



PI: Prof. Mark J. Costello, Nord University (NORD, Norway)

Marine Protected Areas for Europe



The MPA Europe project is co-funded by the European Union under the Horizon Europe program (grant agreement no. 101059988)



WORK PACKAGES

+ **WP1 - Project management**

+ **WP2 - Ecosystem and connectivity modeling**

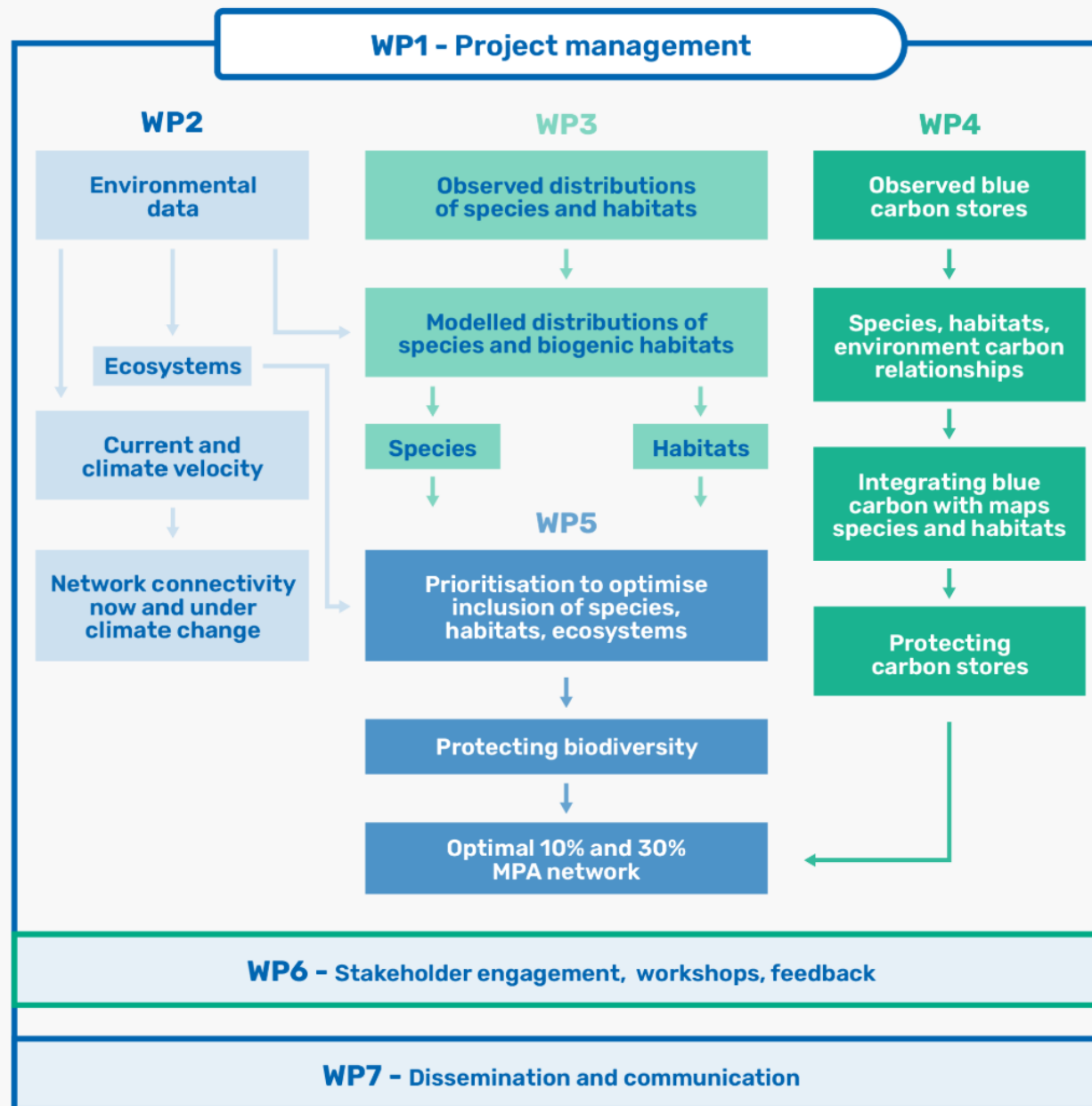
+ **WP3 - Species and biogenic habitat distributions**

+ **WP4 - Blue Carbon**

+ **WP5 - Prioritisation**

+ **WP6 - Stakeholder Engagement**

+ **WP7 - Dissemination and Communication**





21 (of 38) Deliverables submitted on time
13 (of 21) Deliverables online in Zenodo
6 (of 12) Milestones submitted on time
2 Kick-off (Bodø, NO) and annual
(Faro, PT) meetings
6 Quarterly meetings
Many international cooperations with
different projects (WP6)

Risks in staff availability managed



DELIVERABLES

2023

2024

2025

2026

WORK PACKAGE N°	DELIVERABLE RELATED N°	DELIVERABLE NAME	DUE DATE	STATUS
WP1	D1.1	Data Management Plan	feb	Submitted
WP1	D1.2	Report from the kick-off meeting	feb	Submitted
WP7	D7.2	Project website and social media accounts	feb	Submitted
WP2	D2.1	Compilation of marine environmental data ready for ecosystem classification analysis and distribution modelling	jun	Submitted. View the submitted version here
WP3	D3.1	Compile additional data and publish it into OBIS	jun	Submitted. View the submitted version here
WP7	D7.1	Dissemination, Exploitation and Communication plan	jun	Submitted

