. This panel explores how co-management, early engagement, and inclusive governance can transform marine protection from symbolic targets into meaningful outcomes. Speakers will reflect on lessons from across the EU, and examine how to bridge the gap between pledges and practice.

Panel Session 3- International MPAs in MSP

Panellists: Fanny Douvere – UNESCO; Adriano Quintela – Blue Azores / Oceano Azul Foundation; Dmitry Frank-Kamenetsky – HELCOM

Marine ecosystems are transboundary by nature, yet our governance systems often remain fragmented. This panel explores how Marine Spatial Planning (MSP) can support the creation of coherent, adaptive, and ecologically connected MPA networks across jurisdictions. Speakers will examine the role of regional governance, behaviour-based management, and global frameworks in transforming MSP from a planning tool into a driver of resilient, international ocean stewardship.

Panel Session 4 – MPA Europe

Panellists: Mark J. Costello (NORD); Anna M. Addamo (NORD); Silas Principe (UNESCO); Thanos Smanis (CLIMAZUL); Belinda Bramley (CLIMAZUL)

The *MPA Europe* project is designing a spatially optimal network of potential MPA for all European seas that would maximise the inclusion of perhaps 50% and 80% of the species in 10% and 30% of the area under present and future climate change conditions. It has also mapped organic carbon stores in marine sediments to support policies to minimise anthropogenic release of greenhouse gases from the seabed. Stakeholder engagement and synergies with other projects

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run throughout the project implementation The key findings and messages will be presented and opened for discussion.

Panel Session 5 – Biodiversity Inclusive and Climate Smart MSP

Panellists: Fabrice Stephenson - IUCN WCPA; Catarina Fonseca – MSP Global; Oliver Ó Cadhla - Department of Housing, Local Government and Heritage Ireland

Marine Spatial Planning must evolve to meet the twin challenges of biodiversity loss and climate change. This panel explores how MSP can become more inclusive, adaptive, and climate -smart—by integrating ecological data, Indigenous knowledge, and decision-support tools. Speakers will examine how to align MSP with global biodiversity and climate goals, navigate trade-offs, and ensure that ocean space is planned not just for use, but for resilience.

ORAL PRESENTATION ABSTRACTS

KEYNOTE

Leveraging MPAs to balance trade-offs in living and non-living ocean blue economy sectors

Dr Rashid Sumaila

Professor at Fisheries Economics Research Unit, Institute for the Oceans and Fisheries and the School of Public Policy and Global Affairs. University of British Columbia, Canada

Ambitious blue economy (BE) targets aim to extract more goods and services from the ocean while driving economic growth, yet the ocean space is already heavily burdened. Currently, around 66% of ocean surfaces and 77% of Exclusive Economic Zones (EEZs) are impacted by human activity. Overfishing, pollution, and climate change stress marine ecosystems, creating a need for strategic approaches to ensure sustainable oceans. BE activities divide into those dependent on living marine resources, like ecotourism, and those that don't, such as deep-sea mining. Two critical issues arise: first, sustaining a "living ocean" requires suitable habitats and conditions, yet rising temperatures and pollution threaten marine species and ecosystems, impacting livelihoods and human well-being. Second, BE sectors relying on non-living ocean resources typically generate market-traded goods and services, while living ocean activities yield significant non-market values. For example, in British Columbia, non-living BE sectors contributed 81% to GDP compared to 19% from living ocean sectors in 2015. This disparity risks skewing policy trade-offs in favour of non-living sectors, intensifying competition. Marine Protected Areas (MPAs), if designed with these trade-offs in mind, could help balance economic and ecological objectives in the BE.

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1. Marine protected area planning needs to account for individual fish movements

Nils Krueck

Institute for Marine and Antarctic Studies, University of Tasmania, Hobart, Australia

Marine protected areas (MPAs) are important for conservation but cannot fully protect mobile species that move beyond MPA boundaries. However, recent research shows that individual movement variability is high. Here, I present a case study from South Australia that simulated the lifetime survival of 10 ecologically diverse species in MPAs of increasing size. Contrasting survival estimates using individual-based vs species-averaged movements highlights that the conservation impact of MPAs could be 2-32 times higher than commonly assumed. That is, 10-50% more resident individuals could be protected in an MPA when information on individual movements is available and explicitly considered. Study outcomes suggest that MPA sizes between 0.5 and 10 km can effectively contribute to the lifetime survival of mobile species, including some sharks and rays. In my presentation, I will elaborate on these findings and introduce a draft R-shiny application to estimate reef fish protection in MPAs under data-poor conditions.

2. How has ecological modelling integrated MPA, human uses, and threats to species in the Southern Ocean?

Francisco Oliveira Borges[1], Catarina Pereira Santos[1], Cassandra Brooks, James Grecian, José Xavier, Anton Van de Putte, Ben Raymond, Catarina Frazão Santos[1,2,3]

[1]Marine and Environmental Sciences Centre (MARE) / Aquatic Research Network (ARNET), Lisboa, Portugal. [2]Departamento de Biologia Animal, Faculdade de Ciências da Universidade de Lisboa, Lisboa, Portugal. [3]School of Geography and the Environment, University of Oxford, Oxford, United Kingdom

Southern Ocean's ecosystems are under increasing anthropogenic pressure, requiring effective management and governance approaches to support ocean sustainability. By using species distribution models (SDM), scientists and practitioners can establish the past, present, and future-day habitat suitability and consequent distribution of species, allowing community-level projections under diverse scenarios. The latter are key to inform sustainable marine spatial planning and marine conservation initiatives, particularly under climate change. Here we investigate how studies so far have overlapped and integrated projections for species' distribution in the Southern Ocean with existing and potential human uses and activities and conservation areas (e.g., marine protected areas). Such assessment allows for a comprehensive view on the present and future threats affecting marine ecosystems in the region, and how spatial management approaches need to be adapted to upcoming challenges.

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3. Small-scale fishery is a driver of habitat loss also in Marine Protected Areas

Chiara Silvestrini[1], Alessandro Ciccolella[2], Paolo D'Ambrosio[3], Francesco de Franco[2], Luciana Muscogiuri[4], Simonetta Fraschetti[1]

[1]Università di Napoli Federico II, Naples, Italy. [2]Consorzio di Gestione di Torre Guaceto, Brindisi, Italy. [3]Stazione Zoologica Anton Dohrn, Amendolara, Italy. [4]Consorzio di Gestione Area Marina Protetta Porto Cesareo, Porto Cesareo (LE), Italy

Fishery is a major driver of habitat loss. While large-scale fishery impacts have been largely studied, the effect of small-scale fisheries (SSF) on benthic habitats is more often presumed than assessed, with quantitative information lacking. To address this gap, we conducted *in situ* landing photo-sampling with the collaboration of artisanal fishers operating within Marine Protected Areas of Torre Guaceto and Porto Cesareo, in Southern Italy. We characterized the benthic bycatches and the commercial catches from 145 fishing trips, comparing the results across two habitats. Bycatch accounted for 41% of total catch by abundance, and 28% by biomass, representing a non-negligible fraction. To quantitatively assess habitat loss driven by SSF, we combined bycatch data on two habitat-formers with those on fishing effort. Results revealed substantial impacts on coralligenous, with *Axinella cannabina* loss affecting 6400 m^2. Monitoring SSF is fundamental to develop regional management strategies promoting eco-sustainable fisheries.

4. The role of MPAs in preserving the behavioural diversity of Atlantic Cod.

Martina Martorell Barceló[1], Albert Fernández Chacon[1], David Villegas Ríos[2], Esben M. Olsen[3]

[1]Institute of Marine Research, Tromsø, Norway. [2]Intituto de investigaciones Marinas (IIM-CSIC), Vigo, Spain. [3]Institute of Marine Research, Flødevigen, Norway

MPAs are reservoirs of biodiversity and biomass, not only in terms of species but also phenotypic diversity. In recent decades, evidence shows that fishing selectively targets certain behavioural types. In this context, MPAs can serve as reservoirs for the full spectrum of behavioural diversity. Since 2011, we have monitored the behaviour of Atlantic cod (*Gadus morhua*) using acoustic telemetry in Tvedestrand fjørd, where an MPA of ~150 ha was implemented in 2012 but ceased to exist in 2024. The MPA included one no-take area, where all types of fishing were banned, and two buffer zones where angling was allowed. We tracked three traits during this period: chronotypes, activity, and exploration across 364 individuals. This allowed us to assess how these behaviours are affected by fishing and how MPAs can help preserve the species' behavioural repertoire. This setup provides valuable insights into the ecological effects of MPAs on fish behaviour.

5. The value of marine protected areas, as seen by fish

Graham Edgar[1], Rick Stuart-Smith[2], Tundi Agardy[3], Andy Hooten[4], Jon Lefcheck[5]

[1]University of Tasmania, Hobart, Australia. [2]University of Tasmania, Battery Point, Australia. [3]MARES, Washington, USA. [4]Environment Services, Bethesda, USA. [5]University of Maryland, Annapolis, USA

All marine protected areas (MPAs) are different, with an idiosyncratic range of features including biota, boundary configuration, oceanographic climate, history of exploitation, regulations, and

compliance. Despite this variability, most have one common characteristic—they encompass fish communities that are not detectably different from adjacent fished locations. Nevertheless, some 'no-take' MPAs are extremely valuable for large fishes, with many times total fish biomass compared to reference locations. In an earlier investigation of 87 MPAs using the Reef Life Survey (RLS) dataset, we identified five factors contributing to elevated fish biomass—no-take, enforced, old, large and isolated. Here, using updated RLS data from over 150 MPAs, we explore the usefulness of different management levers—including educational outreach, support for alternative livelihoods, agency resourcing, governance arrangements, and research. Using structural equation models, we quantify how these levers interact to drive gains in community welfare, stakeholder support, and, ultimately, ecological benefits for fishes.

KEYNOTE

Marine Protected Areas (MPAs) and their conditions for success (at local and global scales)

Dr Barbara Horta e Costa

Marine ecologist at CCMAR, University of Algarve, Faro, Portugal

Users' legitimacy and participation in the MPA planning process are recognized as central for MPA acceptance and success. Hence, the planning of an MPA following a participatory process informed by scientific information was tested in southern Portugal. This area is located in a biodiversity richspot that is important for human activities and was the first MPA designated in the XXI century in mainland Portugal. BHC has been highly involved in the co-construction and co-design of this new MPA – aiming to be an example for future MPAs in Portugal (and even abroad). In this presentation, Dr Barbara Horta e Costa will share this experience.

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6. Advancing reef conservation in the anthropocene: Taiwan coral ecosystem status and MPAs effectiveness

Lauriane Ribas-Deulofeu[1,2,3], Yuting Vicky Lin[1,4], Wanchien Victoria Hsiao[1,5], Rainer Wunderlich[6], Yen-Li Liu[1], Pierre-Alexandre Château[7], Wei-Jen Chen[1,2], Vianney Denis[1,2]

[1]Institute of Oceanography, National Taiwan University, Taipei, Taiwan. [2]Ocean Center, National Taiwan University, Taipei, Taiwan. [3]Faculty of Biosciences and Aquaculture, Nord University, Bodø, Norway. [4]Tropical Biosphere Research Center, University of the Ryukyus, Okinawa, Japan. [5]School of Biology, Faculty of Biological Sciences, University of Leeds, Leeds, United Kingdom. [6]INRAE, UR EABX, Cestas, France. [7]Department of Marine Environment and Engineering, National Sun Yat-sen University, Kaohsiung, Taiwan

Global and local stressors significantly impact coral ecosystems. Marine Protected Areas (MPAs) can mitigate local degradation and enhance ecosystem resilience, but long-term strategies must consider climate change pervasiveness. Portfolio-based conservation proposes protecting both "good" and "bad" coral communities to preserve biodiversity and resilient populations. Taiwan, with its tropical and subtropical coral communities along a human disturbance gradient, is an ideal case study. Its geographical location may serve as a critical stepping-stone for future coral ecosystems. However, Taiwan's complex MPA governance raises questions about their effectiveness. This study provides a nationwide assessment of Taiwan's coral ecosystems, identifies key natural and anthropogenic drivers, and establishes regional baselines to guide conservation. Results show regional differences in benthic composition driven by environmental factors, while anthropogenic impacts smooth regional specificities. MPA management status failed to explain ecosystem conditions, underscoring the need for tailored approaches. Our findings support portfolio-based strategies for sustainable coral ecosystem management.

7. Assessing MPA effectiveness using fish length observations and general size-based rules

Asta Audzijonyte[1], Graham Edgar[1], Freddie Heather[1], Nils Krueck[1], Shane Richards[2], Rick Stuart-Smith[1]

[1]Institute for Marine and Antarctic Studies, Hobart, Australia. [2]University of Tasmania, Hobart, Australia

This study introduces a length-based approach to assess fish population status using only length observations. A large-scale analysis across hundreds of coral and rocky reef fish species revealed that unfished length distributions follow a consistent normal distribution with a stable coefficient of variation. This allows for the reconstruction of unfished length distributions using a single parameter—maximum length—and their comparison to observed sizes to evaluate marine protected area (MPA) effectiveness. We apply this method to Reef Life Survey underwater visual census data from Australia, incorporating historical and angler records to estimate maximum lengths. Results indicate that many fish populations within MPAs exhibit size structures deviating from unfished expectations, though some larger, isolated MPAs effectively protect targeted species. This method enables rapid population assessments using visual surveys or catch data and integrates historical records to mitigate 'shifting baseline' effects, enhancing conservation and fisheries management efforts.

8. Assessing the effectiveness of MPAs in a world of increasing maritime traffic

Frederico Mestre[1], Marcello D'Amico[2], Vinicius Bastazini[3], Jorge Assis[1,4], David Jacinto[5], Ana Marçalo[1], Fernando Ascensão[6]

[1]Centre of Marine Sciences (CCMAR), Faro, Portugal. [2]Department of Conservation Biology and Global Change, Doñana Biological Station CSIC, Seville, Spain. [3]Independent Researcher, Nivelles, Belgium. [4]Faculty of Bioscience and Aquaculture, Nord University, Bodo, Norway. [5]MARE – Marine and Environmental Sciences Centre/ARNET - Aquatic Research Network, Institute for Research and Advanced Training (IIFA), University of Évora, Évora, Portugal. [6]CE3C - Center for Ecology, Evolution and Environmental Changes & CHANGE - Global Change and Sustainability Institute, Universidade de Lisboa, Lisboa, Portugal

Rapidly expanding maritime traffic increasingly threatens marine biodiversity. Nevertheless, shipless areas (areas of low shipping activity), conservation priority areas (high species richness but low shipping activity), and management priority areas (high species richness and shipping activity) remain poorly defined. This global study assesses the conflict between key marine taxa (cetaceans, sea turtles, pinnipeds, seabirds) and shipping patterns. We evaluate how well existing MPAs cover shipless, conservation and management priority areas. Our findings reveal limited MPA coverage of these critical zones: shipless areas concentrated in polar/remote regions (8.93% coverage by MPA), conservation priority areas along higher latitudes of the southern hemisphere (13.86% covered) and management priority areas along coastlines, mid, southwestern Pacific, south Indian and south Atlantic and around the Azores (13.84% covered). This underscores the urgent need for expanded and strategically placed MPAs and targeted mitigation policies like rerouting traffic and speed reductions.

