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Regional Training on Marine Spatial Planning for Latin America and the Caribbean

Panama City, 18 and 19 February 2025
Languages: English and Spanish

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4. MSP & marine protection and restoration

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Why MPAs and restoration?

- MPAs and restoration activities are different from MSP, in that they are **focused on the protection of a habitat or species primarily**, rather than only the control of a specific activity.
- As such, MPA and restoration management may **rely on many other management or regulatory regimes to control human activity** as the primary means of reducing pressure on a sensitive habitat or species.



What is MPA?

An MPA is defined by IUCN as: Any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been **reserved by law or other effective means to protect** part or all the enclosed environment.

An MPA should be:

A clearly defined marine space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values



MPA types

IUCN proposes six management categories:

- **Ia Strict nature reserve:** Strictly protected for biodiversity and
- **Ib Wilderness area:** Usually large unmodified or slightly modified areas,
- **II National Park:** Large natural or near-natural areas protecting large-scale ecological processes and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities
- **III Natural monument or feature:** Areas set aside to protect a specific natural monument e.g sea mount,
- **IV Habitat/species management area:** Areas to protect particular species or habitats, where management reflects this priority.
- **V Protected landscape or seascape:** Where the interaction of people and nature over time has produced a distinct character with significant ecological, biological, cultural, and scenic value:
- **VI Protected areas with sustainable use of natural resources**



IUCN Management Categories

Category	Definition of Management Objective
Category Ia Strict Nature Reserve	Strictly protected areas set aside to protect biodiversity and also possibly geological or landform features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such protected areas can serve as indispensable reference areas for scientific research and monitoring.
Category Ib Wilderness Area	Protected areas are usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.
Category II National Park	Protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.
Category III Natural Monument/ Feature	Protected areas are set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove. They are generally quite small protected areas and often have high visitor value.
Category IV Habitat/Species Management Area	Protected areas aim to protect particular species or habitats and management reflects this priority. Many category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category.
Category V Protected Landscape/Seascape	A protected area where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value; and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation/ other values.
Category VI Protected Area with Sustainable Use of Nature Resources	Protected areas conserve ecosystems and habitats, together with associated cultural values and traditional natural resource management systems. They are generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area.

Coherent MPA network

- It is critical that all the different types, classification, and conventions for MPAs are coherent in the protection of marine habitats and species.
- In this regard, a network of MPAs refers to **all the different types of MPAs for biodiversity taken together as a full set of protected sites.**

Type	Legal Status	Geographical Scope	Aim
MPA	Legal protection and status required	Intertidal or subtidal area together with its overlying water, habitat and species	Conservation of nature as well as associated ecosystem services and cultural values
Biosphere Reserve	Legal protection and status required	A network of protected areas that may include terrestrial, coastal, and marine ecosystems	Designated to achieve three functions: conservation, development, and logistic support (for both research and education)
Ramsar Site	Do not require formal legal protection	Wetlands and areas of marine water (up to 6m at low tide)	Recognition of wetlands as ecosystems that are extremely important for biodiversity conservation and for the well-being of communities

What is restoration?

Marine restoration and enhancement can be considered an overarching term for actions and techniques that aim to **improve the quality, size, or geographic distribution of a target habitat and/or species.**

This may involve both actively restoring the habitat/species where they currently exist or passive restoration where the priority is to remove pressures to allow natural recovery where a feature has been lost or damaged. Passive recovery is foreseen to happen at a large spatial scale, whereas active restoration is foreseen as appropriate in small scale cases.





UNITED NATIONS DECADE ON
**ECOSYSTEM
RESTORATION**
2021-2030

International and national environmental policy frameworks and commitments



MPA and MSP have been adopted as a planning and management model for achieving **target 14.2 of Sustainable Development Goal 14** (SDG 14) of the United Nations 2030 Agenda.

‘Sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve a healthy and productive ocean’.



Relevant international legal instruments

- United Nations Convention on the Law of the Sea (UNCLOS)
 - Basis for the declaration of the various maritime jurisdictions
 - Stipulates international principles of controlling shipping and right of innocent passage
 - Indicates extent of responsibilities for protection of biological marine resources
 - Authority to manage and prohibit extraction activities within national jurisdiction
 - Addresses piracy and prosecution of illegal activities within national jurisdiction and international/territorial sea cooperation
- United Nations 2030 Agenda for Sustainable Development
- United Nations Framework Convention on Climate Change (UNFCCC) and related agreements and protocols
- United Nations Fish Stocks Agreement
- FAO Compliance Agreement
- FAO International Plan of Action to Prevent, Deter, and Eliminate IUU Fishing
- International Convention for the Safety of Life At Sea (SOLAS)
- Convention on Biological Diversity (CBD)
- International Convention for the Prevention of Pollution from Ships (MARPOL)
- Port State Measures Agreements (PSMA)
- Convention on Wetlands (Ramsar)

MPA and restoration benefits

- **Ecological benefits:** this can include increased diversity, abundance, size, and biomass of species (e.g., fish and crustaceans), which can be 2–5 times higher in MPAs compared to fished areas.
- **Economic benefits:** this includes market e.g. economic values for goods and non-market benefits. MPAs can also contribute to increased long term productivity of fisheries
- **Climate change benefits:** MPAs can protect vital habitats that can protect the coastline from severe weather events and store carbon dioxide e.g. seagrass
- **Increased knowledge of marine science:** through research data, surveys, mapping, local and traditional knowledge

Role of MSP in MPA and restoration

Restoration efforts and MPA management may rely on MSP to control human activities as the primary means of reducing pressure on a sensitive habitat or species.