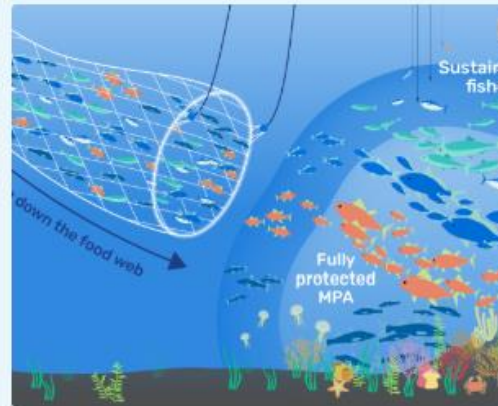
Deliverables reported on project website and can be downloaded from Zenodo



New regularly
reported on
project website

STAKEHOLDER WORKSHOP

NEWS



Misconceptions about Marine Protected Areas

December 20, 2024

One of the most widespread misconceptions about fully protected Marine Protected Areas (MPA) is that they displace fisheries. On his most recent paper, Mark Costello, MPA Europe's coordinator, comments and refutes this and other wrong ideas about MPA.

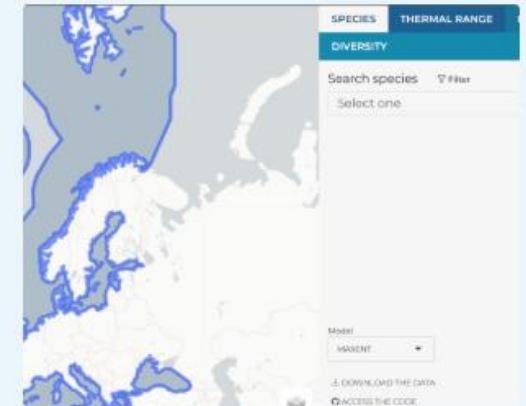


MPA Europe Contributes to Educate Young Minds on Marine Conservation

December 9, 2024

MPA Europe recently published an educational article aimed at young learners, developed by Nord University and Science Crunchers, and featured in the Science Journal for Kids and Teens.

[Read more >](#)



MPA Europe introduces Species range maps

November 29, 2024

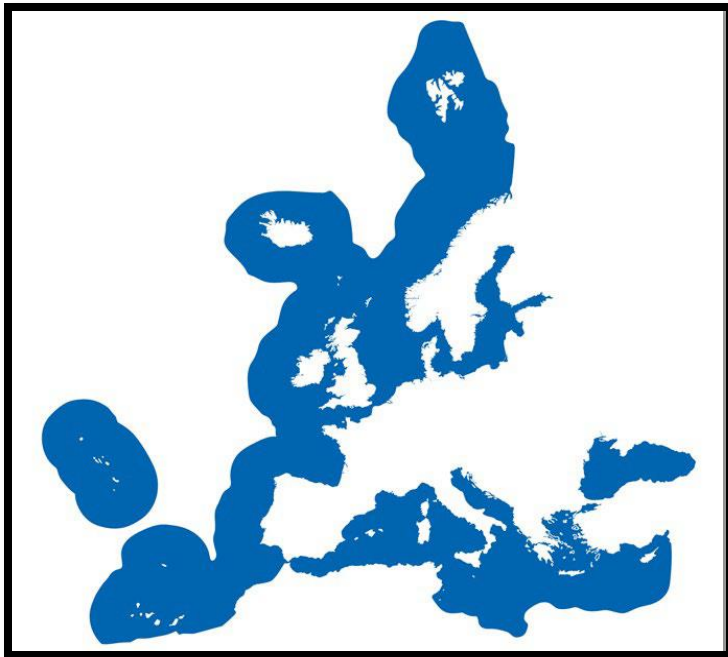
Online interactive platform hosted by OBIS shows species range maps for over 12,500 species found in European seas.

[Read more >](#)

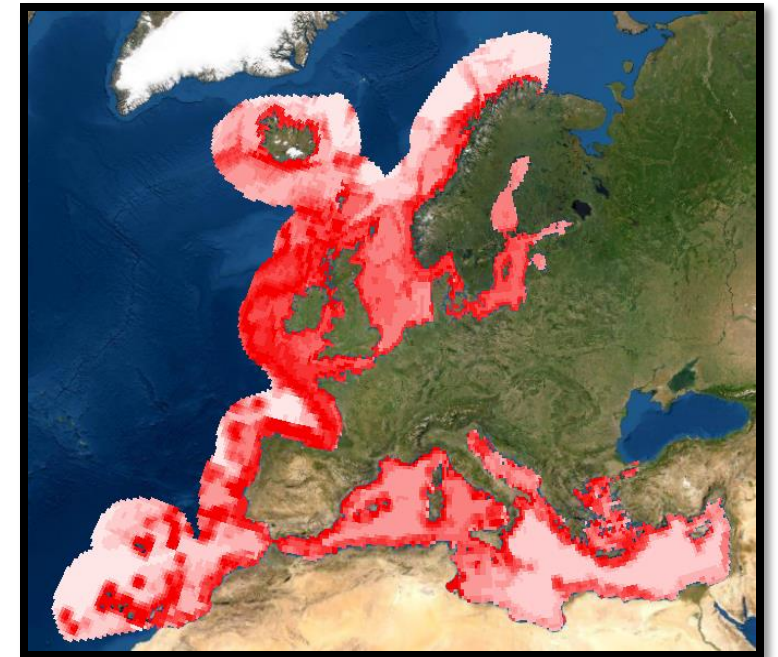
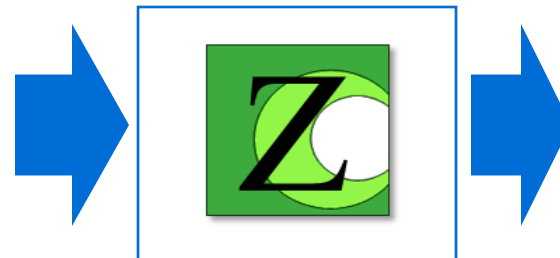
**G
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L**