9. Assessing the progress and effectiveness of Marine Protected Areas in the Mediterranean: A decade of insights

Susan Gallon[1], Asma Kheriji[2], Reda Neveu[1]

[1]MedPAN, Marseille, France. [2]SPA/RAC, Tunis, Tunisia

Since 2010, MedPAN and SPA/RAC have collaborated with Mediterranean countries and stakeholders to assess progress toward MPA targets. By 2020, 8.33 % of the Mediterranean Sea was designated as MPAs, but 97.33 % of this coverage lies within EU waters, revealing a regional disparity. An online survey in 2024 gathered insights from 263 MPAs on governance, resources, and management. Results show that effective conservation depends on regulating human activities and securing key resources like funding and governance frameworks. However, only 0.04 % of the Mediterranean is under strict protection, with minimal expansion over the past decade. Financial and management constraints are also significant, with only 7 % of strictly protected MPAs having adequate budgets. With growing environmental pressures, strengthening MPAs through increased protection, capacity building, and improved management is critical to ensuring long-term conservation and ecological resilience.

10. Why are we chasing 30% coverage of mostly ineffective MPAs?

Rick Stuart-Smith, Ella Clausius, Graham Edgar

Institute for Marine and Antarctic Studies, University of Tasmania, Hobart, Australia

The 30x30 target for protection of the world's seas is not going to be achieved, but are we getting somewhere useful by chasing it? Results from underwater surveys of ~500 MPA zones in 58 countries are indicating that ecological benefits on shallow reefs are unlikely to be evident in far more of the world's MPAs than we'd expect, even based on management inputs (e.g. no-take regulations). So, what has gone wrong? Instead of focussing on the ecological results in this presentation, I'll discuss the parts of the process where communication breakdown has contributed to ineffective and unsupported MPAs and appears to be undermining global conservation progress. This includes between scientists, governments, advocacy groups, coastal communities, fisheries scientists, fishers, and Joe and Jane Blo on the street. Some of the lessons are relevant to many aspects of conservation - and are important ingredients for improving the impact of our research.

11. Integrating climatic connectivity into the global prioritization of MPA

Jorge Assis[1,2], Frederico Mestre[1], Eliza Fragkopoulou[1], David Abecasis[1]

[1]Centre of Marine Sciences, Faro, Portugal. [2]Nord University, Nord, Norway

The expansion of the global Marine Protected Area (MPA) network, targeting 30% ocean coverage by 2030, faces a critical challenge: integrating the dynamic effects of climate change on species distributions and connectivity into spatial planning. Traditional approaches often rely on simplistic temperature-based indicators and overlook the importance of temporal connectivity in allowing species to track climate shifts. This study advances climate-resilient MPA design by incorporating multi-factor climate change projections (temperature, salinity, oxygen, productivity, and pH) in temporal climate analogue analyses. We track global habitat conditions across the 21st century to identify connectivity corridors under contrasting emission scenarios (from Paris Agreement expectations to high-emission trajectories). Mapping connectivity hubs, pathways, refugia, and isolation-prone areas, we highlight strategic locations for MPA expansion and reveal gaps in current protection. Our spatially explicit findings provide crucial guidance for prioritizing MPA expansion, informing effective marine spatial planning for long-term biodiversity conservation under climate change.

12. Challenges for a successful protection: The case of Germans marine protected areas

Josie Antonucci Di Carvalho[1], Dario Fiorentino[2]

[1]Helmholtz Institute for Functional Marine Biodiversity at the University of Oldenburg, Oldenburg, Germany. [2]Thünen Institute, Braunschweig, Germany

Marine Protected Areas (MPAs) are vital for biodiversity but face challenges in Marine Spatial Planning (MSP), especially in the intensively exploited North Sea (NS). With growing pressures

from offshore wind farms, marine protection in the NS relies on Natura 2000 sites to maintain the status quo. Upgrading these to full MPA status could protect critical habitats and support ecosystem restoration by removing harmful human activities (HA). Using GIS analysis, this study evaluated cumulative HA impacts in Germany's Exclusive Economic Zone and found that areas designated as MPAs experience significant HA overlap, with fishing and shipping being primary stressors. Results highlight that MPAs risk failing their objectives unless HA within them is significantly reduced. By emphasizing stricter management, this research contributes to optimizing MPAs within MSP frameworks, offering actionable insights for policymakers balancing conservation and sustainable use

13. The effect of 10% no-take MPA in the French metropolitan EEZ

Cesc Gordó Vilaseca[1], Joachim Claudet[1], Juliette Jacquemont[2,1], Charles Loiseau[1]

[1]CNRS, París, France. [2]University of Washington, Seattle, USA

About 46% of the French metropolitan EEZ area is designated under some protection scheme, which is well above the 30% target that France committed to, to achieve by 2030. However, highly protected MPAs represent less than 1% of its marine and coastal area. We studied the ecological and social effects of establishing no-take MPAs in 10% of the French metropolitan EEZ area, using a spatial explicit food-web model. The preliminary results show that, although not for all species, for most species of high importance to fisheries (such as hake, sardine, or flatfishes), following such a wide and restrictive strategy would benefit catches in the short, mid, and/or long term. Overall, our models suggest that implementing a well-enforced no-take MPA network in the French EEZ would be highly beneficial for French fisheries and that some of its positive effects could be detected within the first years of protection.

14. The truth behind Denmark's 31.7% MPA

Pernille Jacobsen, Mads Christoffersen

Ocean Institute, Copenhagen, Denmark

This joint study by the Ocean Institute, the Danish Society for Nature Conservation, and the Danish Fishermen's Association provides the first comprehensive overview of areas in Danish waters where fishing with bottom-towed gear is prohibited. The study is based on a comprehensive review of legal acts and following comprehensive GIS analysis. The study reveals that Denmark's fisheries legislation is fragmented across more than 13 legal acts, making it complex and difficult to interpret. Currently, only 4.6 % of Denmark's sea area is closed to all five types of bottom-towed fishing gear. 31.7 % of Danish waters are designated as marine protected areas. But marine protected areas, where fishing with bottom-towed gear is prohibited, only make up 3.6 % of Denmark's sea area. The study highlights the need for protection measures in Danish marine protected areas and serves as a knowledge base for sustainable fisheries and MPA management in Denmark.

KEYNOTE

Ireland's Fair Seas: Building a movement of ocean stewardship

Dr Donal Griffin

Fair Seas Campaign Coordinator

Fair Seas is a coalition of leading environment non-governmental organisations and networks. Our ambition is to see Ireland become a leader in marine protection, giving our species, habitats and coastal communities the opportunity to thrive. To achieve our ambition, Fair Seas has embarked on a long and strategic campaign engaging all sections of society including the fishing and offshore renewable energy industries, arts and cultural collectives, politicians, eco-tourism as well as coastal communities deeply invested in the health of the seas and coast around them. With a particular focus on Ireland's forthcoming marine protected area legislation, this presentation will reflect on Fair Seas' successes and lessons learned as we continue to advocate for 30% of Ireland's seas to be designated within effective marine protected areas by 2030.

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15. Assessing the ecological connectivity of Marine Protected Areas at a regional scale

Erika Fabbrizzi[1,2], Daniela Cianelli[3], Simona Saviano[3], Francesco Colloca[4], Alberto Colletti[1,2], Sara De Benedictis[1,2], Chiara Silvestrini[1,2], Simone Maria Santo Musumeci[1], Stefano Moro[4], Francesca Acampa[5], Simonetta Fraschetti[1,2]

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Ensuring ecological connectivity among Marine Protected Areas (MPAs) is pivotal for developing coherent reserve networks, promoting the resilience of marine communities to perturbations. In this study we aim at assessing connectivity patterns at a regional scale among four MPAs in the Southern Mediterranean Sea. We investigated the taxonomic β-diversity of benthic seascapes and tested the observed dissimilarities against connectivity matrices derived from Lagrangian models forced by the Regional Ocean Modeling System. Our results showed that the decline in similarity between assemblages mainly occurs within a distance of 10-20 km. Turnover emerged as the dominant component, suggesting MPAs protect distinct portions of the regional biodiversity. Relationships between β-diversity and dispersion patterns revealed that geography and physical dynamics act as barriers to large-scale connectivity segregating species between the northern and the southern part of the region. These findings support systematic conservation planning processes to design coherent MPA networks.

16. Building MSP scenarios that account for conservation and restoration targets with the MarinePlan decision support system: Practical guidance and key recommendations

Vanessa Stelzenmüller[1], Maren Kruse[1], Prince Bonsu[1], Ibon Galparsoro[2], Stefan Neuenfeld[3], Frank Bockelmann[4], Stelios Katsanevakis[5], Antonios Mazaris[6], Simonetta Fraschetti[7], Sylvaine Giakoumi[8], Wesley Flannery[9], Ben McAteer[9], Mike Elliott[10]

[1]Thünen Institute of Sea Fisheries, Bremerhaven, Germany. [2]AZTI, San Sebastian, Germany. [3]DTU, Copenhagen, Germany. [4]Hereon, Geesthacht, Germany. [5]University of Aegaen, Lesbos, Greece. [6]University of Thessaloniki, Thessaloniki, Germany. [7]University of Nepales, Nepales, Italy. [8]Stazione Zoologica Anton Dohrn, Palermo, Italy. [9]Queen's University Belfast, Belfast, United Kingdom. [10]IECS, Hull, United Kingdom

The MarinePlan Decision Support System (DSS) offers practical guidance and technical solutions for developing ecosystem-based marine spatial planning (EB-MSP) scenarios that address conservation and restoration needs. We present examples of its use in building EB-MSP scenarios that meet EU biodiversity targets (2030-30%-10%) across eight European planning sites. The scenarios were framed by the MSP practice and conservation objectives of the planning sites. The DSS includes an online EB-MSP assessment tool, which allow to identify which elements of the MSP process need improvement to meet the principles of an ecosystem approach. It also includes metrics for mapping ecologically and biologically significant areas (EBSAs) and spatio-temporal maps. It includes tools for considering connectivity through ocean transport and tools for incorporating connectivity into spatial prioritisation. A guidance to frame EB-MSP scenarios

combines all these elements. We summarise the lessons learned and key recommendations for improving the governance to support EB-MSP implementation.

17. Social values and ecosystem services in Marine Protected Areas: Insights from the Danish Wadden Sea

Sophie Van Schoubroeck[1], Wito Van Oijstaeijen[1], Maja Skovgaard Jessen[2], Tine Compernolle[1,3], Lois Watt[4], Cintia Organo Quintana[2], Myriam Johanna Perschke[2]

[1]University of Antwerp, Antwerp, Belgium. [2]University of Southern Denmark, Odense, Denmark. [3]Geological Survey of Belgium, Brussel, Belgium. [4]Baltic Marine Environment Protection Commission, Helsinki, Finland

Marine Protected Areas play a crucial role in biodiversity conservation and sustainable resource use. Understanding how people value these areas is essential for better management. This study, part of the Blue4All European Horizon project, performs a socio-cultural valuation of the northern Danish Wadden Sea. It aims to (1) determine the spatial distribution of social values for ecosystem services, (2) analyse relationships between social values and natural resource conditions, and (3) compare value allocations between tourists and locals. Using the Social Values for Ecosystem Services (SolVES) tool, this study integrates mapped survey responses with environmental data (including bird habitats) to generate social-value maps. As a result, social-value maps are created and expressed with an index using values ranging from 1 to 10, revealing how different groups perceive cultural ecosystem services. The findings provide valuable insights for improving MPA management and ensuring conservation efforts align with social values and stakeholder interests.

18. Development, validation and use of the New Zealand Seafloor Community Classification for informing spatial planning in Aotearoa New Zealand

Fabrice Stephenson[1], Jordi Tablada[2], Shane Geange[3]

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To support ongoing marine spatial planning and reporting at a national scale in Aotearoa New Zealand, a numerical environmental classification was developed that depicts spatial estimates of compositional turnover of 1,716 seafloor taxa (demersal fish, reef fish, benthic invertebrates and macroalgae). Predictions of the compositional turnover of seafloor taxa were classified into 75 groups representing seafloor communities (termed the New Zealand Seafloor Community Classification – NZSCC) and 9 groups representing seafloor bioregions. In this talk, the development and independent validation of the NZSCC will be described and some examples of how the NZSCC, the seafloor bioregionalization and associated biodiversity layers can be used to inform marine spatial planning processes will be provided.

19. Digital twins of the ocean - tools for holistic marine spatial planning

Bente Lilja Bye[1], Arne Jørgen Berre[2], Dhia Guezguez[3], Charalambos Ipektsidis[4], Georgios Sylaios[5]

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By creating virtual, data-rich representations of marine ecosystems, digital twins of the ocean can support decision-making processes that are vital for achieving the European Green Deal's goals of sustainable resource use, biodiversity preservation, and climate resilience. Moreover, digital twins of the ocean enable holistic views of Marine Protected Areas not only by modelling the open ocean but also by incorporating critical data and merging ecological, socio-economic, and management data from Marine Protected Areas. Looking at a Marine Protected Area through multidisciplinary lenses such as digital twins represents an unprecedented effective tool to make decisions weighing various interests such as nature reserves, aquaculture, fisheries and biodiversity. In this presentation examples of digital twins applied to marine environments in Norway and Mediterranean oceans will be given.

20. Evolving waters: Optimising the UK Marine Protected Area (MPA) Network for biodiversity, climate and food security

Lindsay Grant, Peter Chaniotis, Stephanie Clarkson

Joint Nature Conservation Committee, Peterborough, United Kingdom

The Joint Nature Conservation Committee (JNCC) serves as the only statutory nature conservation advisor to all four Governments of the UK and is operationally responsible for all UK Marine Protected Areas (MPAs) beyond 12 nautical miles from the coast (offshore waters). With 38% of UK waters now designated as MPAs, attention must be turned to how we ensure MPAs are delivering conservation outcomes most effectively. In the context of offshore wind expansion, sites of enhanced protection (Highly Protected Marine Areas), and climate change, this presentation will provide an overview of potential opportunities to optimise the UK MPA network for reducing biodiversity loss, mitigating against the impacts of climate change and ensuring food security so that a balance between sustainable use and nature recovery can best be struck for the benefit of present and future generations.