- MSP provides a **framework to prepare, design, provide a spatial guidance and direction** for the management of individual sectors. MSP can inform effective site selection, explicitly consider alternative sites, provide useful platform for improved outreach and education, analyse trade-offs and explicit prioritisation between human activities.
- MSP could enhance the performance of a marine protected area (MPA) network through **zoning synergistic marine-use areas close to MPAs** or buffer zones around vulnerable MPAs.
- MSP could provide a broader perspective of how MPAs are nested within a marine spatial plan, and **increase ecological representativeness** through protection of important areas, including **those not selected as sites for MPAs**, where conservation measures could be proposed and implemented.



Challenges and enablers to mainstreaming protection and restoration in MSP

MPA challenges

An MPA would be a failure if its design, implementation and/or management were insufficient, inappropriate, or neglected. Some of the challenges of MPA management include:

Planning and design phase:

- Lack of or delayed stakeholder engagement
- Poor design e.g. too small or too big to be ecologically sufficient
- Limited evidence and data
- Lack of or limited advocacy and support by stakeholders and communities

Implementation:

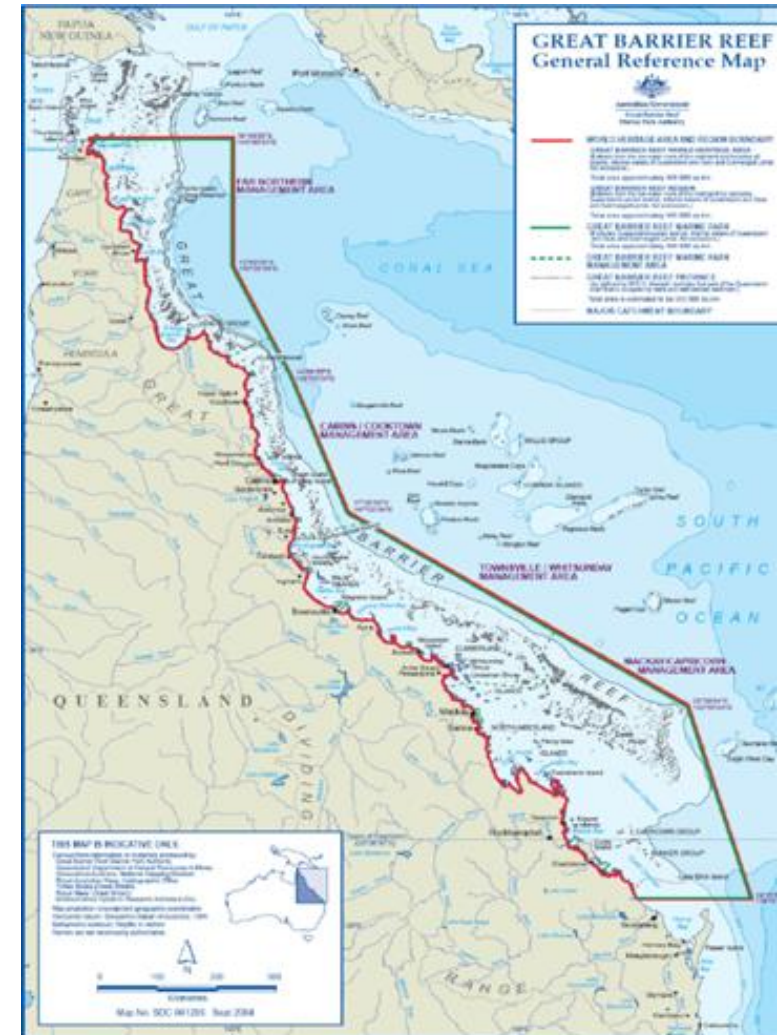
- Limited surveillance, monitoring, and research
- Limited legal backing for designated site
- Institutional and organisational overlaps and gaps
- Lack of coordination mechanisms across public bodies
- degradation of the unprotected surrounding ecosystems

Enabling conditions are the **prerequisite principles, processes, and considerations** by which an MPA is effectively planned (engagement, definition of objectives), designed (zoning), implemented and managed. Enabling Conditions should be considered throughout the stages of establishing an MPA and include :

- Vision and objectives
- Political will and commitment
- Sustainable financing
- Public Engagement and participation
- Evidence and knowledge base
- Coordination across domains and institutions
- Transparency, accountability, and communication
- Recognition of people's needs and conflict resolution
- Monitoring and Evaluation

Example: Australia

- The Great Barrier Reef Marine Park Authority (GBRMPA) in Australia originally had very **little influence over land use** in adjacent Queensland e.g large scale agriculture which leached large amounts of nitrates and phosphates into streams and the nearshore ocean.
- The GBRMPA recognised this shortcoming and **amended its policies to create a management system**, which could begin to engage the State of Queensland, and the outcome seems to be improvement in overall ecosystem health—though some of the condition of corals may be attributable to the most robust reefs being selected for the highest protection status in the **initial zoning** of the park.





MPA and restoration planning and delivery



Delivering MPA and restoration benefits

Key activities for implementing an MPA and restoration area include:

- Ongoing **engagement and partnership** with users and managers,
- Assessment for MPA and restoration area
- Legal **recognition and demarcation** of the MPA and restoration area
- Financing the **operation and management** of the MPA and restoration area
- Ongoing **surveillance, monitoring and evaluation**



Examples of data needs to assess existing environmental conditions

List of spatial data to characterise the environment:

- Oceanographic features like currents, convergence zones, upwelling
- Bathymetry and depth
- Priority areas for conservation (e.g. MPAs, Biosphere Reserves, EBSAs, etc.)
- Benthic geomorphology, shallow and deep
- Deep corals and reefs
- Key ecosystems and community-forming species (e.g. coral reefs, seagrasses, mangroves)
- Distribution and abundance of key species (e.g. cetaceans, turtles, elasmobranchs, seabirds, fish, invertebrates)
- Breeding areas
- Nursery areas
- Feeding or foraging areas
- Seasonal differences, taking into consideration different life stages of species
- Sea-surface temperature (SST)

