marine spatial planning global

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7. Climate-smart MSP

Joel Ngueuko Kamdoum, IOC-UNESCO

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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 CO_2 emissions since the 1980s causing further ocean acidification.

Source: IOC-UNESCO, 2019

Components of climate impacts

Source: IPCC, 2022

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

Source: IPCC, 2019

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**.

Source: WMO/United in Science, 2023;UNESCO-IOC/European Commission, 2021

Challenges and opportunities for climate-smart MSP

Challenges and opportunities for climate smart MSP

Challenges	Enablers and opportunities
• **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	• **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, 2021*d*.

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

Sources: Adapted from Frazão Santos et al., 2020; Cashion et al., 2020.

Delivering Climate-Smart MSP

Climate-smart Planning process

Source: Sawyer et.al, 2017; UNESCO-IOC 2021

Climate literacy

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**

Policy

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.

Knowledge and science

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

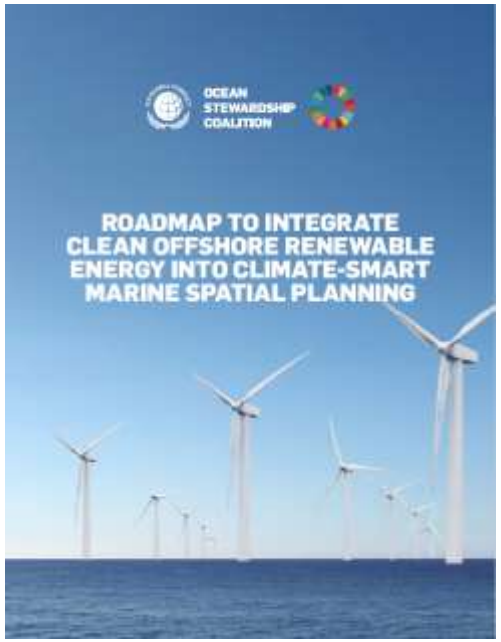
MSP objectives

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**

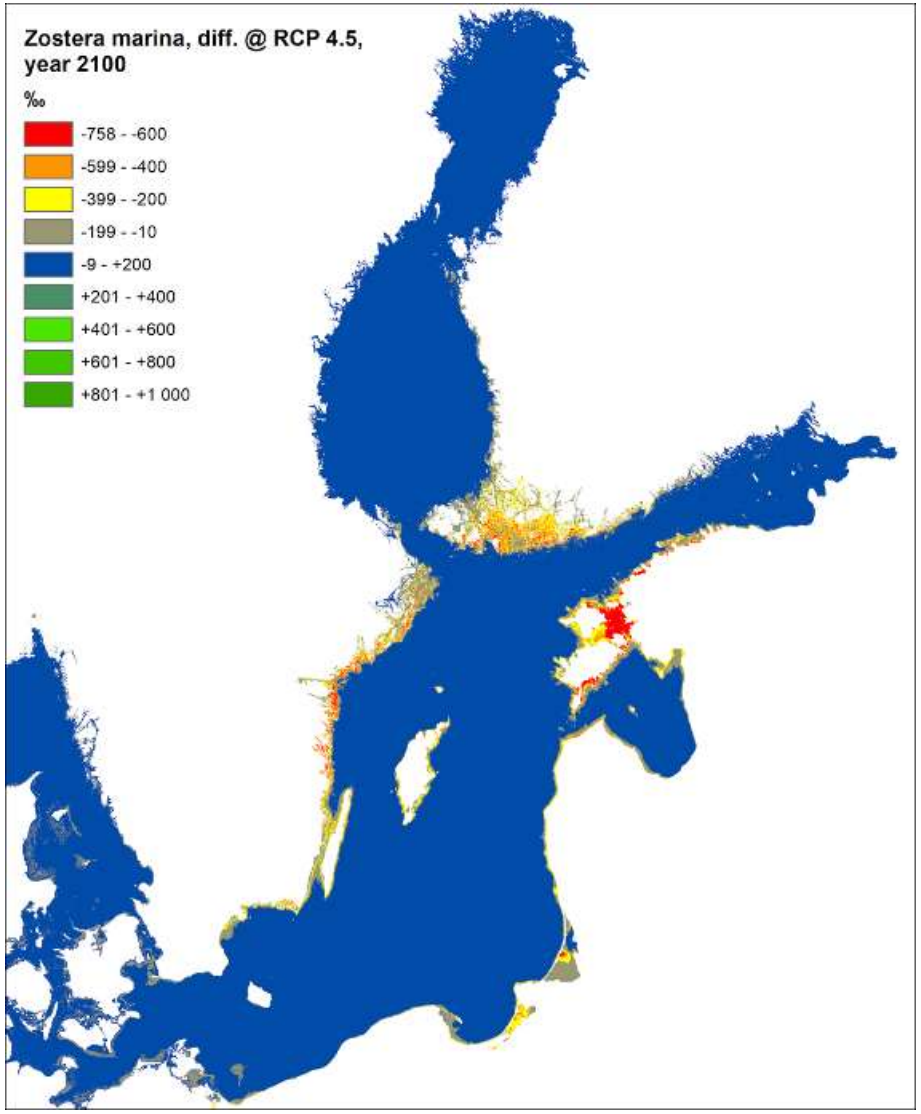
Integrating Offshore Renewable Energy into Climate-smart MSP