21. How a self-governing island has successfully utilised marine spatial planning to deliver marine protection

Freddie Watson

Blue Marine Foundation, Jersey, Jersey

For the last six years, Blue Marine has built a campaign with the aim of expanding Jersey's MPAs from 6.5% of territorial waters, to at least 30%. Research to date has shown that this existing network is positively impacting biodiversity, compared to areas outside the MPAs. This evidence, along with other campaign activities, underpinned our proposal for a network of MPAs, covering

over 30% of Jersey's waters. As a direct result of the campaign, politicians voted for the development of MPAs to be brought into marine spatial planning. Over the next two and a half years, the Government of Jersey proceeded to deliver this plan. The recently approved version includes proposals for a network of MPAs covering 23% of Jersey's waters. These MPAs will play a key role in securing the long-term health of Jersey's seas, the habitats and species that lie within, and the numerous services they provide.

22. Progressing marine conservation in the UK after leaving the European Union

Jean-Luc Solandt

Blue Marine Foundation

Developing the theme of three pillars of marine health; social, economic, and environmental, we need to re-consider the building blocks on which all these factors persist – a healthy, functioning & productive marine environment. With that in mind, UK government has embarked on an ambitious programme to introduce effective marine conservation & spatial planning since 2009. This meant enacting existing MSFD and MPA laws rather than ignoring or downplaying them. This approach led to the emergence of bespoke UK legislation- the Marine and Coastal Access Act (2009) that marries elements of marine spatial planning, marine protected areas, and good governance. We will illustrate how this ambition has played out with the emergence of democratically accountable inshore fisheries conservation bodies (Inshore Fisheries and Conservation Authorities), and how the UK has implemented MPA management of damaging fishing, whilst establishing large-scale offshore wind infrastructure. At a time when our relationship with the EU and adjacent member states is evolving, it is critical to take stock of the current divergence of the UK with adjacent member states in implementation of shared policy and legislation.

Keywords: Ambitious, democratically accountable, ecosystem-based

23. Scaling up our understanding of fish-habitat associations on shallow reef

Elizabeth Oh, Rick Stuart-Smith, Graham Edgar

University of Tasmania, Hobart, Australia

Large-scale assessments of reef habitats are crucial to marine conservation planning but often risk over-simplification of complex reef communities into meaningless or abstract indicators and require synthesis of unstandardised data sources across regions. This often forces reporting to occur at low resolutions of taxonomy or morphology, even for prominent habitat-forming taxa, without understanding if this masks regionally important, co-occurring changes between habitat species and reef fishes. This study utilises standardised survey data from 362 sites in temperate Australian Marine Protected Area networks to investigate fish-habitat associations, highlighting co-occurring species and identifying commonalities which may be relevant to reporting and conservation planning across large spatial scales. Structural Equation Models evaluate the direct and indirect links between key environmental drivers, habitat-formers and fish. Data were available at species-level for fish, macroinvertebrates and macroalgae, allowing comparison

between models generated from species data and models generated from data grouped by species traits.

MPA Europe, Horizon Europe Grant Agreement no. 101059988 and UKRI Grant Numbers 10067934 JNCC and 10069750 SAMS

KEYNOTE

Establishing the largest MPA network in the north Atlantic in the Azores

Dr Adriano Quintela & Rui Martens

Blue Azores Program/Oceano Azul Foundation

Led by the Azores Autonomous Region Government, with the support of the Oceano Azul Foundation and the Waitt Institute, the program also involves the University of the Azores and numerous regional and international partners and constitutes an aggregator program of existing capacities in the region. In this context, the Regional Government of the Azores decided to approve an MPA network (RAMPA) that protects 30%, 15% being fully protected, of the EEZ adjacent to the Azores so that its full implementation is possible by 2030. The MPA network revision process, promoted by the Blue Azores program, is based on two fundamental principles: 1) the use of the best available scientific knowledge and 2) the development of a collaborative and participatory approach with various stakeholders. RAMPA revision assumes two distinct processes: the first process regarding offshore marine areas located between 6 and 200 nautical miles; the second process, concerning coastal marine areas between 0 and 6 nautical miles, is an ongoing work, with the participatory process set to resume in 2024. The Regional Decree Law, n.º 14/2024/A, of 24 December 2024, designates the largest network of MPA in the North Atlantic. In addition, in an innovative initiative, this legal tool establishes the framework, the legal timeline and mandatory contents for next steps: management strategy, management plans and the human and financial resources allocated, to ensure the effective management of this network. The designated network was based on science-based quantitative conservation objectives capable of providing benefits for the overall ocean space of the Economic Exclusive Zone, subdivision Azores. This presentation will overview the participative process methodology and will explore the vital role of Open Access Tools & Data in the Blue Azores Program. It highlights SeaSketch, a tool for co-designing solutions, mapping ocean use, and engaging stakeholders, and Global Fishing Watch, a platform that can support: 1. assessing MPA effectiveness, 2. design of equitable compensation for activity restrictions, and 3. use of vessel behavioural metrics (e.g., vessel speed, track patterns, stopping duration) to guide MPA management plans regulations and streamline enforcement.

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24. Marine spatial planning is not marine protected area planning: Both are key for the sustainability of a rapidly changing ocean

Catarina Frazão Santos[1,2], Lisa Wedding[2], Tundi Agardy[3], Elena Gissi[4], Helena Calado[5], Julie Reimer[6]

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Marine spatial planning (MSP) and marine protected area (MPA) planning are two distinct management approaches that are often conflated. While they share similarities and have been used around the world to support sustainable ocean use and conservation for decades, they are not the same. As the world moves to incorporate climate change considerations into planning, the lack of awareness on their differences may sow further confusion. Both approaches are critical to safeguarding ecosystem health, their benefits to humans, and the continued ability to use marine resources and space sustainably. However, MSP and MPA planning ultimately strive to attain different goals, across various scopes and scales. To advance sustainable ocean management and governance, and enable swift and effective climate-smart solutions, we define and contrast each approach and consider ways that opportunities for delivering effective plans, and synergies between these, might be leveraged.

25. Marine Spatial Planning: Lessons learned in Algoa Bay, South Africa

Hannah Truter[1], Tegan Carpenter-Kling[1], Bernadette Snow[1,2], Mia Strand[1], Nina Rivers[1], James Blignaut[1,3,4,5], Rozanne Bester[1,3], Anne Lemahieu[1], Amanda Lombard[1]

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Marine Spatial Planning (MSP) has become increasingly important globally to sustainably manage ocean space while unlocking economic potential. MSP processes have gained traction in many developing countries in the Western Indian Ocean (WIO), including South Africa, where national MSP legislation has been published. In response to this legislation, we established a research-based community of practice (The Algoa Bay Project) to develop a fine scale MSP for Algoa Bay in the Eastern Cape province, as a pilot study. Building on a significant body of existing data of biophysical features and human-uses for the Bay, including two zoned Marine Protected Areas, we will present the spatial zonation and the use of scenarios as a tool to support MSP. We discuss the importance of scale in MSP and the inclusion of stakeholders that represent all uses of the ocean instead of limiting zonation to conventional uses such as biodiversity and commercial enterprises.

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26. Prioritization of Atlantic protection areas in international waters

Chhaya Chaudhary, Flemming Dahlke

Institute for Marine Ecosystem and Fisheries Science, Center for Earth System Research and Sustainability (CEN), University of Hamburg, Hamburg, Germany

IMAPP (Integrative Mapping and Prioritisation of Protected Areas in the international Atlantic Ocean) is a German project, that aims to develop decision-making guidelines for designating marine protected areas according to the BBNJ Agreement. Here, we provide insights into the first phase of IMAPP, that compiles and harmonizes a comprehensive dataset spanning multiple trophic levels, from phytoplankton and zooplankton to fish and marine mammals. A key component of our project is publication of previously unpublished plankton samples from approximately 40 research cruises conducted over several decades. In addition to biological datasets, we incorporate spatially explicit data on fisheries, shipping intensity, and climate change impacts to assess ecological pressures. We will employ multiple approaches–biodiversity and food-web modelling to evaluate ecosystem functioning and key services, and vulnerability assessments considering anthropogenic pressures. Our prioritization framework will apply ecological, economic, and legal ranking criteria to identify high-priority areas for protection.

27. Remap's approach for assessing compatibility of marine conservation and maritime spatial planning in Europe

Andrej Abramic[1,2], VIctor Cordero-Penin[1], Yaiza Fernández-Palacios[1], Luz Marina Pulido Santiago[1], Agustín Rafael Trujillo Pino[3], Nelson Manuel Monzón López[3], Yolanda Irawán[4], Jose Luis Santiago[4], Ricardo Haroun[1]

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Project ReMAP (Reviewing and Evaluating the Monitoring and Assessment of Maritime Spatial Planning) coordinated by the ECOAQUA Research Institute, funded under EMFAF is developing a technical framework to monitor and evaluate European Maritime Spatial Plans (MSPs) through 10 independent thematic analytical modules. One key module examines the conflicts and synergies of Marine Protected Areas (MPAs) and maritime activities within current MSPs. The module applies a conceptual model aligned with IUCN recommendations, using an (in)compatibility matrix that cross-references maritime activities with IUCN management categories. As part of ReMAP's operational spatial data infrastructure, the matrix integrates the eHILUCS code list register, extended Hierarchical INSPIRE Land Use Classification System for the maritime zoning and marine uses. Following systematic research, the module's output highlights areas of potential conflict and compatibility between conservation and specific maritime activities while pinpointing overlaps requiring further study.

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28. Reviewing MPA design based on mapping activities: The case of southwest Portugal

Adela Belackova[1], Pedro Monteiro[1], Luis Bentes[1], Lene Buhl-Mortensen[2], Bárbara Horta e Costa[1], Jorge M. S. Gonçalves[1]

[1]The Centre of Marine Sciences, Faro, Portugal. [2]Institute of Marine Research, Bergen, Norway

Marine Protected Areas (MPAs) primarily aim for biodiversity conservation. However, they are often established, rather than based on systematic and biologically justified approaches, potentially overlooking valuable conservation features. Parque Natural Sudoeste Alentejano e Costa Vicentina (PNSACV) is the largest coastal MPA in mainland Portugal, encompassing multiple biological habitats and artisanal fishing activities. However, maps of conservation features and human uses were absent until nine years post-establishment. This study aims to evaluate the adequacy of the current zonation of the PNSACV by integrating the latest mapping data. We employed habitat suitability modelling to estimate the spatial distribution of biological habitats and combined these with fishing maps in a systematic conservation approach. A comparison of the existing and alternative zonation scenarios will serve to evaluate the current zonation and suggest potential adjustments. The study findings, incorporated in the final presentation, will contribute to the science-based adaptive management of MPAs.

29. South Africa's 20 new marine protected areas paved a path for ecosystem-based marine spatial planning

Amanda Lombard[1], Kerry Sink[2], Colin Attwood[3], Hedley Grantham[4], Stephen Holness[1]

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In 2014 South Africa began a marine spatial planning (MSP) process that was entered into legislation in 2019. The process aims to achieve both economic and environmental goals and makes provision for the expansion of the country's marine protected area (MPA) estate. Fortunately, using a systematic conservation planning (SCP) approach, the marine science community had begun the identification of an ecologically representative MPA network in the early 2000s, and were ready with stakeholder and science driven recommendations when the MSP opportunity for implementation emerged. This presentation will summarise the 15-year process from planning to implementation of 20 new MPAs that increased the continental MPA estate from <0.05 to 5.4 %. The MPA network achieves biodiversity and fisheries management goals with least impact on offshore stakeholders. We demonstrate that an evidence-based SCP process can work with stakeholders to support implementation of ecologically representative MPA networks aligned to ocean economy goals.

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30. Stakeholder engagement in the BLUECONNECT project: Bridging gaps in marine conservation

Débora Gutierrez[1,2,3,4], Helena Calado[1,2], Alice Newton[3,4], Margarita Stancheva[5], Mercedes Ribera Wansart[6]

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This study aims to enhance stakeholder engagement in maritime spatial planning and marine protected areas through the BLUECONNECT initiative, focusing on 12 Demonstration Sites. Through stakeholder mapping and interactive workshops, the project emphasised early involvement and ongoing collaboration with local communities, government, and researchers. Key findings indicate the successful establishment of local stakeholder working groups and integrating community knowledge with scientific research, facilitating effective conservation measures. The engagement processes have revealed strategies for overcoming resistance and fostering shared ownership among stakeholders. These insights contribute valuable knowledge to the international scientific community and practitioners involved in marine conservation efforts, highlighting the importance of strategic action plans in addressing stakeholder feedback from Macaronesian demo sites.

31. Towards a well-connected global marine protected area network: Global connectivity assessment and priority areas for expansion

Eliza Fragkopoulou[1], Frederico Mestre[1], David Abecasis[1], Jorge Assis[1,2]

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Marine Protected Areas (MPAs) are essential for biodiversity conservation, with part of their effectiveness relying on forming a well-connected network that supports species dispersal, genetic exchange, and climate-driven range shifts. However, the extent to which existing MPAs create a cohesive global network remains uncertain. Here, we assess global MPA connectivity using high-resolution ocean current data, integrated into biophysical modelling simulations and circuit theory to capture movement pathways and stepping-stone linkages. Employing graph theory, we identify key connectivity hubs that facilitate large-scale movement across oceans and regions at risk of isolation. Our findings reveal critical gaps where existing MPAs fail to sustain connectivity and highlight priority areas for new designations to reinforce network connectivity. Analysing MPA distribution within Exclusive Economic Zones (EEZs), we provide strategic recommendations to optimize MPA placement, supporting national conservation targets in line with the post-2020 Global Biodiversity Framework of conserving 30% of the ocean by 2030.