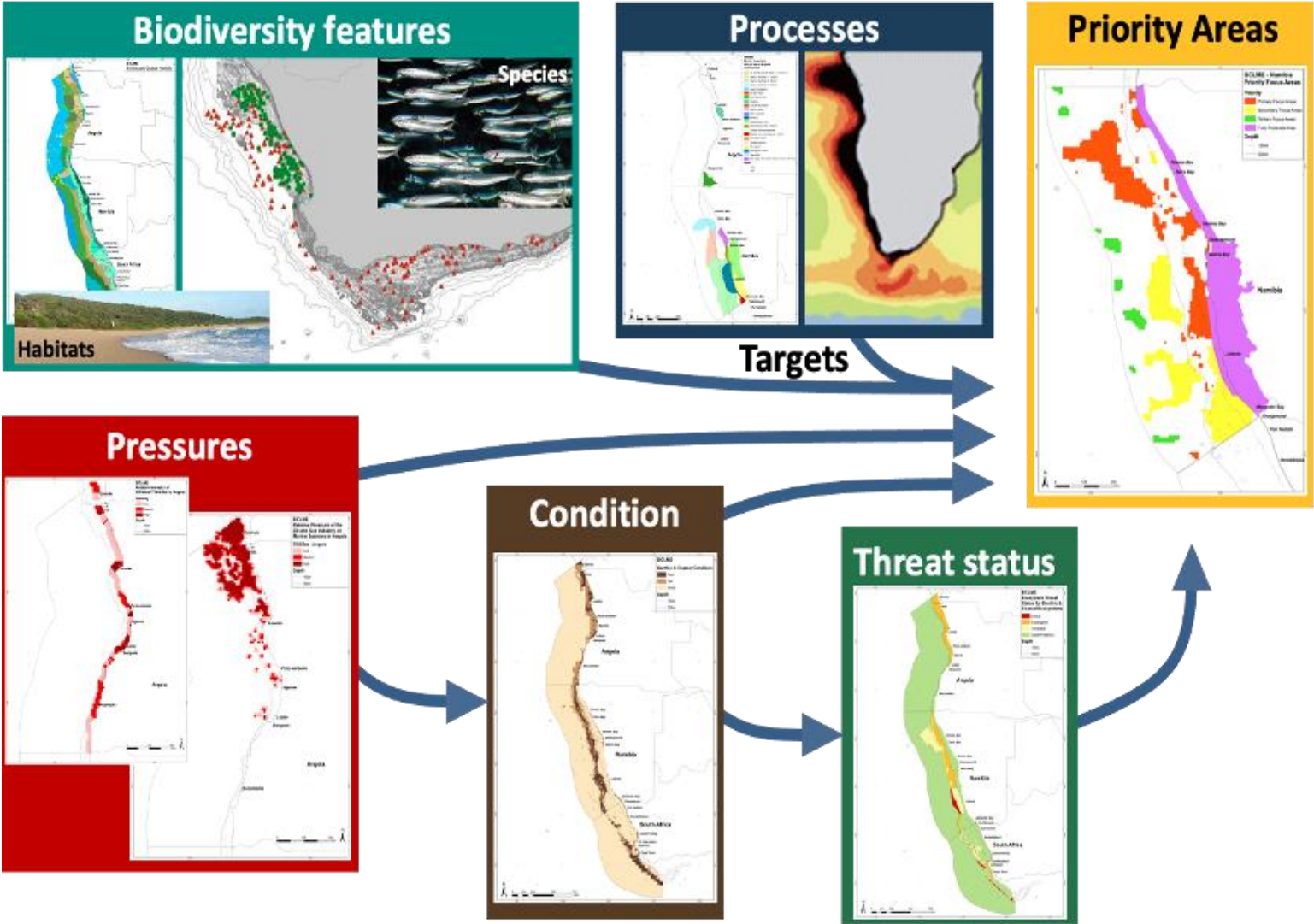
List of data to characterise the environmental status, including indicators:

- Water quality (nutrients, dissolved oxygen)
- Marine litter
- Biodiversity loss
- Invasive species
- Habitat loss

Aspect	SEA	EIA
Planning level	SEA is an overarching framework to enable comprehensive and forward-looking assessment of potential environmental implications at the policy, planning and programme level.	EIA represents a definitive approach to assessing the specific environmental impacts of a specific proposed development.
Spatial scale	SEA is undertaken at a larger spatial scale, such as an MSP region or sector-wide at a national level.	Small spatial scale focusing on the maximum extent of the project boundary impacts (e.g. of a windfarm or aquaculture facility).
Level of detail	At the strategic scale, the complexity of plans means that assessment of effects can only be articulated in general terms such as direction of travel (positive or negative).	At the small scale of EIA, sufficient detail of project design is required to enable quantification of impacts, and judgement on the significance of these.
Flexibility	Iterative and adaptive, informing changes to the plan based on assessment including review of alternative options to the plan.	Mitigation measures can be proposed to address negative effects but there is limited flexibility to adapt the proposal.
Responsibility	Responsibility of planning authority.	Responsibility of proponent (e.g. industry).

Source: European MSP Platform, 2021b.

Example: Namibia



Sources: Finke et al., 2020; Harris et al., 2019; Holness et al., 2014; Kirkman et al., 2019

The design and zoning aspects include:

- **Size and shape:** MPAs should be as large as possible because of the open nature of marine ecosystems. However, small MPAs are often more acceptable to local communities and therefore easier to implement
- **Location, position of boundaries:** avoid ambiguous language like 'approximate low water', and use the most detailed charts or maps available to ensure the greatest level of accuracy
- **Zoning:** design and zonation of an MPA must be discussed with stakeholders as their agreement and support will improve compliance
- **Ecological representation,** and links or connectivity with other MPAs

Establishment of the MPAs

The delivery stages of MPA establishment include:

- **PROPOSED/COMMITTED:** The intent to create an MPA is made public, for example through a submission to the Convention on Biological Diversity or other instrument, conference announcement, official press release, or other official declaration.
- **DESIGNATED:** An MPA is established or recognized through legal means or other authoritative rulemaking. The MPA now exists ‘on paper’ and in law or another formal process.
- **IMPLEMENTED:** An MPA transitions to being operational and ‘in the water’ with plans for management. The MPA has a defined boundary, objectives, and management strategy for regulating activities, ideally including plans for protecting key habitats and species.
- **ACTIVELY MANAGED:** The MPA management is ongoing, including monitoring, periodic review, and changes made as needed to achieve biodiversity



Financing for MPAs and restoration

There are several sustainable ocean financing mechanisms, many of which are suitable for MPAs and restoration, including:

- **Government budget**
- **User fees and direct revenue sources:** these are daily tickets for tourists, seasonal passes for residents, and specific fees for activities such as diving, filming and photography, mooring of boats, and overnight stays
- **Environmental trust funds:** a sum of money that (1) can only be used for specified purposes; (2) must be kept separate from other funding sources (e.g. a government's budget) and (3) is managed by an independent Board.
- **Donor funding:** bilateral donors, NGOs, charitable foundations, private sector

Implementation and management

The implementation and management phase of establishing an MPA and restoration requires the following key activities:

- A team to carry out **operational activities, monitor, report, supervise** management measures
- Ongoing **monitoring, evaluation, and knowledge sharing** of ecological changes (threatened species and habitats), socio-economic trends and management structures
- **Adaptive management**
- **Support for livelihoods**, e.g., development programs, capacity building, hiring
- Effective management of broader **seascape and external pressures**
- Ongoing efforts to **build trust, strong local leadership, and ongoing partnerships** with local users
- Collaborating with **local organizations and communities** in monitoring, enforcement, and management activities
- Ongoing consideration of **cultural values, traditions**, and activities in site management

Blue Carbon Project: Best practices

The Ocean Panel defines blue carbon projects as initiatives aiming to **restore, conserve and/or sustainably manage** blue carbon ecosystems (here: **mangroves, seagrass meadows and tidal marshes**) because of their capacity to capture and store carbon dioxide from the atmosphere, contributing to climate change mitigation.



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4. Climate-smart MSP

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What is the impact of climate change?

THE IMPACT OF CLIMATE CHANGE ON THE OCEAN AND CRYOSPHERE

+ 1.5°C scenario	Key projections for 2100	+ 2°C scenario
+ 70-90%	Coral reefs are projected to decline by	+ 90%
- ~1.8%	Oxygen loss is projected to decrease by	- ~3.45%
+ ~0.43 cm	Sea level rise is expected to increase	+ ~0.84cm
~ 0.039 pH units	Ocean acidification is expected to decrease by	~ 0.288 pH units

Island states threatened by rising sea level



Kiribati
Tuvalu
Maldives

In the tropical western Pacific, rates up to four times the global average have been reported between 1993 and 2009.