MPA Europe is mapping the **optimal locations** for Marine Protected Areas in European seas to support **science-based** Marine Spatial Planning

**A
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SYSTEMATIC
CONSERVATION
PLANNING (SCP)



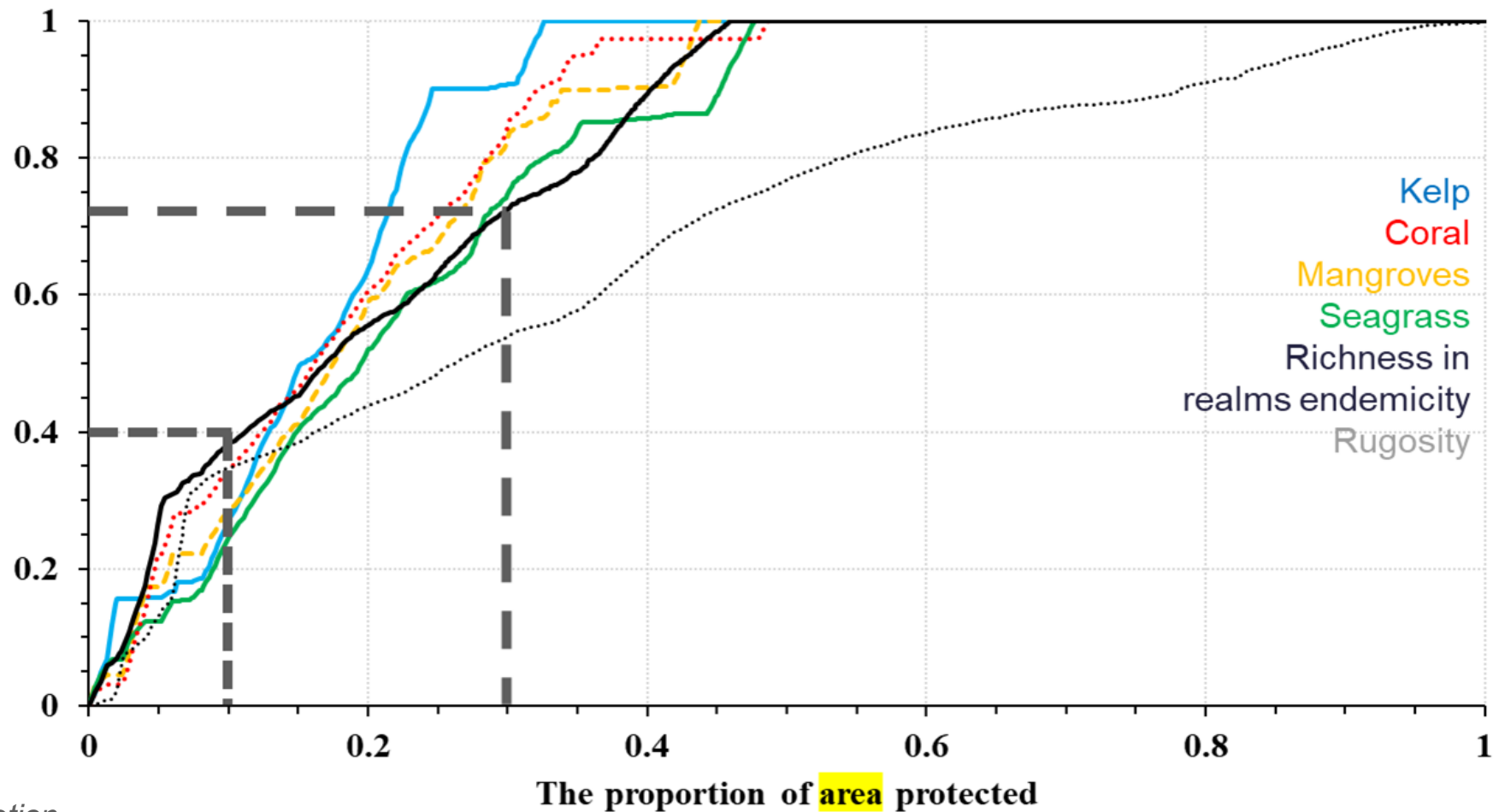
Systematic Conservation Planning

designs a network of areas that best represent (include)
measures of biodiversity