32. Urban typology of Marine Protected Areas (MPAs): An exploratory and methodological framework applied to the Western Mediterranean Sea

Julie Marty-Gastaldi[1,2], Nathalie Lazaric[2], Benoit Dérijard[1]

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The densely populated coasts of the Mediterranean countries require the establishment of Marine Protected Areas (MPAs) to conserve their marine biodiversity. Our objectives are first to develop "urban" variables to classify MPAs, and then to define the characteristics of an "urban MPA" by establishing relevant thresholds. Twenty western Mediterranean MPAs were assessed using an urban indicator based on nine variables derived from population metrics and satellite image analysis. The results indicate that (1) only 6 out of the 20 MPAs can be classified as urban MPAs which (2) tend to be easily accessible and located near densely populated areas, while (3) non-urban MPAs may also be found in highly touristic areas. We provide initial insights into the profiles of MPAs located in urban contexts. This research bridges marine conservation and social sciences, paving the way for management strategies adapted to urbanisation levels to enhance ecological effectiveness and social acceptance.

33. How much species' biodiversity could area targets protect globally

Qianshuo Zhao[1]

[1]Ocean University of China

Protection targets for addressing biodiversity loss include protecting at least 30 % of the land and ocean area in ecologically representative areas, but do not say how many or what proportion of species should be protected from extinction. Here, analysis of expert derived geographic ranges of 77,880 marine, freshwater and terrestrial species indicates all species could be included in areas occupying 50 % of the planet; 69 % in 30 %; and 58 % in 10 %. This is only if the optimal areas for these species are protected. Thus, the "at least 30% by 2030" international target cannot protect more than about two-thirds of all species even in optimal places. However, 39 % of the optimal areas are in places with minimal human impact, and over 80 % of endangered species occur in 10 % of the planet. Thus, focusing on the top 10 % of optimal places, in a network of fully protected areas, plus protecting areas less impacted by people, would be a more cost-effective target for conservation than a simple indicator of area protected.

KEYNOTE

California's Network of Marine Protected Areas: lessons learned from design to monitoring

Dr Jennifer Caselle

Principal Investigator at Marine Science Institute, University of California Santa Barbara, CA, USA

Over the period of 2007 to 2012, the state of California – driven by enabling legislation called the Marine Life Protection Act – designed and implemented a network of 124 Marine Protected Areas, protecting 16% of California's 1350 km of coastline with 9.4% in no-take reserves. The network design used fundamental scientific principles and guidelines combined with data driven models and was heavily community based, including stakeholders from a diversity of groups. In the years following implementation, the network has been adaptively managed by a group of interested state agencies. Periodic evaluations of MPA network success against specific criteria have been undertaken, with the most recent 'decadal' evaluation completed in 2022. Monitoring has enabled analyses of the rate of ecological recovery, effects of fished species, fishery benefits, connectivity, and climate change resilience. I will summarize these findings and the lessons learned from two decades of planning, implementing and adaptively managing a Marine Reserve network in the face of rapidly changing climate.

34. 3D climate velocity as a tool for climate-smart maritime spatial planning and biodiversity conservation

Alessia Rizzi[1], Stefano Menegon[1], Marco Fianchini[2], Serena Zunino[2], Donata Canu[2], Elena Gissi[1]

[1]National Research Council (CNR), Institute of Marine Science (ISMAR), Venice, Italy. [2]National Institute of Oceanography and Experimental Geophysics (OGS), Trieste, Italy

Climate change is profoundly modifying biodiversity and ecosystem functioning of the Mediterranean Sea. This challenges maritime spatial planning (MSP) and conservation strategies, which must adapt to climate-induced changes. Here, we identify future climate refugia in the Mediterranean and assess their alignment with Italian maritime spatial plans. To map these areas, we compute an analogue-based climate velocity index by comparing water column temperatures between 2006-2030 and 2031-2055. We identify areas expected to remain stable (climate refugia), and those likely to experience intense climate effects (hotspots) along water column. This approach accounts for shifts between different depths, providing a more comprehensive perspective than surface-based methods. Refugia and hotspots are overlaid with Italian MSP zoning scenarios to evaluate if intended uses – including new protected areas – account for future climate conditions. Our findings support a risk-based assessment of Italian MSP and inform conservation strategies, highlighting critical areas for biodiversity conservation and ecosystem resilience.

35. Co-creation and transference of a climate change vulnerability assessment tool for MPA managers: Evidence from the Mediterranean Sea, potential for supporting adaptation and MSP

Silvia Rayo Luengo[1], Andrea Blaskovic[2], Lorenzo Merotto[3], Francesca Barrazzetta[4], Joaquim Garrabou[5], Soteria-Irene Hadjieftychiou[6], Antonis Petrou[6], Barbara Horta e Costa[7], Jorge Dos Santos Gonçalves[7], Andreu Blanco[1], Juan Bueno Pardo[1], Elena Ojea[1]

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A climate change vulnerability assessment tool was co-developed with MPA managers to help track risks, prioritize adaptation actions, and integrate ecological, socioeconomic, and governance perspectives into conservation. This study presents the tool's creation through a two-step co-development and transfer process. First, the tool was developed with seven Mediterranean MPAs and refined implementing their valuable feedback. Then, its replicability was tested in two new MPAs—one in the Eastern Mediterranean and another in the Southern Portuguese Atlantic—testing its applicability to the Atlantic region. The result is a toolkit and an online course for MPA managers, available in two learning platforms. The co-creation process has been essential, fostering capacity building and learning between MPA managers and researchers. Lessons learned can inform the integration of climate adaptation tools into marine spatial plans and strengthen adaptation efforts in the Mediterranean Sea and beyond.

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36. Evaluating the resilience of the Scottish marine protected area (MPA) network in response to marine heatwaves

Caitlin Lamb[1], Steven Benjamins[1], Michael Burrows[1], Laura Steel[2], Tavis Potts[3]

[1]Scottish Association for Marine Science, Oban, United Kingdom. [2]NatureScot, Inverness, United Kingdom. [3]University of Aberdeen, Aberdeen, United Kingdom

Establishing climate-resilient Marine Protected Areas (MPAs) is critical for safeguarding marine biodiversity. This study considered the resilience of Scotland's MPA network and developed stakeholder-led recommendations for climate adaptation. Combining social and natural science, we used statistical models to predict changing distributions of five PMFs (minke whale, basking shark, flapper skate, flame shell beds, and seagrass beds) with an iterative, systematic stakeholder engagement process (Delphi Method). The process showed the susceptibility of MPAs to climate change, identified key perspectives on climate resilience integration, and emphasised adaptive management, long-term monitoring and cross-sectoral collaboration. Recommendations included increased investment, promoting ocean literacy, and balancing regional and national policy approaches. Addressing socio-ecological limitations of Scotland's MPA network contributes towards the establishment of an effective global MPA network. By synthesising stakeholder insights and model projections, the project strengthens MPA network effectiveness amidst climate change both in Scotland and globally.

37. Importance of polar seas protection to climate change and nature-loss crises

David Barnes

British Antarctic Survey, Cambridge, United Kingdom

Protected marine area is half that on land, only 50% is 'no take', and even less is carbon-rich habitat – we must change this, and rapidly for '30 by 30' for efficacy in both crises. Biodiversity conservation can be better targeted to address intertwined climate change and species loss emergencies. Polar nature may be out of sight, but needs to be in mind; the biggest mitigating feedbacks on climate change are there. Synergistic solutions tackling both are much more effective and tend to co-benefit human quality of life. Increasingly nature-based solutions are efficient, cost effective and cobenefit-rich pathways to sequestration. Disappearing and degrading habitats need urgent attention but emergent polar habitats, species-rich and powerful carbon sinks, warrant high priority. Efficacy of Nature-based Solutions (NbS) in providing biodiversity and sequestration gains are maximal in near-intact environments, where protection can be sustained, with aquatic interfaces and where local people are properly consulted and involved.

KEYNOTE

Considering pelagos and benthos in MPA spatial planning

Dr Tom Letessier

University of Plymouth, School of Biological & Marine Sciences

Assessing the effectiveness of marine protected areas (MPAs) across seascapes is limited due to challenges in surveying heterogeneous habitats underwater. This presentation will address this challenge by deriving fish size indicators from 17,411 stereo baited-video deployments to test for differences between pelagic and benthic responses to remoteness from human pressures and to MPAs. Whereas effective protection of benthic size structure can be achieved in MPAs near markets, recovery of the world's largest and most endangered fishes in pelagic systems can benefit from the creation of highly protected areas in remote locations. These findings show the benefits of fully protecting both benthic and pelagic environments in MPA.

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38. Incorporating climate change in marine protected area design for the Indian sub-Antarctic high seas

Tegan Carpenter-Kling[1], Francesco D'Ovidio[2], Eric Goberville[3], Philippe Koubbi[2], Azwianewi Makhado[4,5,6], Kerrie Swadling[7], Hannah Truter[1], Amanda Lombard[1]

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Climate change is potentially the greatest threat to marine ecosystems in polar regions and needs to be included when designing Marine Protected Areas (MPA). The systematic conservation planning (SCP) approach integrates numerous data layers into spatial products that can guide inclusive decision making on MPA design. Here, we investigate incorporating the predicted impacts of climate change in a SCP approach for the sub-Antarctic Indian Ocean, a productive area hosting diverse predator and prey species. Although our study area incorporates national waters of South Africa, France and Australia, we aim to augment existing MPA efforts in these national waters with recommendations for high seas protection. SCP products will need to address the diverse governance instruments in the region, notably national governments, Regional Fisheries Management Organisations (RFMOs), the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR) and the United Nations Agreement on Biodiversity Beyond National Jurisdiction (BBNJ).

39. Marine conservation futures: Scenario-based planning for MPAs in MSP

Stelios Katsanevakis[1], Michael Elliott[2], Antonios D. Mazaris[1], Nikolaos Nagkoulis[1], Maria Bas[3], Marta Coll[3], Miguel Ortega[3], Maren Kruse[4], Robert M. Runya[5], Olga Lukyanova[6], Benedict McAteer[7], Ibon Galparsoro[6], Sylvaine Giakoumi[8], Vanessa Stelzenmüller[4]

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To advance ecosystem-based marine spatial planning (EB-MSP), future scenarios must be developed to enhance the integration of marine protected areas (MPAs) and spatial conservation measures within MSP frameworks while addressing the challenges posed by uncertain future drivers. The MarinePlan project has created four distinct scenario narratives, shaped by two key global drivers—climate change and international politics & governance—ranging from severe environmental degradation to sustainable conservation success. Using a structured six-step scenario development process, including expert consultations and participatory workshops,

these scenarios use qualitative narratives to explore alternative futures for marine conservation. Applied to European marine planning sites, they assess potential governance, ecological, and socio-economic challenges in achieving the EU Biodiversity Strategy 2030 targets. This science-based guidance enhances adaptive MSP, ensuring MPA networks are resistant and resilient to socio-political and environmental uncertainties. These insights support policymakers in designing effective, forward-looking conservation strategies that balance biodiversity protection with sustainable development.

MPA Europe, Horizon Europe Grant Agreement no. 101059988 and UKRI Grant Numbers 10067934 JNCC and 10069750 SAMS

KEYNOTE

The European Fisheries Control Agency

Dr Susan Steele
European Fisheries Control Agency (EFSA) Executive Director

The European Fisheries Control Agency (EFCA) coordinates national operational activities in fisheries and assists member states in applying the Common Fisheries Policy (CFP). The EFCA's mission is to promote the highest common standards for control, inspection, and surveillance under the CFP. It organizes and coordinates cooperation between national control and inspection activities and trains national inspectors and trainers. The EFCA aims to enhance close cooperation between EU Member States, ensuring a compliant, efficient, and uniform implementation of the policy. This contributes to a Europe-wide level playing field for the fishing industry and sustainable fisheries. In this presentation, Dr Susan Steele will speak on these objectives, the role of fisheries restricted areas in the CFP, and how EFCA supports their effective management and protection including in the use of technologies.

MPA Europe, Horizon Europe Grant Agreement no. 101059988 and UKRI Grant Numbers 10067934 JNCC and 10069750 SAMS

40. Safeguarding climate-resilient mangroves requires a small increase in the global protected area

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Climate change and anthropogenic activities threaten biodiversity and ecosystem services. Climate-smart conservation plans address these challenges by focusing protection in climate-resilient areas. However, integrating climate change in the design of conservation plans is often deemed too expensive, as it may require larger networks or protecting more costly sites. Using mangroves as a case study, we evaluated the efficiency of protecting mangroves in climate-smart versus climate-naïve reserve networks. We found that climate-smart conservation plans could provide sizable benefits for relatively small increases in protected area. Moreover, transboundary plans, involving cooperation among countries, require less area and protect more climate-resilient mangroves than individual national plans. Implementing these strategies would improve the current network of protected areas for mangroves, which currently has poor climate resilience. These findings could also be applied in other ecosystems.

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41. Black coral and gorgonian assemblages of Santo Antão (Cabo Verde): The need for conservation through regulation, community action, and proposed MPAs

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Black coral and gorgonian assemblages play a vital role as habitat providers but remain poorly studied in Cabo Verde. This study presents the first systematic assessment of these communities in Santo Antão, analysing their distribution, density, and size structure through SCUBA surveys. Eleven species were identified, each displaying distinct spatial patterns. Black corals were more abundant on vertical walls exposed to strong currents, while gorgonians thrived on flatter terrains with moderate currents. Some species, like *Stichopathes luetkeni*, exhibited globally high densities (46.0 ± 50.5 colonies/m^2) and significant height variation. This study underscores the critical role of black corals and gorgonians as habitat providers in coastal areas and establishes a crucial baseline for their diversity and functionality in Santo Antão. The findings emphasise the need for conservation strategies, such as the establishment of marine protected areas (MPAs), the implementation of regulatory measures and community-based conservation initiatives.

42. The importance of deep benthic biodiversity in special areas of conservation in the Canary Islands (northeastern Atlantic Ocean)

Laura Martín García[1], Marcos González Porto[1], Alba Jurado-Ruzafa[1], Bertín García Mañé[1], José Carlos Mendoza[1], Raúl Jiménez[2], Jesús Manuel Falcón[1], Silvia Oliva[1], Noemí Dionis[1], Sebastián Jiménez[1], Pablo Martín-Sosa[1]

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This study aims to enhance our understanding of deep benthic biodiversity and to identify and map the 1170 Reef Habitats in the circalittoral and bathyal depths of the marine Special Areas of Conservation (SACs) SACs in the Canary Islands. Data were collected during four surveys of 12 SACs using the TASIFE towed camera at depths between 50 and 1400 m. The analysis of these georeferenced video transects allowed the identification of 383 taxa, including 89 habitat -forming species. Multivariate analyses and spatial modelling of the biodiversity dataset, combined with seafloor information obtained from multibeam sonar, led to the mapping of seven previously unrecognized benthic communities classified as priority conservation habitat 1170 Reef. The findings of this study enable the assessment of the conservation status of 1170 habitats, and the development of management and conservation plans of these SACs.