Megacities threatened by rising sea level

New York City
Tokyo
Jakarta
Mumbai

Shanghai
Lagos
Cairo

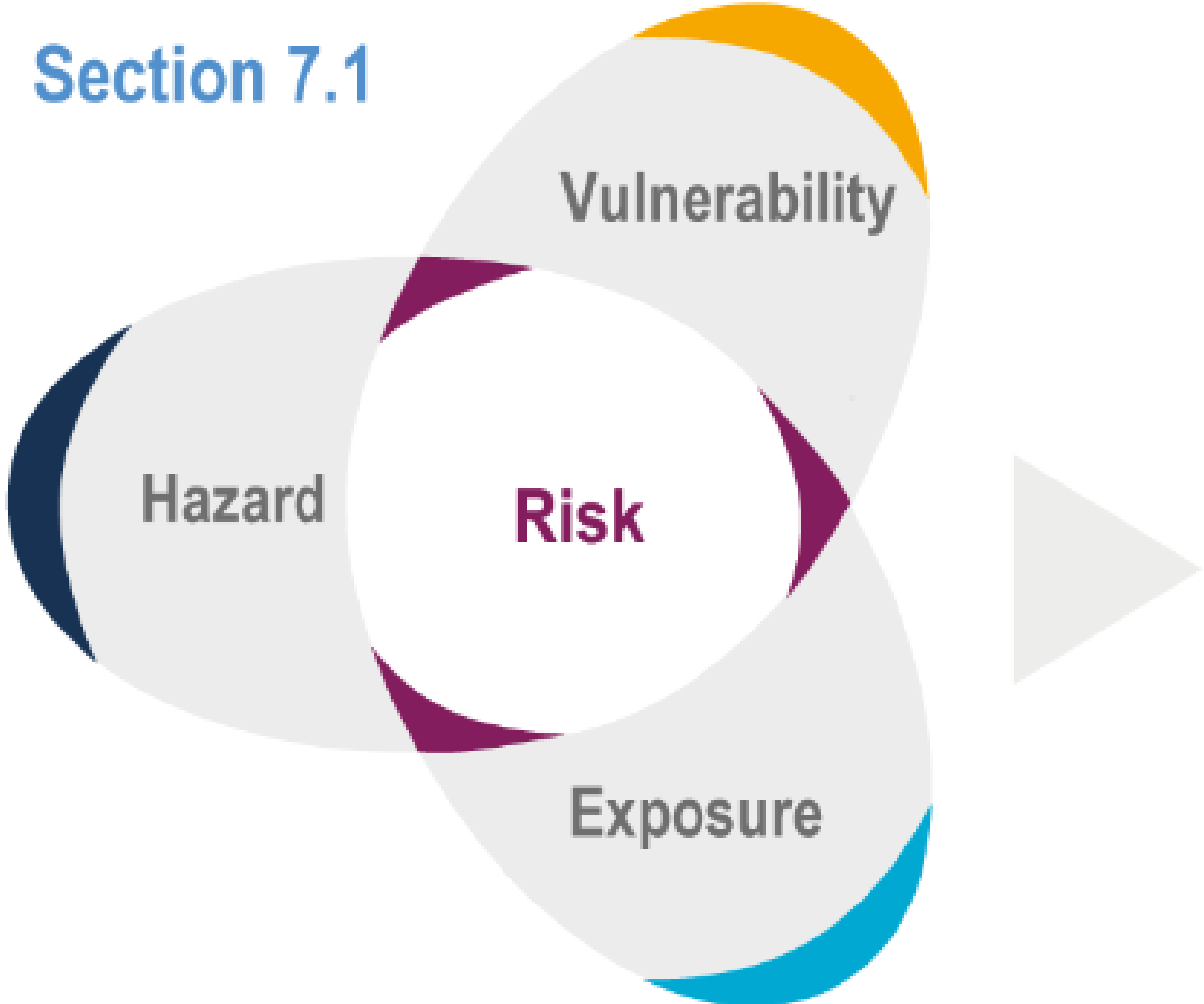


IPCC special report statements

- The ocean and the cryosphere play a critical role for life on Earth. A total of 670 million people in high mountain regions and **680 million people in low-lying coastal zones** depend directly on these systems.
- It is virtually certain that the **global ocean has warmed** unabated since 1970 and has taken up more than 90% of the excess heat in the climate system (high confidence). Ocean warming dominates the global energy change inventory. Since 1993, the rate of **ocean warming has more than doubled**.
- The ocean **has taken up between 20–30%** of total anthropogenic CO₂ emissions since the 1980s causing further ocean acidification.

Components of climate impacts

Section 7.1





Why climate change consideration?

Climate change is important to be considered in MSP due to:

- increased emissions making the **ocean warmer and more acidic**.
- Impact on **biodiversity, shifts in geographical and seasonal distribution** of some mobile marine species are expected, while immobile ones will be under greater pressure.
- Changes in **oceanic circulation and chemistry** also affect the delivery of marine ecosystem services, while sea level rise and more frequent extreme weather conditions are making coastal communities, infrastructure and maritime activities more vulnerable

Mitigation vs Adaptation

According to the UN Framework Convention on Climate Change (UNFCCC):

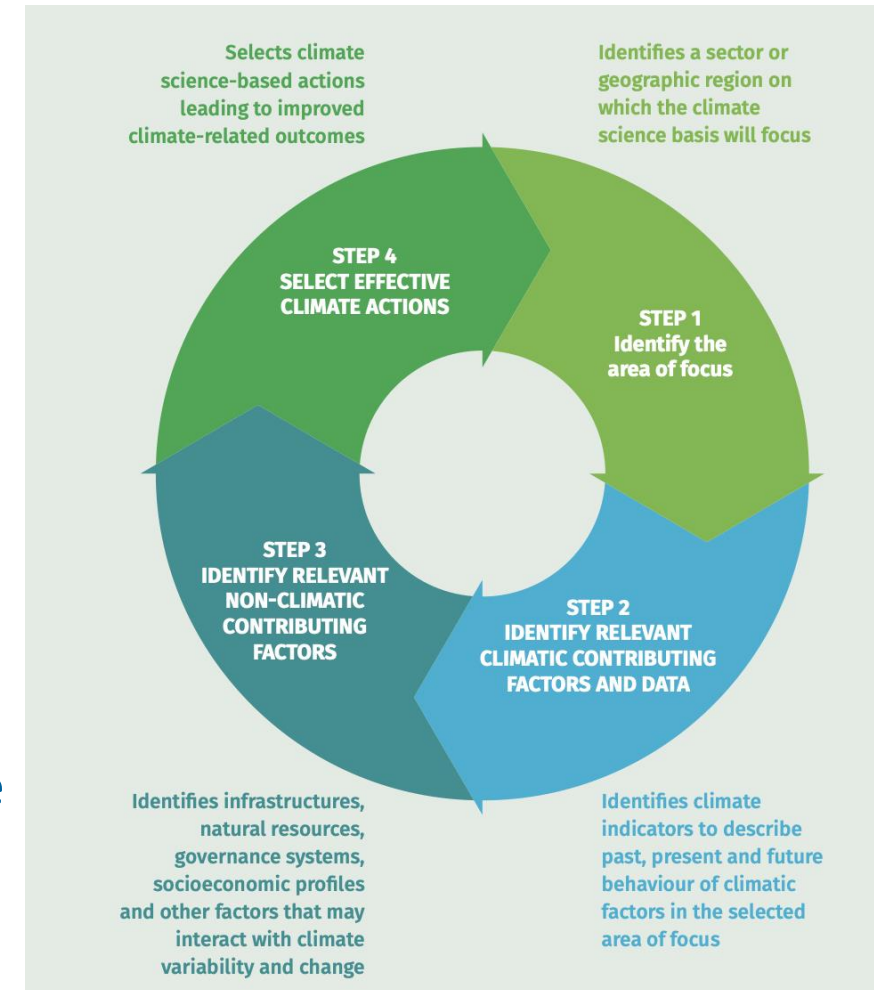
- **Mitigation** is related to efforts to reduce greenhouse gas emissions and increase carbon sequestration;
- **Adaptation** refers to adjustments in ecological, social or economic systems in response to actual or expected climate change impacts.

The IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (2019) clearly states that ‘intensifying cooperation and coordination among governing authorities across scales, jurisdictions, sectors, policy domains and planning horizons can enable effective responses to [climate change induced] changes in the ocean’.