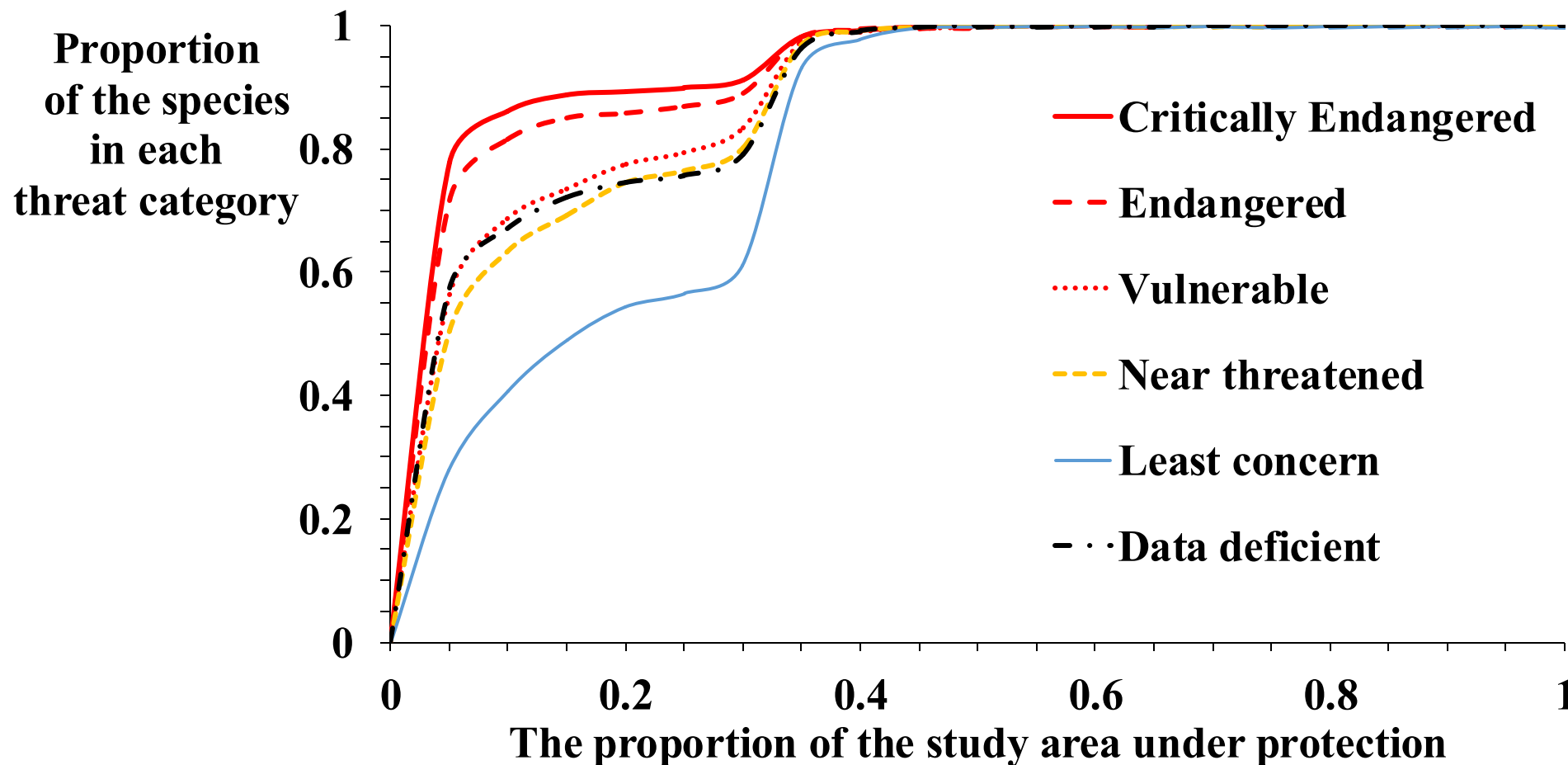
**Aim for
at least 80%
representation
of biodiversity
within 30%
of the sea area**

Example is from a global
prioritisation in 2020

The proportion of a measure of biodiversity per area



Systematic prioritisation preferentially selects rare and threatened species



for 75,000
land,
freshwater and
marine species
from IUCN
Red List

(unpublished)

1st key message: biogeography and ecosystem **regionalisation**

The MPA network will need to include the 6 regions:

Baltic, Black and Mediterranean Seas

Arctic-Boreal

Mid-European Atlantic

Offshore mid-southern European Atlantic

MPA and climate change

1. MPA provide resilience against climate change by having larger, and more natural (genetically), populations
2. MPA can be designed to accommodate future species range shifts due to climate change
3. In Europe, most species will remain in most of their present range under climate change



2nd key message: **climate change**

Even in worst case scenarios,

- Most species will remain in their current geographic range
- With increased species richness in northernmost (Arctic)
- Possible extirpations of some species in the Mediterranean

3rd message:

protecting seabed carbon stores

Map of organic carbon concentrations available for European seabed.

Management could ban disturbance of sediments with high organic carbon to minimise release of greenhouse gases from sediments (CO₂, CH₄).