43. Enhancing biodiversity protection in MSP: The Ecological-Socio-Economic management framework (ESE)

Stefano Menegon[1], Débora Gutierrez[2,3], Camila Pegorelli[4], Eléonore Cambra[5], Marina Marković[6], Lucia Bongiorni[1], Matthieu Bekaert[1], Helena Maria Gregório Pina Calado[2], Javier García Sanabria[4], Elena Gissi[1], Sara Sottoriva[1], Martina Bocci[7,1]

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Effective integration of Marine Protected Areas (MPAs) into Marine Spatial Planning (MSP) requires balancing ecological, socio-economic, and policy aspects. Within the Horizon EU project MSP4BIO, the Ecological-Socio-Economic (ESE) management framework was developed as a tool-based, step-by-step guidance to enhance marine ecosystem protection and restoration. Developed through a user-driven process, it provides marine planners, decision-makers, and MPA managers with practical guidance to address management needs and policy challenges at various stages—from scoping to monitoring and evaluation. The ESE framework formalizes and integrates key questions, criteria, data, tools, best practices and practical application examples in six MSP4BIO test sites across Europe, fostering alignment with EU biodiversity targets. The framework is accessible online through a multi-entry point system, facilitating its application across different governance contexts. By supporting science-based decision-making, ESE enhances the prioritization of MPAs, facilitating more effective and adaptive marine spatial planning for biodiversity conservation and sustainable maritime activities.

44. Marine natural capital approaches to MPA conservation advice

Sarah Blanchard, Pete Chaniotis

Joint Nature Conservation Committee, Peterborough, United Kingdom

Habitats and species are natural assets which can provide ecosystem services. Marine protected areas (MPAs) are area-based management tools which traditionally focus on designated habitats and species. Due to this method, MPA conservation advice typically focuses on designated habitats and species in MPAs and does not universally include the wider natural capital benefits that MPAs can offer. This is a gap in reporting on the ecosystem services provided by MPAs and their natural assets, such as carbon storage or nursery grounds. There is growing support to move from feature-based management to ecosystem-based management. This talk aims to showcase how the UK proposes to implement the standardization of including natural capital reporting in conservation advice for offshore MPAs. The updated advice will provide policy makers, industry and management authorities a more accurate picture of the wider ecosystem services provided by MPAs.

45. Diversity is key to the more effective and equitable governance of marine protected areas

Peter Jones[1], Rick Stafford[2], Isabel Hesse[3], Duong Khuu[4]

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Drawing on coevolutionary governance and social-ecological systems concepts, we hypothesise that (1) effective governance frameworks for MPAs rely on various combinations of incentives; (2) effective MPAs employ a higher diversity of governance incentives. This analysis of 50 MPAs supports these hypotheses and demonstrates that: (a) there is correlation between the effectiveness of MPAs and the number of governance incentives used; (b) combinations of economic, legal, communication, knowledge and participatory incentives are shown to be employed in effective MPAs and mostly needed in less effective MPAs; (c) whilst some incentives are frequently identified as being important to promote effectiveness, no particular 'magic wand' incentives guarantee this. We show that effectiveness is not determined by any specific governance approaches or incentives, but rather the combination of a diversity of functionally integrated incentives, i.e. diversity is the key to resilience, both of species in ecosystems and incentives in governance systems.

46. Funder collaboration to accelerate marine protection

Emma McIntosh[1], Jonathan Kelsey[2], Jacqueline Hartley[2], Emily Small[2]

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The Joint 30x30 Funding Initiative, launched by Bloomberg Philanthropies and Arcadia in 2023 and housed by Oceans 5, aims to conserve and protect 30% of the world's oceans by 2030. With an initial commitment of USD $51 million, the Fund focuses on supporting the ambitions of Indigenous Peoples, coastal communities, non-governmental organizations, and governments to strengthen the health and resilience of the ocean. Strategic funding is provided to non-governmental organizations to advance Marine Protected Areas (MPAs) and other effective area-based conservation measures (OECMs) at three scales: the High Seas, national exclusive economic zones, and coastal waters. This collaborative effort unites philanthropic organizations to address critical funding gaps that hinder MPA and OECM design and establishment. Case studies of marine planning and protection efforts in Europe and elsewhere will be presented, demonstrating the wide range of efforts underway to meet Target 3 of the Global Biodiversity Framework.

47. Integrating MPA and MSP processes

Ivana Stojanovic for Helena Calado[1,2], Debora Gutierrez[1,3], Joyce Queiroz[1], Larissa Oliveira[1], Marina Markovic[4]

[1]Azores University, Ponta Delgada, Portugal. [2]MARE Research Centre, Lisboa, Poland. [3]Algarve University, Faro, Portugal. [4]PAP/RAC, Split, Croatia

The study aims to provide the results of screening Marine Spatial Plans (MSPs) in Europe on their role to ensure effective integration of Marine Protected Areas (MPAs) into the planning process. The methodology involved a structured assessment where partners evaluated MSPs based on established criteria, expert judgments, and case studies from various countries to identify key relationships between MPAs and MSPs. Key findings indicate that MSPs can effectively enhance biodiversity and ecological coherence when they explicitly incorporate MPA networks and stakeholder engagement, highlighting examples where such integrations have promoted successful conservation efforts. The implications of this work emphasize the necessity of developing legally binding frameworks that foster collaboration among sectors, ensuring that both MSPs and MPAs contribute to sustainable marine management and ecological resilience.

This study is performed under the scope of MSP4BIO Project.

48. Integrated assessment of ecological and socio-economic dimensions of small scale fisheries management in Marine Protected Areas

Claudia Scianna[1], Antonio Calò[2], Manfredi Di Lorenzo[3], Elena Principato[4], Patricia Ventura[5], Giulia Visconti[6], Antonio Di Franco[3]

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This study evaluates the ecological and socio-economic dimensions of small-scale fisheries (SSF) management in Marine Protected Areas (MPAs) by integrating three methodologies: underwater visual census for ecological assessment, landings photo-sampling for economic evaluation, and fisher questionnaires for social perception analysis. The approach was applied to three case study MPAs: Capo Milazzo (CM), Capo Rizzuto (CR), and Isole Pelagie (IP). Results show that fish biomass was consistently higher within MPAs than in adjacent areas, with significant site-specific variability. Revenue per unit effort was twice as high within MPAs in CR and IP, but half outside in CM. In CR, all interviewed fishers reported no engagement; in CM, 40% indicated no engagement and 30% low engagement; in IP, these values were 30% and 30%, respectively. These findings highlight the need for multidisciplinary assessments integrating ecological and socio-economic dimensions to assess MPA contributions to SSF, foster community engagement and enhance MPA effectiveness.

KEYNOTE

Fifty years of MPAs: from enhancing marine fisheries and biodiversity to proclaiming 'paper parks' and back

Dr Daniel Pauly

Institute for the Oceans and Fisheries, The University of British Columbia, Canada

This presentation, after introducing 3 pioneers for the creation of marine protected areas (MPAs), will provide a bird's-eye view of what MPAs are supposed to help achieving, which differs among fishers, environmental activists, and the public. Earlier efforts and progress will be reviewed, with an emphasis on the reasons MPAs were proposed, the arguments and tactics of MPA detractors, and the policies that led to 'paper parks' instead of functioning MPAs. Finally, a partial shift in MPA advocacy is proposed - from protecting biodiversity to maintaining vibrant fisheries - which may connect better with the public at large.

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POSTER PRESENTATION ABSTRACTS

1. **Agnesi, S.** Seagrass and saltmarsh representativity in European MPA networks and potential contribution to carbon acclimation
2. **Armoskaite, A.** Pairing cumulative impact (CIA) and ecosystem service (ESA) analysis approaches to gain insights into trade-offs between conservation and human uses
3. **Bas, M.** A new Western Mediterranean Sea EBSAs proposal based on the best available quantitative information on EBSA criteria
4. **Bellon, G.** The consequences of long-term changes in water quality on fisheries, tourism, and nature protection in a Baltic Sea lagoon
5. **Berre, A.** Digital Twins of the Ocean in support of Marine Spatial Planning and Marine Protected Areas
6. **Bocci, M.** Enhancing cross-border biodiversity and ecosystem protection in the Otranto Strait (Mediterranean Sea) through Area-based Management Tools (ABMTs)
7. **Borges, F. O.** Revisiting the use of species distribution modelling in the Southern Ocean to support sustainable ocean planning and conservation
8. **Bye, B. L.** Supporting multidisciplinary marine spatial planning through effective data management, standards, and best practices
9. **Collier, C.** Filling the ocean conservation-finance gap through marine spatial planning with Nature Bonds
10. **Emerit, A.** Trends and state of the art of using Uncrewed Aerial Vehicles (UAVs) in environmental research in support of Marine Protected Area (MPA) spatial planning in North-East Atlantic waters: A Systematic Review.
11. **Farstad, M.** Integrating Social-Ecological Models into Marine Spatial Decision-Support Tools
12. **Ferreira, J. A.** Benthic & ichthyofaunal diversity of Black Coral Forests in Santo Antão, Cabo Verde
13. **Frazão Santos, C.** Balancing conservation and use: Insights from the Portuguese Marine Spatial Planning Process
14. **Frigato, A.** Maritime Spatial Planning for Marine Protected Areas in Europe through the Horizon and Interreg projects in the period 2021-2024
15. **Gissi, E.** Scoping management questions for mainstreaming biodiversity conservation in marine spatial planning
16. **Guerra Marrero, A.** AMPLIA project: Can a novel governance approach be implemented to manage the marine protected areas of the Canary Islands?
17. **Hansen, H.S.** A scenario-based approach to cumulative impact assessment to support the MSP process
18. **Herkül, K.** Spatial relationships of underwater cultural and natural assets, and human pressures in Estonian marine area: Implications for nature conservation and marine spatial planning
19. **Horn, H. G.** Towards a prioritization of Atlantic protection areas: The IMAPP approach
20. **Katsanevakis, S.** Developing a toolbox to support ecosystem-based planning and expanding MPA networks
21. **Kruse, M.** Competing for space: Long-term variability in Norway lobster larval connectivity within the nexus of fisheries, conservation, and offshore wind farms

MPA Europe, Horizon Europe Grant Agreement no. 101059988 and UKRI Grant Numbers 10067934 JNCC and 10069750 SAMS

22. **Lavin, C.** Using drone-borne sensors to map shallow water marine vegetated habitats: A powerful tool for MPA monitoring
23. **López, M.** Mapping bentho-demersal communities to assess already-implemented no-take MPA networks
24. **Maréchal, M.** Climate benefit by seagrass vs. bare sediments: Exploring trade-offs between blue carbon burial and GHG emissions
25. **Mazzotta, M.** Assessing ecosystem services and their climate resilience in 'Tegnùe di Chioggia' through agent-based modeling
26. **Min, W.** A Study on the Ecosystem and Environmental Changes of the Ulleungdo Marine Protected Area, an Oasis in the East Sea of Korea
27. **Neubert, S.** Integrating sustainable use and systematic conservation through multiple-use spatial planning
28. **Nöth, E.** CLICK-SPOT: An open-source, AI-based tool to detect click activity for the monitoring of killer whales and surveillance of marine protected areas
29. **Papetti, C.** Antarctic fish as proxies for connectivity: tools for monitoring Weddell Sea biodiversity
30. **Pereira Santos, C.** Decoding the debate on Antarctica marine management
31. **Pereira Santos, C.** Misperceptions of marine spatial planning and conservation in polar regions
32. **Poling, D.** Effects of Trawling Activity on Benthic Habitat in a Norwegian National Park and a Standardized Method for Baited Video Surveys in the Deep Sea
33. **Rayo Luengo, S.** Assessing sectoral pressures on MPAs and identifying solutions: applying the DAPSI(W)R(M) framework to support MSP
34. **Reithmeier, M.** Leveraging Geo-Data for Effective MPA Development and Management
35. **Slila, C.** Modelling the influence of management measures on food web functions on the Sylt- outer reef- Eastern German Bight
36. **Snow, B.** Tackling complexity of marine spatial planning using a just social-ecological approach
37. **Socrate, J.** Evaluating Ecosystem Services Approaches to Inform Marine Spatial Planning: Insights from Argentina's Maritime Areas
38. **Stagličić, N.** Limited Effectiveness of MPAs in the Eastern Adriatic for Coastal Fish Communities
39. **Stelzenmüller, V.** Key pathways for integrating conservation and restoration actions in marine spatial planning in European Seas
40. **Stephenson, F.** Establishing marine protected areas in a changing climate
41. **Strāķe, S.** LIFE REEF project: Mapping habitats and assessing ecosystem service supply to identify critical areas for protecting– challenges and state of the art in the southern Baltic Sea
42. **Thorbjørnsen, S. H.** Using co-creation of knowledge to ensure ownership of research findings and public engagement in a conservation project
43. **Tong, C.** Temporal variability in larval dispersal needs explicit consideration in marine conservation planning
44. **Vaidianu, N.** Analysing policy readiness on protected areas and conservation for a successful maritime spatial planning process in Romania
45. **van Rijs, C.** Engaging stakeholders through interactive mapping of a marine national park to achieve effective and resilient marine spatial management

46. **Woo, S.** Deep-sea ecosystem, coral biodiversity of seamount in West Pacific
47. **Woo, S.** Deep-sea macrobenthic biodiversity of seamounts in the western Pacific

1. Seagrass and saltmarsh representativity in European MPA networks and potential contribution to carbon acclimation

Sabrina Agnesi[1], Aldo Annunziatellis[1], Jacob Carstensen[2], Dorte Krause-Jensen[2], Carmen Leiva-Duenas[2], Giulia Mo[1], Johnny Reker[3]

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The carbon accumulation capacity of saltmarshes and seagrasses included within and outside the existing European Protected Area (PA) network is estimated. Potential carbon accumulation rates (CAR) of these habitats were extrapolated from scientific literature. Fit-for-purpose layers describing the EU transitional/coastal marine biogeographical assessment areas, protected area networks and collated maps of saltmarshes and seagrasses were processed to assess habitat inclusion in the PA network and to estimate the potential carbon accumulation per habitat within the network. Existing PA networks already include a high proportion of both habitat typologies potentially guaranteeing the maximum blue carbon benefit. Despite the biases due to the limitations in habitat maps and CAR values, the Mediterranean Sea shows the highest CAR potential due to seagrass extension and high CAR rates. An analogous assessment on the potential CAR of other marine habitats would help evaluate how the total MPA network contributes to climate policy objectives.