Role of MSP

MSP can play a crucial role in achieving the Sustainable Development Goals 13 (“Climate Action”) and 14 (“Life Below Water”) of the 2030 Agenda for Sustainable Development by :

- analysis of cumulative impacts and incorporation of **climate change modelling** in the development of scenarios about the future use
- Data should be made available at **appropriate spatial scales** and that uncertainties in the planning scenarios be recognised and properly addressed
- effectively allocating the marine space to accommodate **appropriate mitigation and adaptation measures.**





Challenges and opportunities for climate-smart MSP

Challenges and opportunities for climate smart MSP

Challenges

- **Variable impacts on sectors, in different geographies and at different scales:** The effects of a changing climate are not expected to affect all places uniformly, and so differences in socio-ecological vulnerabilities should be spatialised and considered in planning scenarios
- **Limited knowledge of processes and impacts:** There is still limited knowledge on the complexity of the processes underlying the impacts of climate change
- **Variable national responses:** There is a tremendous difference in technical, institutional and financial capacities for climate change adaptation between developed and developing countries

Enablers and opportunities

- **Climate-smart MSP:** Planning initiatives that use data and knowledge about climate change impacts on marine ecosystems and human uses at appropriate spatial scales to develop resilience scenarios
- **Marine Protected Areas and nature-based solutions:** These can be used to promote adaptation benefits such as towards the conservation of ecosystems that provide services such as coastal protection, climate adaptive areas, climate refugia and carbon sequestration
- **Stakeholder engagement:** Stakeholders may provide valuable knowledge about how a system functions overall and how it has changed over time
- **Ocean and climate literacy:** Raise awareness on climate change issues and potential nature-based solutions

Source: UNESCO-IOC, 2021d.

Pathways for the inclusion of climate change in MSP

Approaches	Actions
Integrating climate change impacts in MSP policies	Recognising climate change as a threat or challenge
	Including specific objectives related to climate change responses
	Developing climate-related modelling and mapping tools in assessments about future conditions of ecosystems and biodiversity, as well as maritime activities
	Developing climate-related vulnerability and risk analyses
	Including climate change in spatial-use scenarios and visioning processes
Promoting adaptation to climate-related change	Adopting dynamic ocean management, i.e. defining flexible designated areas with boundaries that change in space and time in response to climate-related change
	Developing anticipatory zoning, e.g. defining a priori designated or exclusion areas in anticipation of potential climate change impacts
	Adopting an adaptive planning approach that includes revision opportunities to incorporate new climate-related knowledge



Delivering Climate-Smart MSP

Climate-smart Planning process



Raising awareness of stakeholders on the effects of a changing climate on marine ecosystems and maritime activities may contribute to:

- Developing a **better-informed participatory planning process**
- Fostering **new behaviours and social norms** in local communities can improve knowledge and skills on opportunities for sustainable mitigation and adaptation options
- Sharing of **good practice approaches**
- contribute to more **active involvement in co-management actions**

Integrating strategic climate objectives into overall sustainable development and environmental policies include:

- Using **climate-smart, nature-inclusive MSP** as a common framework for setting up meaningful and effective actions across regions
- Establishment of **interdisciplinary MSP networks** to develop climate-smart, nature inclusive design frameworks for ocean planning.
- Practical **adaptation and mitigation strategies at appropriate scales**, using fit-for-purpose, spatially explicit and operationally mature nature-based solutions.
- **Strategic investments** are necessary to achieve long-term visions reflected in climate-smart, nature-inclusive spatial plans



The integrative ocean governance process of MSP may effectively support the **‘think globally, act locally’** slogan, which is an integral part of climate action, and may function as a switchboard for mitigation, adaptation and sustainable development objectives.



Increasing the knowledge base on the impacts of a changing climate is necessary. This includes:

- building solid evidence on the uses **most vulnerable to the effects of climate change** and which are valuable for a specific region's socio-economy, and integrating their possible spatial relocation in the development of MSP scenarios.
- Knowledge on **priority species and keystone ecosystem components** expected to be significantly affected by a changing climate and including them in impact analysis assessments to promote their sustainability and resilience.
- **environmental impacts** must be coupled with an **understanding of the social and economic implications of climate change**, particularly in communities highly dependent on marine resources for their livelihoods

Efforts to reduce the impacts of climate change are reported every five years as nationally determined contributions (NDCs) to the Paris Agreement. Examples of MSP objectives related to climate change responses may include:

- Promotion of **offshore renewable energy**
- Promotion of **blue infrastructure and nature-based solutions** for carbon sequestration or coastal vulnerability reduction
- Conservation of potential **areas for climate refugia**