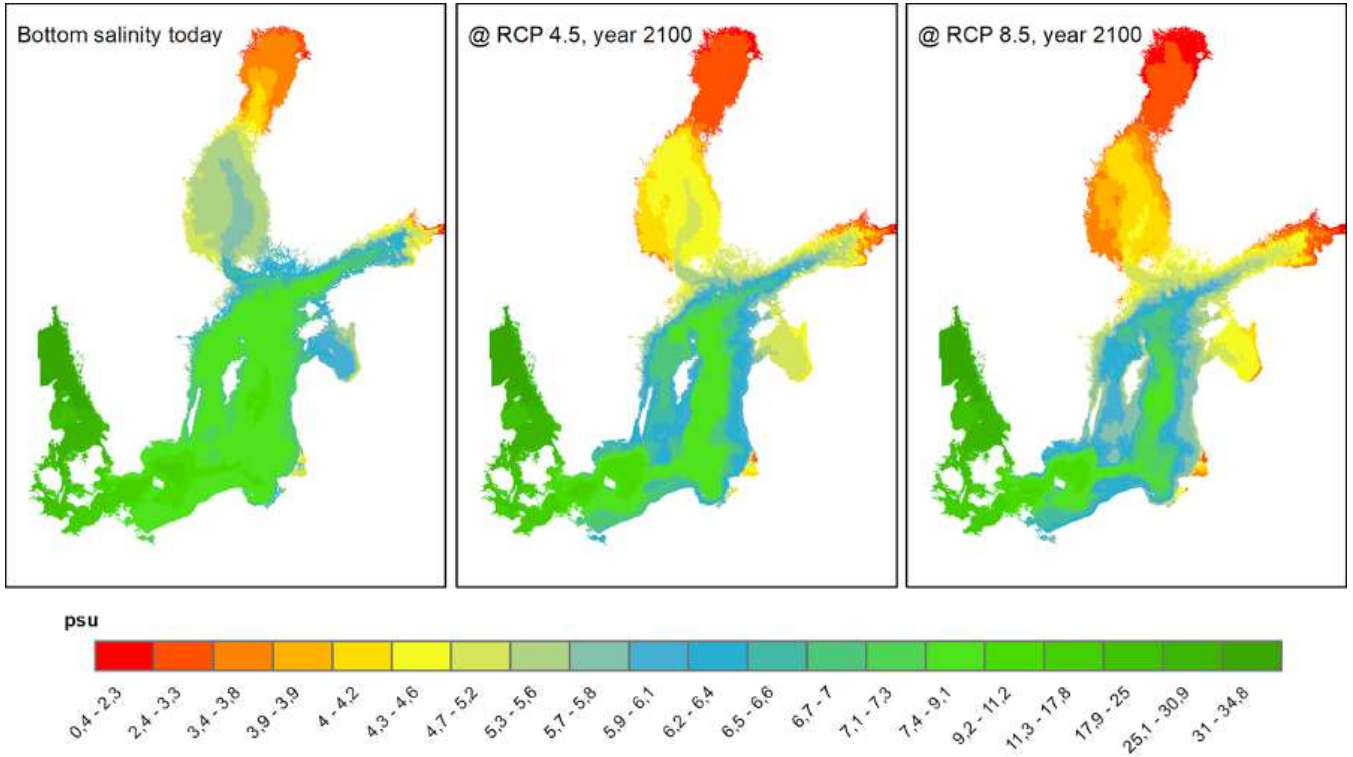
1. Recognize the importance of and ensure **implementation** of a Climate-Smart MSP
2. Unlock **public and multilateral financing** to support countries in advancing a climate- smart MSP process
3. Improve **knowledge and data-sharing** on national and international levels
4. Strengthen **socio-economic 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