2. Pairing cumulative impact (CIA) and ecosystem service (ESA) analysis approaches to gain insights into trade-offs between conservation and human uses

Aurelija Armoskaite[1], Solvita Strāķe[1], Ingrīda Andersone[1], Juris Aigars[1], Ida Maria Bonnevie[2], Henning Sten Hansen[2], Lise Schrøder[2], Miriam von Thenen[3]

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Understanding the effects of individual and cumulative stressors on ecosystems and the services ecosystems provide to society is a key part of the MSP and MPA designation. A method combining a geospatial, relative ecosystem service analysis (ESA) and the Halpern et al. 2008 cumulative impact analysis (CIA) approach has been developed and tested in the project LIFE REEF context. The study maps changes in ecosystem functioning and service supply under different scenarios, representing different levels of ecosystem protection and restrictions on activities creating physical pressures on benthic habitats. The results provide spatially explicit insights into how multiple human activities affect ecosystem functioning and multiple service supply. Further, they highlight high-impact areas and service supply hotspots useful for decision-makers reviewing maritime spatial plans and designating new MPAs to reach the 30x30 goal. The method uses openly available tools (MYTILUS, QGIS, and ESA4MSP, an Excel-based tool) and data and can be easily applied in other locations.

3. A new Western Mediterranean Sea EBSAs proposal based on the best available quantitative information on EBSA criteria

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Ecologically or Biologically Significant Marine Areas (EBSAs) are critical for maintaining the healthy functioning of oceans and can be used in the definition of Marine Protected areas (MPAs) and other marine spatial conservation measures. Using a range of GIS-based tools and information, we redefined existing EBSAs for the Western Mediterranean Sea by leveraging the best available quantitative data on EBSA criteria (e.g., naturalness, uniqueness), and integrating climate change stability into the analysis. We further evaluated their overlap with current protected areas, established EBSA boundaries, and the most relevant zones for each EBSA criterion at both the regional scale and within each Exclusive Economic Zone (EEZ). Preliminary findings reveal an uneven representation of EBSA, with conservation efforts disproportionately concentrated in northern regions. This imbalance risks neglecting ecologically significant areas in the southern regions, highlighting the need for more equitable spatial planning to achieve effective biodiversity conservation.

4. The consequences of long-term changes in water quality on fisheries, tourism, and nature protection in a Baltic Sea lagoon

Giulia Bellon[1], Miriam von Thenen[1], Gerald Schernewski[1], Henning Sten Hansen[2]

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Anthropogenic activities in the Baltic Sea have caused severe environmental degradation, with eutrophication being a concern since the 1950s. Despite reduced nutrient loads, ecological improvements remain limited. This study investigates the influence of water quality on coastal uses – fisheries, tourism, and nature protection – in Greifswald Bay, a Baltic Sea lagoon, by analysing its long-term trends (1980-2020). Results reveal changes over time and identify critical thresholds, highlighting risks to current and future coastal uses. A mixed-methods approach, incorporating diverse data sources and stakeholder input, offers unique value by integrating local perspectives into coastal use assessment while also tracking changes in ecosystem uses by coastal communities. The findings aim to guide spatial planning authorities in preserving and improving Greifswald Bay's ecosystem while ensuring sustainable coastal development. It will additionally contribute to the development of socio-ecological analysis and models for the Digital Twin Ocean (SEADITO project).

5. Digital Twins of the Ocean in support of Marine Spatial Planning and Marine Protected Areas

Arne Berre[1], Bente Bye[2], Georgios Sylaios[3], Evangelos Agorogiannis[4], Igor Mayer[5], Pedro Sarmento[6]

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The objectives of Digital Twins of the Ocean and Biodiversity is to become digital representations of the ocean with links to biodiversity and socio-economic data and models, with data connections that enable synchronisation between the physical and digital states at an appropriate fidelity in time and space. A number of platform-based ecosystems are now emerging in Europe in particular related to the "European Digital Twin of the Ocean" (EU DTO). This work has been done within the context of the European Digital Twins of the Ocean projects, Iliad DTO with connections to EDITO for MetOcean, DTO-BioFlow for biodiversity and SEADITO for socio-ecological models. The architecture is a set of multiple digital twins interactions, including biodiversity digital twins in interaction with ocean and socio-economic digital twins. Digital Twins of the Ocean will in the future become a useful service for marine spatial planning for marine protected areas.

6. Enhancing cross-border biodiversity and ecosystem protection in the Otranto Strait (Mediterranean Sea) through Area-based Management Tools (ABMTs)

Martina Bocci[1], Fabio Carella[2], Tullio Scovazzi[3], Folco Soffietti[2], Marina Markovic[4]

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The Strait of Otranto between Albania and Italy is recognised as an area of significant ecological value. Despite spatial protection measures in place, marine and coastal zones continue to face considerable environmental challenges. To address these issues, a Feasibility Study explored options to utilise ABMTs to enhance and expand marine protection through a cross-border approach. The study builds on Italy's Maritime Spatial Plan (MSP) for the Adriatic Sea and ongoing MSP initiatives in Albania. It proposes legal frameworks for implementing ABMTs collaboratively between the two countries, with measures such as expanded MPAs, Fisheries Restricted Areas, and Particularly Sensitive Sea Areas. National and local authorities were actively involved in discussions surrounding the proposed solutions. Developed as part of the Coastal Area Management Programme (CAMP) (ICZM Protocol, Barcelona Convention), the study highlights the adaptability of the ABMT approach in addressing the complexities of marine management and protection. A story map was prepared to facilitate communication.

7. Revisiting the use of species distribution modelling in the Southern Ocean to support sustainable ocean planning and conservation

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The Southern Ocean (SO) is home for important species assemblages and key ecosystems with consequential impact at the global level. It is also one of the regions most at risk from the effects of climate change, together with increasing pressure from human activities such as fisheries and tourism. Knowledge on present and future distribution of key species is of paramount importance to support sustainable ocean use and conservation in the region. The present study conducts a review of species distribution modelling (SDM) and ecological niche modelling (ENM) approaches that have been projected to date in the SO. We evaluate how the topic evolved over time (e.g., taxa, data-sources, modelling techniques) and the level of focus on marine climate change-related projections. We further identify knowledge gaps and potential pathways forward to support the development of marine spatial planning and marine conservation approaches in the SO that are sustainable and climate-smart.

8. Supporting multidisciplinary marine spatial planning through effective data management, standards, and best practices

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By creating virtual, data-rich representations of marine ecosystems, digital twins of the ocean can support decision-making processes that are vital for achieving the European Green Deal's goals of sustainable resource use, biodiversity preservation, and climate resilience. Moreover, digital twins of the ocean enable holistic views of Marine Protected Areas (MPA) not only by modelling the open ocean but also by incorporating critical data and merging ecological, socio-economic, and management data from MPAs. Looking at MPAs through multidisciplinary lenses such as digital twins represents an unprecedented effective tool to make decisions weighing various interests such as nature reserves, aquaculture, fisheries and biodiversity. In this presentation the Iliad project approach and implementation of thematic and local twins will be explained. Examples of digital twins applied to marine environments and their capacity to serve as holistic tools in marine spatial planning across regions in Europe, Africa and Middle East will be given.

9. Filling the ocean conservation-finance gap through marine spatial planning with Nature Bonds

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Nature Bonds projects combine debt refinancing and technical assistance to help countries deliver on their biodiversity, climate and sustainable development goals, close the nature-finance gap, and support local communities. Through Nature Bonds projects, The Nature Conservancy partners with governments and other stakeholders to unlock long-term funding and co-design binding commitments for durable ocean conservation, blue economy development, climate adaptation and mitigation. To date, Nature Bonds marine projects have been launched in five countries – Seychelles, Belize, Barbados, Gabon, and The Bahamas – enabling Marine Spatial Planning, the designation of new Marine Protected Areas, and improved ocean management. Through capacity building that addresses the needs of each country and assistance with science-based ocean planning, conservation fund management, and policy development, Nature Bonds projects deliver benefits for both nature and people.

10. Trends and state of the art of using Uncrewed Aerial Vehicles (UAVs) in environmental research in support of Marine Protected Area (MPA) spatial planning in North-East Atlantic waters: A Systematic Review

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With increased pressure to meet international commitments aimed at protecting 30% of our seas by 2030, Marine Protected Areas (MPAs) form a key strategic tool within marine spatial management and are essential for marine conservation. Uncrewed Aerial Vehicles (UAVs) constitute an exciting and innovative approach that could potentially redefine traditional monitoring methodologies for MPA management. In this systematic literature review, we evaluated the use of UAVs for monitoring and data collection in the marine environment and assessed their suitability across different marine environmental applications. We demonstrated that there is a preference for smaller compact UAVs, providing a cost-effective and non-invasive approach to monitoring biotic and anthropogenic features of interest in marine environments. However, efforts need to be made to; 1) Incorporate UAVs as monitoring tools for biotic and anthropogenic features of MPAs and 2) Develop standardised frameworks for UAV field survey design and reporting.

11. Integrating Social-Ecological Models into Marine Spatial Digital-Support Tools

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The SEADITO project aims to integrate marine social-ecological models and tools within a digital twin environment by creating scalable and interoperable spatial decision support tools that are compliant with EU Digital Twin Ocean (DTO). The study will focus on implementation of models in a technical geoinformatic framework while creating workflows for the integration process. The

research will be combining spatial analysis with participatory approaches (e.g., use case model) to effectively integrate the social-ecological models in the GIS ecosystem. The models and tools will be created in collaboration with related projects ensuring the reuse and optimisation of existing methods and tools. It is expected that the developed social-ecological models and tools will enable decision-makers and spatial planners to balance socio-economic factors with ecological sustainability. This research will support more data-driven governance approaches using digital twin technology, ultimately improving sustainable management of marine ecosystems and supporting long-term conservation strategies.

12. Benthic and ichthyofaunal diversity of Black Coral Forests in Santo Antão, Cabo Verde

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Mesophotic black coral forests (BCFs) in the Tropical Atlantic Realm are vital yet understudied ecosystems. This study investigated benthic and ichthyofaunal diversity associated with BCFs along the coast of Santo Antão, Cabo Verde, across eight locations (30-68.7m depths). Using photo quadrats (n=240) and video transects (n=38), we documented 45 benthic species and 53 confirmed fish species, with significant spatial variation in community composition. Habitat forming species included *Antipathella wollastoni*, *Stichopathes luetkenii*, and *Tanacetipathes spinescens*. The endemic damselfish *Chromis lubbocki* dominated fish assemblages, while benthic communities featured high coverage of rhodoliths, red algae, and encrusting sponges. Diversity indices and rarefaction analyses revealed varying community complexity among sites, influenced by local environmental conditions and habitat characteristics. Our findings establish a comprehensive baseline of BCF-associated biodiversity in Cabo Verde, highlighting these ecosystems as biodiversity hotspots and their significance for marine conservation.

13. Balancing conservation and use: Insights from the Portuguese Marine Spatial Planning Process

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Marine spatial planning (MSP) is critical to support sustainable ocean use and conservation. However, gathering the essential data to allocate multiple and often competing human activities while adhering to ecosystem-based management principles remains a significant challenge. Achieving these goals requires robust information, particularly regarding interactions among human uses and activities. This demand is expected to intensify given climate change impacts on ocean biophysical features and international commitments to designate 30% of ocean areas as protected by 2030. Here, we explore the compatibility of marine conservation with other uses of the ocean space in Portugal, and the role of marine ecosystem services in shaping spatial planning priorities. Using geospatial analysis, we identify zones of potential conflict and evaluate

their overlap with ecologically significant areas. Our findings aim to contribute valuable insights to the Portuguese case study while providing a framework for supporting future MSP revision processes at a global scale.

14. Maritime Spatial Planning for Marine Protected Areas in Europe through the Horizon and Interreg projects in the period 2021-2024

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The integration of Marine Protected Areas (MPAs) within Marine Spatial Planning (MSP) plays a crucial role in advancing the sustainable and resilient blue economy in Europe. This study examines how Horizon and Interreg projects contribute to this integration, aligning with the European policy framework. From September 2024 to January 2025, a Sustainable Blue Economy think tank was conducted, analysing European policies, Horizon and Interreg programs, and literature. At national level, MPAs within MSP comprehensively integrate socio-economic and ecological indicators with climate change projections and adaptive management strategies, thus enhancing ecosystem connectivity and stakeholder co-design for skills development. In transboundary contexts, this integration fosters cross-border cooperation and the transfer of blue skills for science-based maritime planning. By aligning with EU strategic objectives, MPAs in MSP provide stakeholders with scientifically grounded, place-based metrics on ecosystem and biodiversity value, strengthening negotiation processes and enhancing sustainable maritime value chains.

15. Scoping management questions for mainstreaming biodiversity conservation in marine spatial planning

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The global marine biodiversity and climate crises require effective actions to mitigate ongoing changes by tailoring management actions to achieve biodiversity- and climate-related objectives. However, decision makers are often left wonder about scoping conservation problems and setting targets for transitioning to climate-smart Marine Protected Areas (MPA) design within Marine Spatial Planning (MSP). Here we present a set of management questions identified with local stakeholders of six European marine case studies under the framework of mainstreaming biodiversity conservation in Maritime Spatial Planning (MSP4BIO project). The portfolio of management questions is analysed based on targets, management and knowledge needs, spatial

and temporal scales, and potential relations with MPA and MSP planning and implementation steps. Considering that conservation strategies and actions need be context-specific and adapted to conservation challenges, the MSP4Bio portfolio is meant to provide planners with an operational framework towards solutions within ongoing MPA and MSP processes.

16. AMPLIA project: Can a novel governance approach be implemented to manage the marine protected areas of the Canary Islands?

Lorena Couce Montero, Airam Guerra Marrero, Ana Espino Ruano, David Jiménez Alvarado, Julián Cabana Gandiaga, Raibel Núñez González, Ángelo Santana del Pino, José Juan Castro Hernández

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The goal of the AMPLIA project is to evaluate the advisability of expanding and rezoning marine areas part of the Biosphere Reserves of the eastern islands of the Canary Archipelago (Spain) to help with the develop comprehensive policies addressed to preserving biodiversity and approach to a more sustainable fishing. Co-management strategies have been considered to improve fisheries governance and promote a more participative, data supported (including citizen science), and adaptive fishing policy. Multisectoral forums were held to make a diagnosis of the state of fisheries resources and marine ecosystems, as well as the social and economic implications related to fishing activities in the Canary Islands. The identification of the threats to the fisheries sector, and to reach consensus on measures to dampen them, enable to glimpse that participative strategies are appropriate to reach an environmentally and socio-economically sustainable balance.