10 publications supported by MPA Europe

- Abecasis, D., Fragkopoulou, E., Claro, B., Assis, J. (2023). Biophysical modelling and graph theory identify key connectivity hubs in the Mediterranean marine reserve network. *Frontiers in Marine Science*
- Assis, J., Fernández Bejarano, S. J., Salazar, V. W., Schepers, L., Gouvêa, L., Fragkopoulou, E., et al. (2024). Bio-ORACLE v3.0. Pushing marine data layers to the CMIP6 Earth System Models of climate change research. *Global Ecology and Biogeography*.
- Assis, J., Fragkopoulou, E., Gouvêa, L., Araújo, M. B., Serrão, E. A. (2024). Kelp forest diversity under projected end-of-century climate change. *Diversity & Distributions***
- Balogh, V., Fragkopoulou, E., Serrão, E. A., & Assis, J. (2023). A dataset of cold-water coral distribution records. *Data in Brief*
- Costello, M. J. (2024). Evidence of economic benefits from marine protected areas. *Scientia Marina***
- Costello, M. J. (2024) Fully protected Marine Protected Areas do not displace fisheries. *Proceedings of the National Academy of Sciences***
- Appeltans, W., Provoost, P., Principe, S. C., Driedger, A., Webb, T., Costello, M. J. (2024). Biodiversity knowledge and threats on marine life: assessing no-take zones as a refuge for marine species. In: Enevoldsen et al. (eds) *State of the ocean report 2024*. UNESCO-IOC**
- Predragovic, M., Assis, J., Sumaila, U. R., Gonçalves, J. M. S., Cvitanovic, C., Horta e Costa, B. (2024). Up to 80% of threatened and commercial species across European marine protected areas face novel climates under high emission scenario. *Npj Ocean Sustainability*, 3(1), 1–9
- Vafeiadou, A., Fragkopoulou, E., Assis, J. (2024). A global dataset of demosponge distribution records. *Data in Brief*,
- Zhao, Q., Huang, H., & Costello, M. J. (2024). Systematic planning shows more than half of the most species-rich ocean region is needed to include all species in representative protected areas. *Global Ecology and Conservation***

How many species and IUCN threatened species are in MPA?

STATE OF THE OCEAN REPORT 2024



Species data from the
Ocean Biodiversity Information System (OBIS)

MPA defined by Protected Seas
who check fishing regulations:
9.5% ocean partly protected, including
1.2% fully protected

	In 9.5%		In 1.2%
Species	93,106	50%	40%
Threatened species	1,061	72%	54%

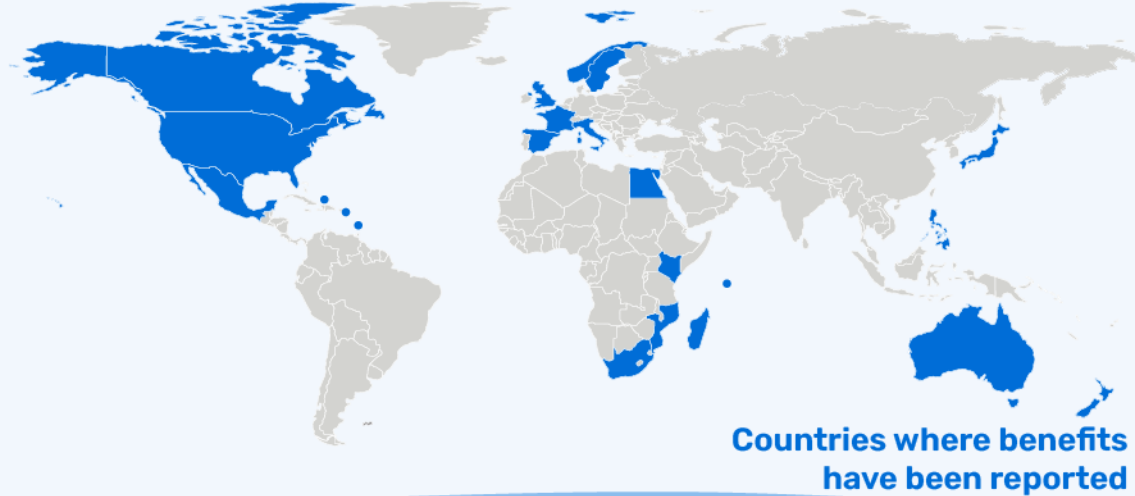
Fisheries do NOT loose catch due to MPA

Total examples in literature	51	100%
Increased fishery catch only	33	
Increased body size of fishery species	5	
Both bigger catch and body size	6	
“Spillover” reported	8	
Sub-total benefits to fisheries	46	90 %
Uncertain effects on fishery	5	
Decreased fishery catch	0	0 %

Details in

Costello MJ. 2024. Evidence of economic benefits from Marine Protected Areas.
Scientia Marina.