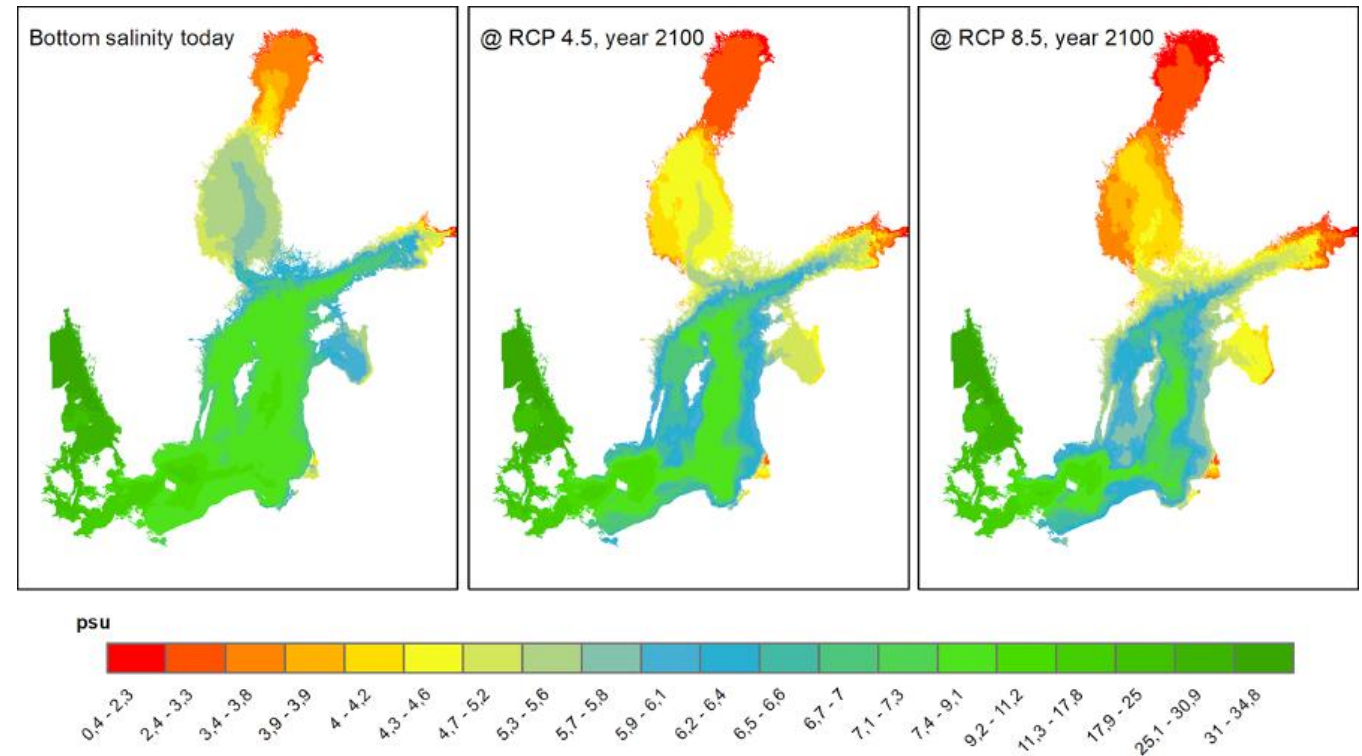
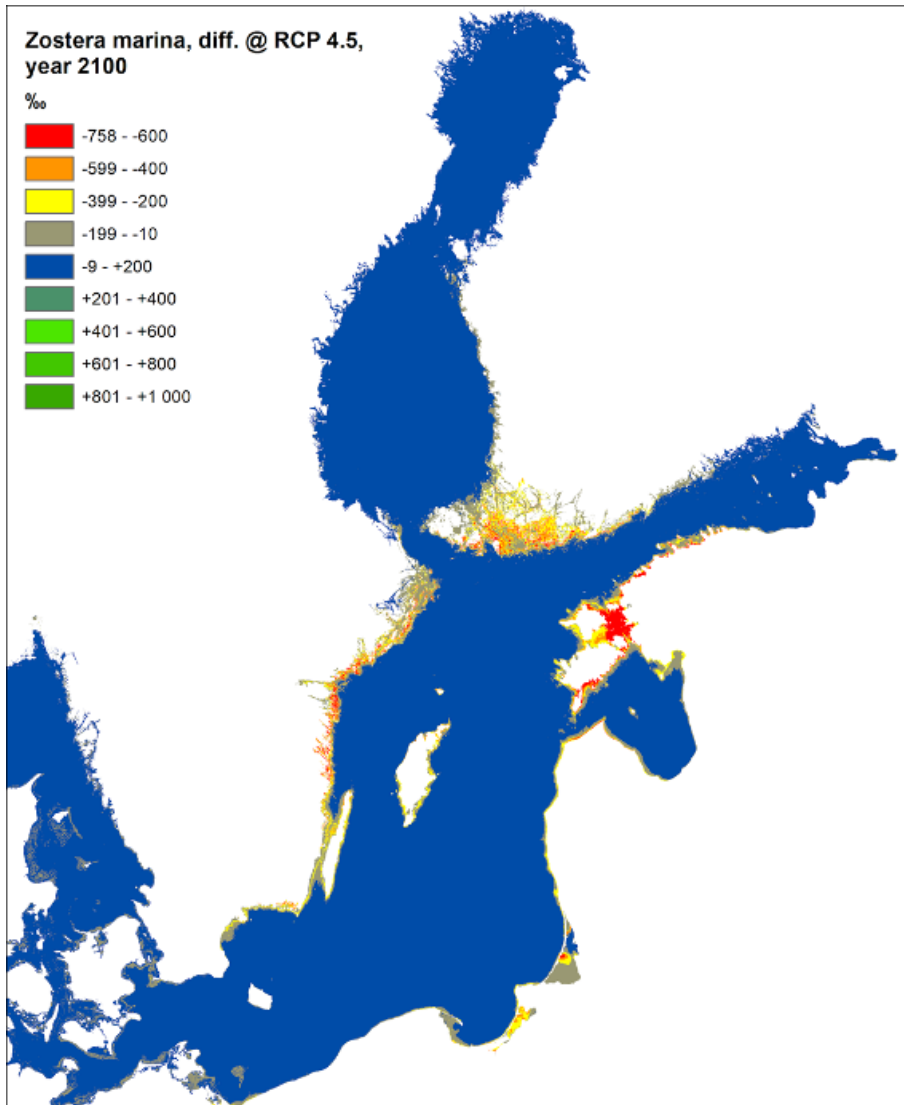
Integrating Offshore Renewable Energy into Climate-smart MSP



1. Recognize the importance of and ensure **implementation** of a Climate-Smart MSP
2. Unlock **public and multilateral financing** to support countries in advancing a climate- smart MSP process
3. Improve **knowledge and data-sharing** on national and international levels
4. Strengthen **socio-economic considerations** of planning decisions
5. Strengthen **cross- border and transnational collaboration mechanisms** on MSP and ORE
6. Ensure a stakeholder process that uses a climate-smart approach to **minimise conflicts and maximise synergies** between ocean users
7. Strengthen the links between ORE and **biodiversity protection / restoration** to maximize climate mitigation effects
8. Explore **synergistic multi-use combinations** that can speed up the transition to low-carbon and climate-resilient economies