17. A scenario-based approach to cumulative impact assessment to support the MSP process

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Cumulative Impact Assessment (CIA) is a popular instrument in MSP to identify pressures and negative effects on MPAs. However, the current CIA implementations lack the temporal dimension and support for what-if scenarios. In the SEADITO project aiming at developing social-ecological models for the EU-DTO, we have developed an updated CIA-implementation, where the user can define various scenarios with adapted drivers and activities and calculate the CIA. The main principle behind is a baseline-scenario indexed to 100 while alternative scenarios are indexed in relation to the baseline. During 2025 the tool will be tested in 7 SEADITO case-studies and afterwards added to the EU-DTO. The first version is based on data for the Baltic Sea, but the next step is to use data from pan-European repositories. The new approach to CIA will support MSP as a forward-looking process through what-if scenarios supporting explorative stakeholder involvement. It is freely available and developed in R.

18. Spatial relationships of underwater cultural and natural assets, and human pressures in Estonian marine area: Implications for nature conservation and marine spatial planning

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Sustainable marine management requires integrated, interdisciplinary knowledge of natural and cultural assets along environmental and human pressure gradients. Despite the benefits of managing these assets together, this approach remains rare. This study examined the spatial overlap between underwater cultural heritage (UCH), natural assets, and marine protected areas (MPAs). While MPAs and non-MPAs showed clear differentiation along environmental gradients, UCH and non-UCH areas exhibited minimal differences. UCH-MPA co-occurrence was low and did not significantly exceed random distribution. UCHs and MPAs were spatially separated along natural and human pressure gradients. Although Estonian data suggested no strong basis for joint conservation strategies, this methodology has the potential to reveal overlaps between UCH sites, MPAs, and natural assets within environmental gradient spaces, providing a science-driven foundation for the efficient co-management of cultural and natural assets within the marine spatial planning framework.

19. Towards a prioritization of Atlantic protection areas: The IMAPP approach

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For the high seas beyond national jurisdiction, establishing marine protected areas (MPAs) is hindered by lacking biological data and competing interests with shipping and fishing. The objective of IMAPP (Integrative Mapping and Prioritization of Atlantic Protection Areas) is to provide decision-making guidelines for MPA prioritization balancing conservation priorities with economic and legal interests. By combining unpublished cruise data with existing databases, we will create a comprehensive database integrating trophic levels from phytoplankton to marine mammals with spatial data on fishing, shipping, and climate change impacts. We will use the data for biodiversity, biogeography, and food web models assessing species distributions and habitat preferences, ecosystem connectivity, functioning, and vulnerability. The results will be employed in a spatial prioritization analysis incorporating socioeconomic and legal interests, followed by multi-criteria assessments and optimization analyses to develop an MPA decision support tool. Here, we present details on the IMAPP work packages and complementary approaches.

20. Developing a toolbox to support ecosystem-based planning and expanding MPA networks

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The MarinePlan Horizon-Europe project advances ecosystem-based marine spatial planning by developing an innovative decision-support toolbox to enhance marine protected area (MPA) planning and expansion. Key R-based tools were developed, including Prior3D, PriorCON, and the Ecological Corridors tool, designed to incorporate depth, connectivity, and ecological integrity into systematic conservation planning. These tools can analyze multi-dimensional spatial data to optimize site selection while integrating ecosystem structure, climate change, and human activities. Results from application in European marine planning sites demonstrate their efficacy in identifying conservation priorities, balancing biodiversity protection with socio-economic activities. The MarinePlan toolbox also supports the evaluation of Other Effective area-based Conservation Measures (OECMs), expanding conservation beyond MPAs. By facilitating science-based, stakeholder-driven decision-making, MarinePlan provides a flexible Decision Support System for adaptive, resilient marine conservation strategies. These developments contribute to achieving EU and global biodiversity targets, supporting effective marine ecosystem protection in the face of environmental change.

21. Competing for space: Long-term variability in Norway lobster larval connectivity within the nexus of fisheries, conservation, and offshore wind farms

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This study evaluates long-term variability in Norway lobster larval connectivity and its role in sustaining populations amidst growing spatial demands in the North Sea. We apply ensemble learning and Lagrangian methods to analyse how variability in larval dispersal patterns affects connectivity between habitat patches across the North Sea. Our findings reveal key source and sink areas, suggesting that Norway lobster populations may be largely self-sustaining, with limited connectivity between distant patches. Offshore wind farm developments overlapping critical lobster habitats could disrupt larval exchange and potentially jeopardize population persistence. Incorporating larval connectivity and its variability into marine spatial planning, including decisions on MPAs, fishing restrictions, and wind farm development may help to sustainably manage Norway lobster populations and mitigate the impacts of increasing human activities, and habitat fragmentation.

22. Using drone-borne sensors to map shallow water marine vegetated habitats: A powerful tool for MPA monitoring

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Vegetated habitats are a crucial aspect of marine protected areas (MPAs) but can be difficult to map. In our research, we deployed drone-borne optical and laser sensors, paired with machine learning, to map and analyse shallow-water marine vegetated habitats in two- and three dimensions for area and volume calculations, respectively. Using the 'optical fingerprint' of multispectral imagery, we distinguished between habitat types to map the extent of eelgrass (*Zostera marina*) and different macroalgal species in southern Norway, allowing us to analyse the seasonal- and inter-annual dynamics of the canopy. From drone-borne LiDAR (Light Detection and Ranging), we collected geometric and elevation data to create a three-dimensional model of the eelgrass canopy, providing quantification of volumetric habitat available for associated biodiversity. Our results reveal the utility of drone-borne technology to advance high-resolution

monitoring of shallow water vegetated ecosystems, whilst also providing a cost-effective and reproducible technique relevant for MPA monitoring.

23. Mapping bentho-demersal communities to assess already-implemented no-take MPA networks

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We aimed to map the distribution of the bentho-demersal community and identify existing bioregions in the heavily exploited Balearic Sea to assess current MPAs in the area. To do this, we used a joint species distribution model (HMSC) to fit community data on 129 species of fishes, cephalopods and crustaceans sampled by bottom-trawl fishing vessels. From the 41724 km2 considered, we found that the current no-take MPA network in the Balearic Sea covers an uneven representation of the three identified bioregions, with only 2.5% of the Shelf, 1.80% of the Upper slope and 0.16% of the Middle slope bioregions being located within their boundaries. The need to expand current protection measures towards the EU's target of 10% of marine waters to be strictly protected needs to be evenly represents and maximize biodiversity conservation. Our results may inform decision-makers on current protection measures, and towards expanding the existing MPA network.

24. Climate benefit by seagrass vs. bare sediments: Exploring trade-offs between blue carbon burial and GHG emissions

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Coastal ecosystems, particularly seagrass meadows, are vital for climate regulation, acting as blue carbon sinks with carbon burial rates significantly higher than terrestrial forests. However, their global decline and greenhouse gas (GHG) emissions, including methane and nitrous oxide, reduce their climate benefits. Our study investigates *Zostera noltei* meadows in Arcachon Bay, France, the largest of this species in Europe. By comparing Carbon Accumulation Rates (CAR) and GHG fluxes in seagrass-covered versus bare sediments, we observed that seagrass areas had 2.5 times higher CAR values, indicating superior carbon burial. However, GHG emissions were 3.5 times higher in seagrass meadows, offsetting 29% of the net climate benefit from carbon burial. Hydrodynamic conditions played a key role, with sheltered areas promoting organic matter accumulation but increasing GHG emissions. Despite these trade-offs, *Zostera noltei* meadows still offer a net climate benefit 2.2 times greater than bare sediments, emphasizing their importance for climate regulation.

25. Assessing ecosystem services and their climate resilience in 'Tegnùe di Chioggia' through agent-based modeling

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Designated as a Special Area of Conservation in 2018 but lacking a management plan, Tegnùe di Chioggia are biogenic mesophotic rocky outcrops of high ecological significance in the Northern Adriatic Sea. By focusing on this site within the POSEIDONE (Interreg IT-SLO project) – which aims to strengthen the Natura 2000 Network and counteract biodiversity loss, by assessing ecosystem services (ES) and their resilience to climate change – this work first identifies and categorizes ES, using the CICES framework, and qualitatively describes climate pressures through literature review. The second part quantitatively analyses sponge community responses to environmental changes, focusing on their roles in nutrient cycling and bentho-pelagic coupling. An agent-based model was developed to simulate sponge growth and population dynamics, exploring changes in regulatory ES under IPCC scenarios (RCP 4.5 and RCP 8.5). The model provides critical insights into potential ecological shifts, informing adaptive management for the conservation of Tegnùe di Chioggia.

26. A Study on the Ecosystem and Environmental Changes of the Ulleungdo Marine Protected Area, an Oasis in the East Sea of Korea

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The Ulleungdo Marine Protected Area is located in the center of the East Sea of Korea and was designated by the Ministry of Oceans and Fisheries in December 2014, under the Marine Ecosystem Conservation and Management Act. The designation aims to protect habitats and spawning grounds of marine species in need of conservation while preserving the region's exceptional underwater landscapes, including coral and unique seaweed ecosystems. Within this area, Dokdo, though only 0.187 ㎢ in size, hosts a remarkable biodiversity with 1,963 recorded species. This high diversity is largely influenced by the East Sea's unique physical and geographical conditions. Recent studies focus on ecological and environmental changes, including habitat shifts due to climate change, the decline of seaweed forests, marine plastic pollution and potential radioactive contamination from the indirect inflow of Fukushima wastewater. These efforts support the conservation and sustainable management of the marine protected area.

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27. Integrating sustainable use and systematic conservation through multiple-use spatial planning

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Growing global demands for food, energy, and resources drive competition for space while increasing pressure on natural systems, highlighting the need to balance sustainable resource use with biodiversity conservation. Multiple-use spatial planning provides a pathway to achieve this balance and meet international targets for sustainable development and conservation. Here, we illustrate current approaches for integrating multiple uses into spatial planning, including incorporating multiple economic costs, zoning, and multi-objective frameworks, and provide practical guidance for selecting appropriate methods. We also explore gaps and challenges that hinder multiple-use spatial planning, including greater consideration of benefits and costs, economic impacts, real-world applications, the timing of interventions, capacity building and aligning with development priorities. We aim to make multiple-use planning more accessible to scientists and conservation practitioners and stimulate a wider uptake of these approaches to help meet international ecological, economic, and social goals.

28. CLICK-SPOT: An open-source, AI-based tool to detect click activity for the monitoring of killer whales and surveillance of marine protected areas

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Our long-term goal is to provide AI-based tools to monitor whales in critical habitats and promote and survey marine protected areas. We present CLICK-SPOT, an open-source, YOLO-based tool to identify clicks and echoes of killer whales. In this study, we refer to clicks and echoes as events. The tool was trained on 6994 and tested on 5322 events, recorded in the Vestfjord in northern Norway. Input to the system is a sequence of 5ms-windows with 2.5ms overlap (192kH sampling rate). We generate an "RGB"-image, where the channels contain the waveform, spectrogram and scalogram. CLICK-SPOT achieved 84.4% precision, 84.9% recall and 71.6% event accuracy. This method serves as baseline to further classify the animals' vocal activity, including other vocalizations and species, based on event frequency over time. The goal is to acoustically detect the whales' behaviours (feeding, socializing, etc.), and monitor changes due to noise pollution and climate change.

29. Antarctic fish as proxies for connectivity: tools for monitoring Weddell Sea biodiversity

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Systematic monitoring of the Weddell Sea (Southern Ocean) is essential to establish a baseline of biodiversity status and ecosystem functioning allowing stakeholders to develop appropriate protection measures. This is particularly crucial for the implementation of the Weddell Sea Marine Protected Area, under consideration by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). The Weddell Sea hosts crucial habitats for Southern Ocean biota, including the recently discovered extensive breeding aggregation of the icefish *Neopagetopsis ionah*. This breakthrough discovery provides an opportunity to test connectivity hypotheses in Antarctic fish. Genetic analysis of samples collected from the Weddell Sea spawning aggregation and the Antarctic Peninsula suggests very low differentiation between fish of the two regions. Further work on genetic connectivity should provide key insights into numbers and distribution of *N. ionah* spawning sites and possibly a proxy for other icefish. Such results could help emphasise the urgent need to protect key benthic habitats in the Southern Ocean.

30. Decoding the debate on Antarctica marine management

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The Southern Ocean (SO) is unique in many ways. One of such ways is its governance structure (the Antarctic Treaty System), bounding nations to cooperate in its management "to the benefit of mankind". Yet, this laudable framework is not without challenges, particularly under a rapidly changing climate. Through text mining and natural language processing, we perform a content analysis of the official documentation produced over the last six decades of Antarctic Treaty Consultative Meetings. We examine how the topics of ocean planning, management, and conservation have been framed to date to unveil barriers and highlight pathways to the region's effective sustainable management. With the SO being increasingly affected by anthropogenic pressures and representing the only sea basin worldwide without a formal marine spatial planning initiative to date, this exercise is of the utmost relevance.

31. Misperceptions of marine spatial planning and conservation in polar regions

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Marine spatial planning (MSP) is a critical process for balancing human demands and ecosystem conservation used worldwide, yet its implementation in polar regions (Arctic and Antarctic) is limited. By using targeted online surveys, we explore the perceptions of 172 polar experts from over 30 countries on the status and challenges of MSP development in these regions. We show that there is an overall low level of familiarity with the concept of MSP amongst polar experts in both the Arctic and the Antarctic. Our results also indicate a conflation of the concepts of MSP and marine protected area (MPA) planning among polar experts, especially in the Southern Ocean. This has implications for sustainability as it represents a barrier to the full recognition of MSP benefits, hindering its further development and implementation. Fostering MSP literacy amongst polar stakeholders and rights-holders is, therefore, urgently needed to support coupled ocean-human health.

32. Effects of Trawling Activity on Benthic Habitat in a Norwegian National Park and a Standardized Method for Baited Video Surveys in the Deep Sea

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This study aimed to investigate understudied key benthic habitat in a southern Norwegian national park to better understand the effects of human disturbance from bottom trawling. We also developed a standardized baited remote underwater video (BRUV) rig which can be used to observe bottom habitat in a way that minimizes cost and is most complementary to existing shallow-water BRUV surveys. We ran a pilot study in fall 2024 which demonstrated the success of our BRUV unit and showed how the data it collects complements shallow-water BRUV data as well as deep-water towed video. We also collected initial evidence of the effects of trawling on bottom habitat, especially benthic sessile organisms. Further fieldwork will be conducted in April 2025 to collect further information about the habitat conditions and community composition of the deep in Raet National Park.