Economic benefits of MPAs for finfish, crustacean, and mollusc fisheries

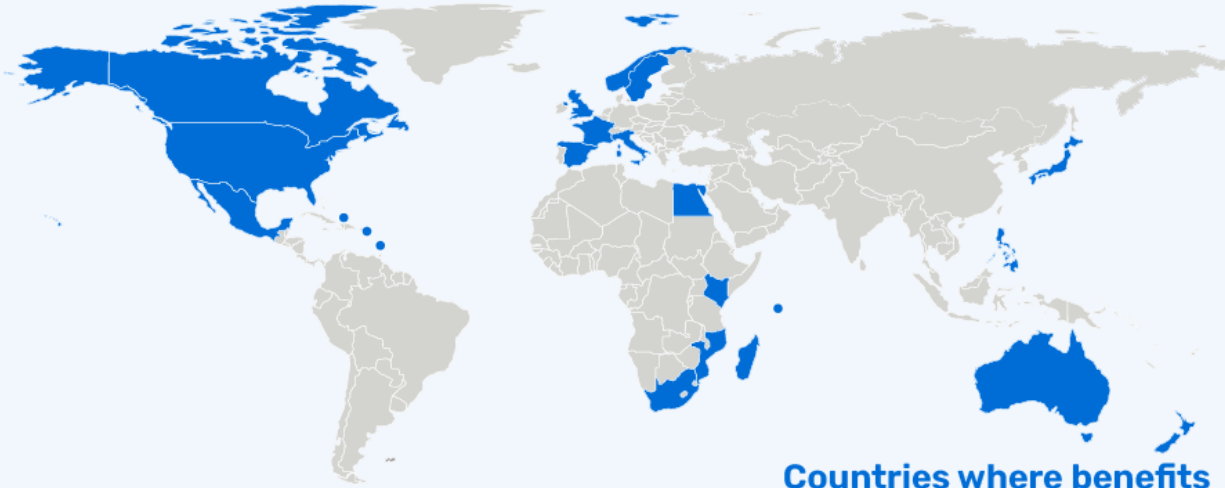
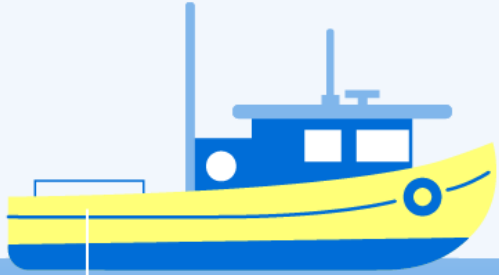


New review of science literature on MPA effects on fisheries found examples from 25 countries.

No indications of any fishery loss due to MPA anywhere.

- **39** studies found **increased catch since MPA designation**
- **13** studies found **increased body size up to 34%**
- **6** studies found **increased catch and body size**
- **0** studies reported **decreased catch**
- **8** studies reported **spillover of larvae and adults**

Economic benefits of MPAs for finfish, crustacean, and mollusc fisheries



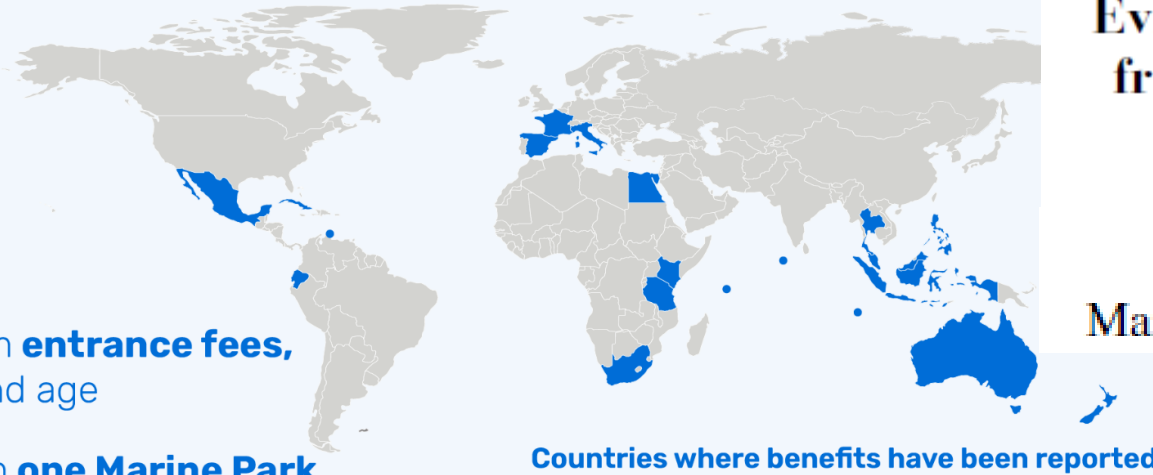
Countries where benefits have been reported

91%
examples
from
fully-
protected,
no fishing,
MPA

- **39** studies found **increased catch since MPA designation**
- **13** studies found **increased body size up to 34%**
- **6** studies found **increased catch and body size**
- **0** studies reported **decreased catch**
- **8** studies reported **spillover of larvae and adults**

98%
examples
for
coastal
fisheries

Economic benefits of MPAs for tourism



Evidence of economic benefits from marine protected areas

Mark John Costello

SCIENTIA MARINA 88(1)
March 2024, e080, Barcelona (Spain)

- **30 to 50 jobs per MPA**
- Up to **US\$2.7 million** from **entrance fees**, depending on MPA size and age
- Up to **US\$6.4 billion** from **one Marine Park**

- Up to **US\$7 million** from **scuba diving**
- Up to **US\$7 million** provided to **local economy**
- **Older MPAs** provide **higher total tourism revenues**

PNAS

COMMENTARY

Fully protected Marine Protected Areas do not displace fisheries

Mark John Costello^{a,b,1}

Do MPA “displace fisheries” ?

or, is it an “*invented problem*” ? (Ballantine 2014)