Source: UN Global Compact, 2021

Example: Sweden



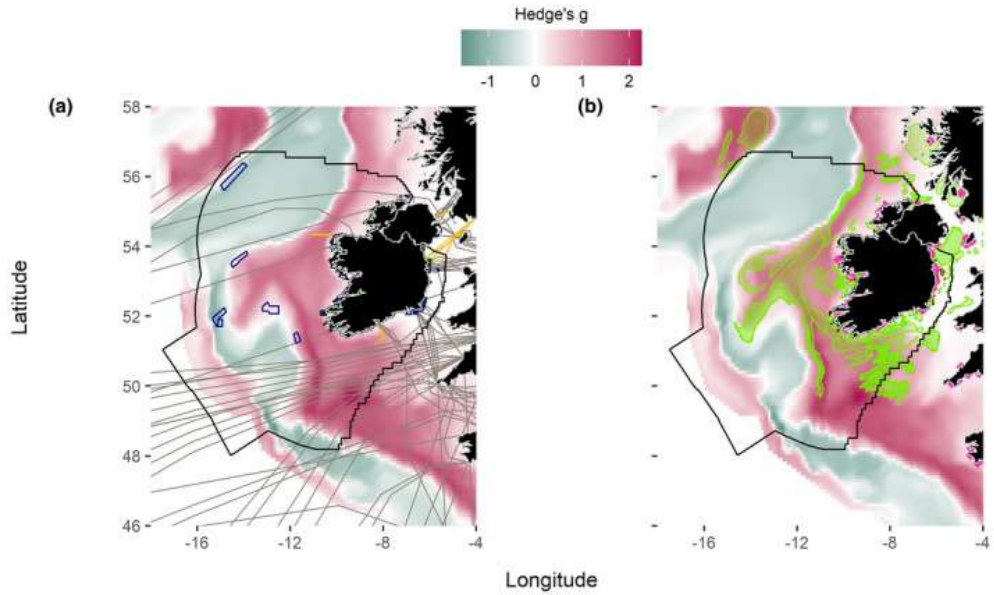


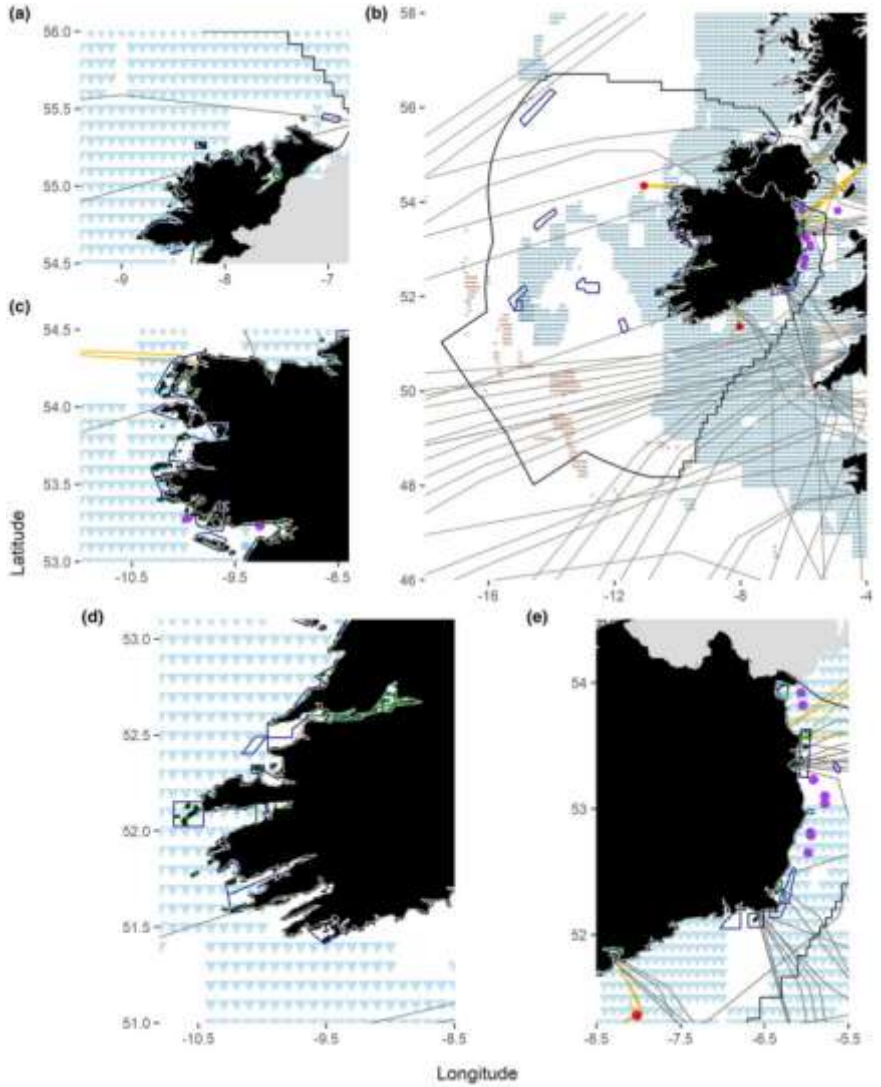
Sources: Törnqvist et al., 2019; Wählström et al., 2020

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)





Sources: Queirós et al., 2021

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

Thank You!

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