33. Assessing sectoral pressures on MPAs and identifying solutions: applying the DAPSI(W)R(M) framework to support MSP

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Marine Protected Areas (MPAs) are key to preserving marine biodiversity, forming the foundation of ecosystem-based marine management alongside Marine Spatial Planning (MSP). Within the European MSP4BIO project, this study aims to assess the pressures and impacts of five key

sectors—aquaculture, fisheries, mineral extraction, renewable energy, and tourism—on MPAs and their ecosystem services. Additionally, it compiles global examples of good practices to mitigate these impacts. Using an adapted DAPSI(W)R(M) framework, we analyze sectoral activities, their ecological consequences, and potential policy responses. This approach provides a comprehensive perspective for policymakers and MPA managers, offering solutions that integrate biodiversity into decision-making and promote stakeholder engagement. By applying this model at a European scale, we demonstrate its potential as a flexible framework that can be adapted to specific contexts, supporting more effective marine conservation and sustainable sectoral management.

34. Leveraging Geo-Data for Effective MPA Development and Management

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To explore the role of geo-data in MPA development and management, focusing on data-driven planning and ongoing monitoring. EUSPA-funded project: Coastal Observation Advances leveraging Space Technology Services (COASTS). Showing through 3 pilot areas (Maldives, Jersey/France and Germany) the role of accurate geo-data in MPA boundary delineation, baselining & monitoring, along with other blue carbon use-cases. Project partners: EOMAP, Fugro, Maldives Space Research Organisation and Submaris. Enabling data-driven decision-making through enhanced multi-scale coastal observation capabilities (satellite EO + in situ measurements, and hydromorphodynamic modelling); developing a digital solution for blue carbon ecosystems (mangroves and seagrasses), their erosion protection potential, and carbon sequestration ability. The project is ongoing. Integrating geo-data in MPA development and management is crucial for effective marine conservation, supporting sustainable blue economy goals and international conservation targets (30x30, EU Nature Restoration Law etc). Collaboration with private sector companies can scale-up these efforts.

35. Modelling the influence of management measures on food web functions on the Sylt- outer reef- Eastern German Bight

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Sylt Outer Reef (SOR) is a marine protected area located in the Eastern German Bight of the North Sea, characterized by high sediment diversity and a rich benthic community. It has garnered attention due to the exclusion of bottom trawling, a measure that was counteracted in 2023. Large-scale management measures, such as bottom trawling exclusion, have rarely been investigated at the ecosystem scale. Therefore, we use the Ecopath with Ecosim ecosystem modelling approach to create a base model, utilizing recent field data from SOR covering the

period 2010–2020. This model quantifies the food web trophic interactions and energy flow, assesses key species of the SOR, and analyses ecosystem dynamics through ecological network analysis indicators. We aim to simulate how fish biomass and the ecosystem network respond to trawling exclusion, demonstrating long-term changes in fish biomass and ecosystem stability.

36. Tackling complexity of marine spatial planning using a just social-ecological approach

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Marine Spatial Planning (MSP) has emerged globally as an effective mechanism for sustainable seascape management, encompassing both political and public processes. However, many voices remain unheard in ocean management, with equity and justice often overlooked in public participation processes. This marginalisation is particularly problematic for coastal communities excluded from decision-making. In Algoa Bay, South Africa, we employed a case study approach using participatory research methods within a social-ecological systems framework to promote inclusion and equity in MSP design and implementation. Our findings underscore the necessity of incorporating diverse values and knowledge for a just process. We also understand that a just process advances ocean stewardship and shared conservation values. This paper outlines the methodology, shared learning, and challenges of scaling up these efforts.

37. Evaluating Ecosystem Services Approaches to Inform Marine Spatial Planning: Insights from Argentina's Maritime Areas

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Marine ecosystems in Argentina provide key ecosystem services, supporting diverse uses and activities that often result in conflicts. As Marine Spatial Planning (MSP) in Argentina remains in

its early stages, this study analysed a portion of the country's Spatial Maritime Areas through a socio-ecological systems lens. The DAPSI(W)R model was applied to assess ecosystem services, conflicts, and human-environment interactions, generating zoning proposals for management. Additionally, the effectiveness of this ecosystem service approach case study was evaluated based on criteria. These criteria addressed issues such as stakeholder engagement, scalability, and policy relevance. The results identified medium-high effectiveness (score: 21/30), with weaknesses in scalability, dynamic adaptability, and stakeholder inclusion. This analysis emphasizes the need for adaptive MSP approaches to harmonize uses, reduce conflicts, and preserve biodiversity, while offering an innovative framework for socio-ecological systems integration in marine management.

38. Limited Effectiveness of MPAs in the Eastern Adriatic for Coastal Fish Communities

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Despite their intended role in biodiversity conservation, Marine Protected Areas (MPAs) do not always yield expected ecological benefits. This study assessed fish communities in three high-level protection MPAs of the eastern Adriatic - Brijuni National Park, Kornati National Park, and Telašćica Nature Park - using in situ visual census surveys across fully protected, partially protected, and unprotected areas. Species richness, abundance, biomass, and size distributions of key fish species were analysed to evaluate protection effects. Results show no marked differences across protection gradients, as all analysed parameters of fish communities were similar inside and outside MPAs, except for Brijuni, where biomass was moderately higher. However, the demographic recovery of commercial species remained limited. These findings suggest weak enforcement, illegal fishing, or broader ecological factors may be limiting MPA effectiveness. Strengthening enforcement, monitoring, and adaptive management is crucial for improving conservation outcomes in the eastern Adriatic.

39. Key pathways for integrating conservation and restoration actions in marine spatial planning in European Seas

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As part of the EU Horizon MarinePlan project, we developed evaluation frameworks for ecosystem-based marine spatial planning (EB-MSP) and systematic conservation planning (SCP) to align MSP with conservation and restoration actions across European Seas. Both assessments cover nine topics, including objectives, environmental status, stakeholder engagement, and monitoring. They evaluate knowledge, relevance, confidence, and implementation based on defined benchmarks. Using a Bayesian belief network (BN), we analysed data from eight European

MSP sites. Results showed a 43% overlap in SCP and EB-MSP objective-setting tasks, highlighting integration opportunities. However, gaps remain—while 42% of MSPs recognized environmental status as relevant, only 30% addressed it, and just 20% used high-quality data. Standardized evaluation frameworks provide practical guidance for integrating SCP into MSP. By identifying overlaps and gaps, our approach enhances EB-MSP implementation, supporting better conservation and restoration efforts across European Seas.

40. Establishing marine protected areas in a changing climate

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Considering climate change impacts for the planning, design, and implementation of new and expanding MPAs and MPA networks is critical to delivering long-term conservation outcomes. IUCN's Protected Areas and Climate Change Specialist Group and the International Partnership on Marine Protected Areas Biodiversity and Climate Change have developed best practice guidance on this topic. This included developing and defining a set of four guiding principles for creating climate-informed MPAs: Understand Change (understand and monitor past, current, and future environmental change); Adaptive and Resilient (proactively provide effective area-based conservation in a changing climate); Equitable Design (equitable and inclusive design and management which considers human communities, cultural practices, and values); Holistic Co-Benefits (safeguard and strengthen climate mitigation, adaptation and resilience, whilst acknowledging the full spectrum of ecosystem services). Case studies from around the world illustrating these principles in practice are presented, as are tools that can be used to implement these principles.

41. LIFE REEF project: Mapping habitats and assessing ecosystem service supply to identify critical areas for protecting– challenges and state of the art in the southern Baltic Sea

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Towards achieving the 30/10 goals LIFE REEF project contributes to a comprehensive management system of MPAs in Latvia by identifying protected habitats and developing integrated ecosystem service assessment to determine critical areas for protection in the Latvian marine waters. The newly developed benthic habitat and sediment maps were used in combination with the results of an expert knowledge based ecosystem service supply assessment to map ecosystem service supply. A comparison between the results of the analysis based on 2022 and 2016 ecosystem data revealed considerable change, especially in coastal areas. 2022 analysis

results also highlight that the deeper areas play a significant role in regulating and maintenance service supply. Despite the fact that ecosystem services have changed in coastal areas, their inclusion in the status of strictly protected areas remains essential.

42. Using co-creation of knowledge to ensure ownership of research findings and public engagement in a conservation project

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How can conservation projects most efficiently reach and engage the public, impacted parties and decision makers? Plans for communication, dissemination/exploitation and engagement are a core element of most conservation projects. In the MARHAB-project (2024-2027) we implement co-creation of knowledge to ensure 1) the best possible research design and 2) ownership and uptake of the findings. Through open meetings at the early stage of the project we 1) invited the audience to comment on our research questions, potentially refining existing hypotheses or adding new ones and 2) collected data on their current overview of the conservation status of marine areas in their vicinity. Towards the end of the project, we will return to the same locations to both present findings and repeat point 2 from the initial meeting. We present preliminary results from the initial round of public meetings and discuss methodological advantages and risks.

43. Temporal variability in larval dispersal needs explicit consideration in marine conservation planning

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Marine larval connectivity underpins critical ecological processes and is commonly inferred to inform spatial management. However, temporal variability in larval dispersal remains poorly understood and rarely considered. Using simulations over two decades across four species groups, we demonstrate that dispersal patterns can vary more between years than between species. We further show that temporal averaging of connectivity, a standard practice used in marine conservation planning, introduces systematic bias. Fundamental network characteristics, such as density of connections, are consistently overestimated, distorting our understanding of likely recolonisation pathways and recovery times. When identifying critical reef patches for specific management objectives, incorporating temporal dynamics led to substantially different site prioritizations compared to temporally-averaged dispersal analyses, with as little as 4% overlap. Our findings reveal that temporal variability in larval dispersal is not merely noise but a fundamental property shaping population dynamics, which should be explicitly considered to avoid potentially misleading management decisions

44. Analyzing policy readiness on protected areas and conservation for a successful maritime spatial planning process in Romania

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Designation of protected areas is an essential policy tool to halt biodiversity decline. One target of the EU Biodiversity Strategy for 2030 is to legally protect a minimum of 30% of European seas by 2030. Even a lot of information on European marine protected areas is available, many aspects remain less known, such as governance or national and subnational implementation and management. This paper thus aims to bridge this knowledge gap by exploring national realities from Romania. Our analysis focus on identifying the challenges and successes in the management of marine protected areas, as well as the specific needs to be addressed in order to support successful national implementation of the maritime spatial planning. Our preliminary conclusion reflects that Romanian conservation efforts need more collaboration and stronger protection levels on areas that face development pressure, taking into account the sensitive environment and geo-political tensions in the Black Sea.

45. Engaging stakeholders through interactive mapping of a marine national park to achieve effective and resilient marine spatial management

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This study maps conflicts and uses of local stakeholders in Ons and Salvora islands within the Marine-Terrestrial National Park of Illas Atlánticas de Galicia (Spain), investigating the potential for expanding strictly protected areas. The current management plan designates 0.44% of the MPA as no-take areas. Key local stakeholders are identified and interviewed through an interactive online mapping survey that allows participants to draw maps representing their activities, collecting their perspectives on marine conservation and socio-economic practices within the area. By integrating stakeholder uses with scientifically prioritized marine conservation areas, the final hot-spot maps lead to the identification of suitable areas for stricter protection and highlighting the areas of conflict or compatibility. These maps show overlapping uses, while survey data captures participants' perspectives on effective ecosystem-based management. Inclusive participatory studies serve as a comprehensive approach that contributes to developing an MPA management plan fitting the international conservation Agenda.

46. Deep-sea ecosystem, coral biodiversity of seamount in West Pacific

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Seamounts have a great effect on circulation patterns and currents, which in turn have very important effects on seamount biota. In this study, we explored seamounts in West Pacific,

approximately 400km northeast from Guam, to investigate the deep-sea fauna and biodiversity around the seamounts and aimed construction of the ecological map and discovery of biological resources, particularly from cnidarian. We purposed sampling of deep-sea coral species and extracted its RNA and DNA. We constructed transcriptomic assemblage of 3 deep sea corals (*Rohdanirdogorgia* sp., *Chrysogorgia stellate*, *Calyptrophora lyla*) after de novo RNA sequencing to investigate further gene expressions in abiotic extreme environment and also to discover differentially expressed genes comparing between deep-sea environment and shallow water species or cold water and trophic coral species. This research was supported by Korea Institute of Marine Science & Technology Promotion (KIMST) funded by the Ministry of Oceans and Fisheries (No. 20220509, No.20210646).

47. Deep-sea macrobenthic biodiversity of seamounts in the western Pacific

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The main objective is to describe the species composition and richness of macrofauna from different seamounts in the study area. A total of 103 benthic species belonging to 4 phyla (Echinodermata, polychaetes, and crustacea, mollusks) were collected, and 44 species in Echinodermata, three species in polychaetes, and 56 species were identified. As a result, by taxonomic group, spider starfish were dominant, and species belonging to the genera *Asteroschema*, *Ophiloleila*, and *Ophioplinthaca*, and amphipods and decapods primarily appeared. Most echinoderms live attached to dead sponges and live corals. The decapod *Uroptychus* species were clinging to coral. Shrimps lived inside dead sponges or on the sponges. There are host species that affect the distribution of benthic animals in seamounts, and species richness increases with increasing host species. We suggest that the host species may consider to play a very important role in the diversity of microbenthic on deep sea seamounts.

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Valanko	Sebastian	International Council for the Exploration of the Sea (ICES)
van der Knaap	Inge	Institute of Marine Research
van Deurs	Mikael	DTU Aqua
van Nieuwerburgh	Lies	Department of Waterways and Public Works
van Rijs	Cleo	University of Vigo / IMBRSea Ghent University
Van Schoubroeck	Sophie	University of Antwerp
Vaughan	Louise	Atlantic Technological University
Vester	Heike	Faculty of Biosciences and Aquaculture, Nord University
Vieira	Soraia	MARE / University of Évora, Portugal
Watson	Frederick	Blue Marine Foundation
Wiggins	Allison	Government of Barbados, Coastal Zone Management Unit
Woo	Seonock	Korea Institute of Ocean Science and Technology
Yamakawa	Yo	University of the Ryukyus
Zhabina	Daria	Nord University
Zhao	Qianshuo	Ocean University of China
Zupan	Mirta	Joint Research Centre - European Commission

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