Biological Conservation

journal homepage: www.elsevier.com/locate/biocon

Perspective

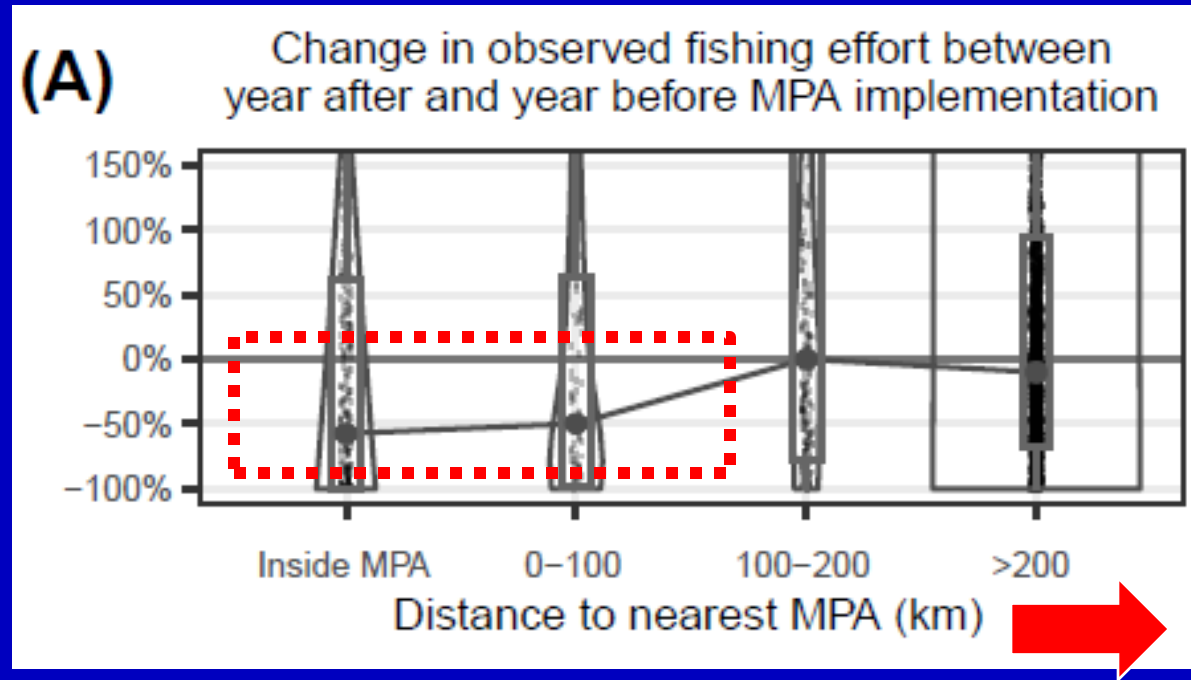
Fifty years on: Lessons from marine reserves in New Zealand and principles for a worldwide network

Bill Ballantine

University of Auckland, Institute of Marine Science, Leigh Marine Laboratory, PO Box 349, Warkworth, New Zealand

No!

1. Using global fishery data and past MPA expansion, find fishing effort decreased around MPA
2. Predict continued decreasing fishing effort under multiple MPA expansion scenarios
3. increased effort if business-as-usual



Observed decreased effort around MPA

Global expansion of marine protected areas and the redistribution of fishing effort

PNAS

Gavin McDonald^{a,b,c}, Jennifer Bone^{a,b,c}, Christopher Costello^{a,b,c}, Gabriel Englander^d, and Jennifer Raynor^e

Coral Grouper fishery in the Great Barrier Reef, Australia

Marine reserves contribute half of the larval supply to a coral reef fishery

SCIENCE ADVANCES

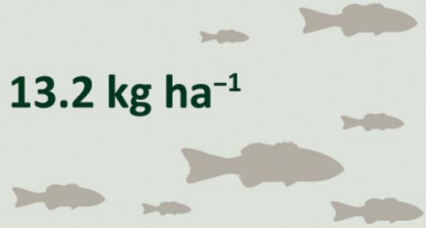
5 Feb 2025

- 766 no-take Marine Reserves occupy 30% of the GBR area
- designed using systematic conservation planning
- fishery is well (sustainably) managed
- Yet 30% MPA contributes to whole GBR:
 - **55% of larval supply,**
 - **50% of larval settlement,**
 - **47% of commercial catch,**
 - **one of every two fish to the fishery.**