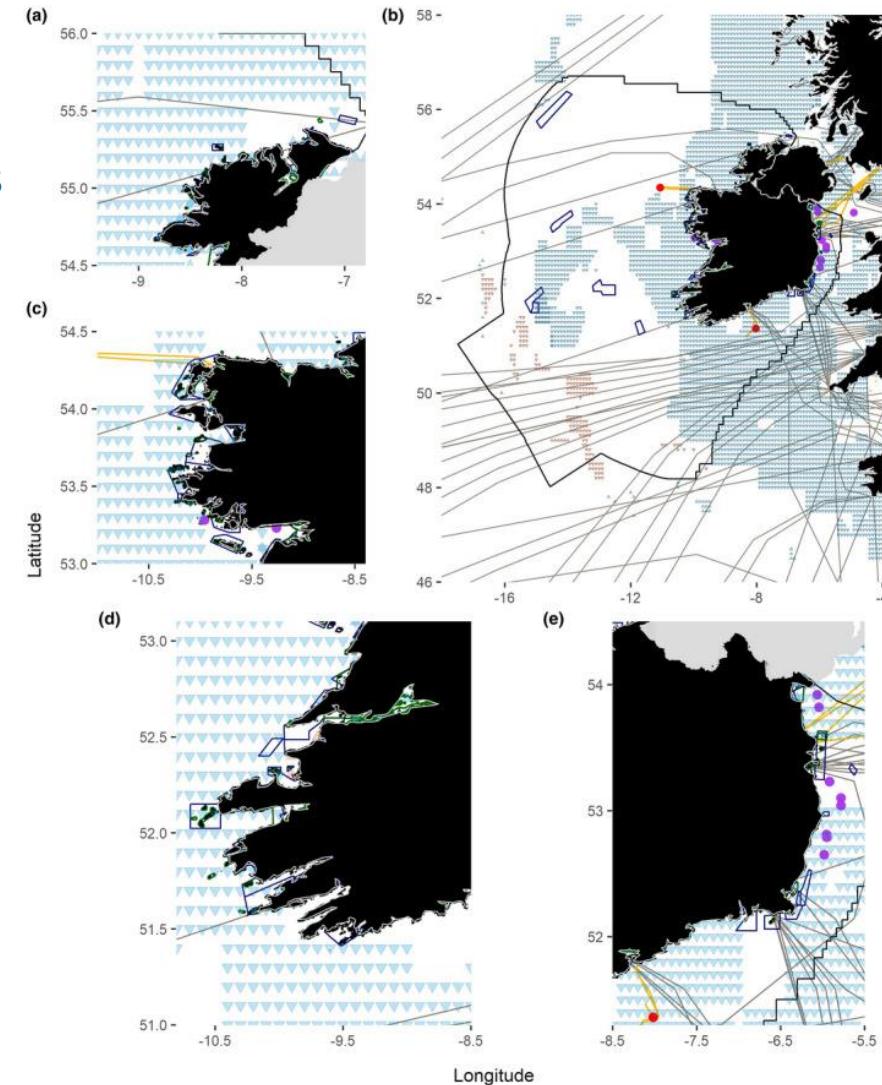
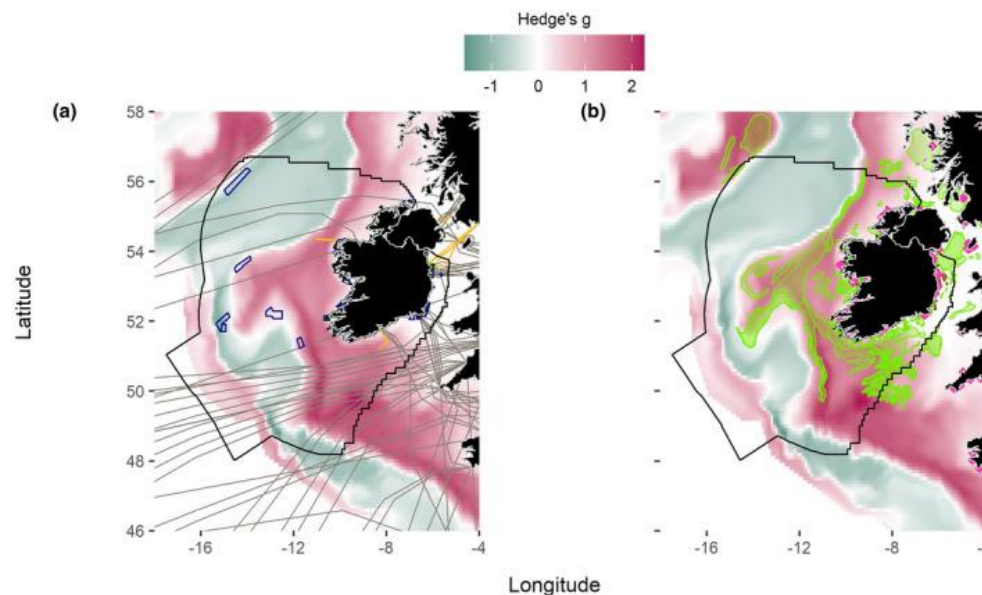
Example: Sweden



Example: Ireland

The Irish MSP process assessed where sector-relevant ecosystem change is attributable to CC to inform MSP by identifying:

- CC refugia (areas where the ecosystem remains within the boundaries of its present state)
- CC hotspots (where climate drives the ecosystem towards a new state, inconsistent with each sectors' present use distribution)
- bright spots (areas where oceanographic processes drive range expansion opportunities that may support sustainable growth in the medium term)

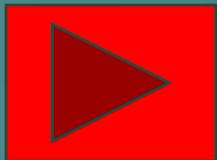


Key Messages

A climate-smart MSP should:

- apply the **ecosystem-based approach**
- centred on the recognition that value creation based on the sustainable use of marine resources is dependent on a **healthy ocean** and on species and habitat diversity
- promote **offshore renewable energy**
- promote **blue infrastructure and nature-based solutions**
- Identify **climate change hotspots areas** and define mitigation and adaptation options
- Allocate **marine space** to accommodate appropriate mitigation and adaptation measures

What is blue carbon? The ocean and climate change



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