Reserve reefs

30% GBRMPA

13.2 kg ha⁻¹



62%

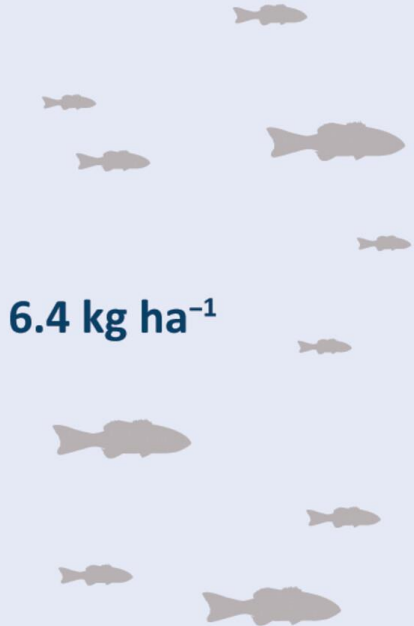
38%



Fished reefs

70% GBRMPA

6.4 kg ha⁻¹



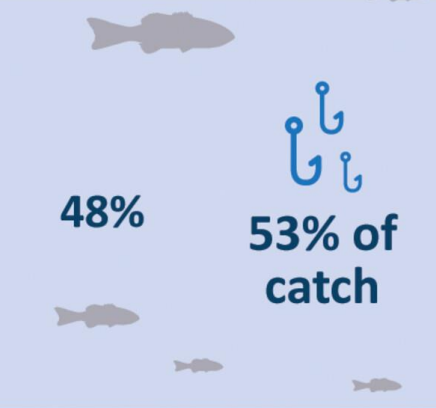
52%

47% of catch



48%

53% of catch



well managed fisheries
benefit from Marine Reserves
(no take MPA)

Biomass density

Contribution to
total larval supply

Source of
larval supply

Contribution
to catch

4th key messages: fishery benefits

1. MPA do not only benefit biodiversity, there are ~50 examples of benefits to fisheries through spillover effects.
2. There is no published evidence of any MPA reducing fishery catch anywhere.
3. There is no evidence of fishery displacements effects, but there is of improved fishery CPUE around MPA locally and globally.

Partly-Protected MPA do not (aim to) work

1. **91% examples on fishery benefits from fully-protected MPA**
2. Partly-protected MPA, allowing subsistence-recreational fishing, led to same trophic cascade as outside MPA.
3. European countries allow seabed trawling in MPA (25% trawled)
 - So they may have no ecological benefits
 - Do they have social or political benefits?

People do not see
benefit of partial
protection

Evaluating the social and ecological effectiveness of partially protected marine areas

Conservation Biology, Volume 35, No. 3, 921–932

John W. Turnbull ^{1,2} Emma L. Johnston ^{1,2} and Graeme F. Clark ^{1,2}

¹School of Biological, Earth and Environmental Sciences, University of New South Wales, Kensington Campus, Sydney, NSW 2052, Australia

²Evolution and Ecology Research Center, University of New South Wales, BEES, Sydney, NSW 2052, Australia

“We found no social or ecological benefits for partially protected areas”

partially protected areas act as red herrings in marine conservation because they create an illusion of protection and consume scarce conservation resources yet provide little or no social or ecological gain over open areas.

Fully protected areas, by contrast, have more fish species and biomass and are well understood, supported, and valued by the public. They are perceived to have better marine life and be improving over time in keeping with actual ecological results.”

**Full protection is equitable for people and nature;
why exclude commercial food-fishing over recreational fishing?**

5th key message:

Part-protection does not work

- In medicine (half a dose may have no benefit)
- Public health
- In business (not getting paid what is needed)
- Or nature conservation

Implications of key messages

- Because biodiversity includes all species and ecosystems, it cannot be protected piecemeal.
- Nature conservation should prioritise strictly protected areas where people are prohibited from killing any marine wildlife and damaging their habitats.
- An ecologically representative (coherent) network of MPA is appropriate now and under future climate change.

Beyond MPA Europe

- Assumptions
 - Our data are representative of biodiversity in the region
- Limitations
 - Species are only present in locally suitable habitats within their range
 - Species seasonal abundance is not directly accounted for
- Next steps
 - Use the MPA Europe data layers to provide a geographic context for planning MPA in cooperation with local stakeholders, e.g., using the SeaSketch platform as used in the Azores.



**Call for
abstracts
is now
open**

**WE ARE WAITING FOR
YOU IN BODØ!**





INTERNATIONAL CONFERENCE

Marine Protected Areas IN Marine Spatial Planning

9-12 July 2025
Bodø, Norway



- HOMEPAGE
- THE PROJECT
- TEAM
- STAKEHOLDER NETWORK
- RESOURCES
- FAQs
- NEWS
- CONTACT US
- MPA CONFERENCE

KEYNOTE SPEAKERS

Speakers confirmed to date. More will be announced as soon as they are confirmed.



Barbara Horta e Costa

Investigator at CCMAR, Portugal

Title: Marine Protected Areas (MPAs) and their conditions for success (at local and global scales) – [View Abstract](#)



Helena Sims

Project Manager at Seychelles Marine Spatial Planning Initiative, Seychelles

Title: Achieving Marine Protection goals through the Seychelles Marine Spatial Plan – [View Abstract](#)



Susan Steele

Executive Director at European Fisheries Control Agency, Spain

Title: The European Fisheries Control Agency – [View Abstract](#)



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

Title: Leveraging MPAs to balance trade-offs in living and non-living ocean blue economy sectors – [View Abstract](#)



Donal Griffin

Fair Seas Campaign Coordinator, Ireland

Title: Ireland's Fair Seas: Building a Movement of Ocean Stewardship – [View Abstract](#)



Jenn Casell

Principal Investigator at UCSB Marine Science Institute, California, USA

Title: California's Network of Marine Protected Areas: lessons learned from design to monitoring. – [View Abstract](#)



Tom Bech Letessier

Lecturer at University of Plymouth, School of Biological & Marine Sciences, UK

Title: Considering pelagos and benthos in MPA spatial planning – [View Abstract](#)

THANK YOU!

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