

# Climate change and MSP

NESB Project Kick-off Meeting

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25 February 2025



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# Climate change



**ipcc**  
INTERGOVERNMENTAL PANEL ON *climate change*

## CLIMATE CHANGE 2023 Synthesis Report

A Report of the Intergovernmental Panel on Climate Change



# Ocean warming



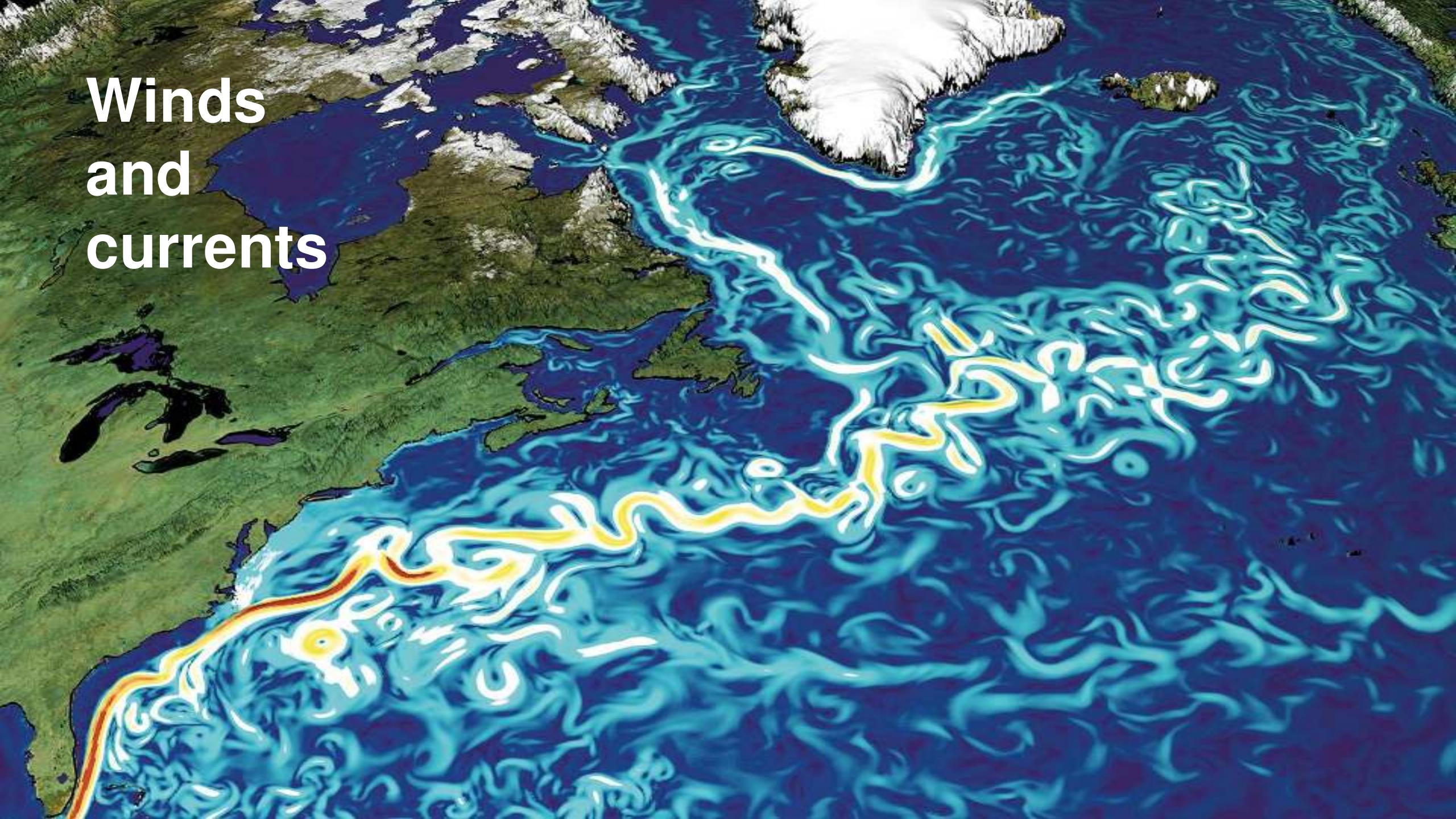
# Acidification



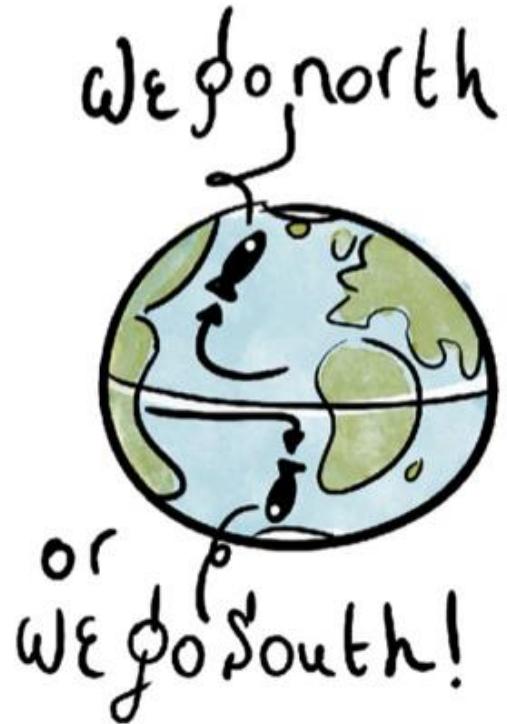
# Extreme events



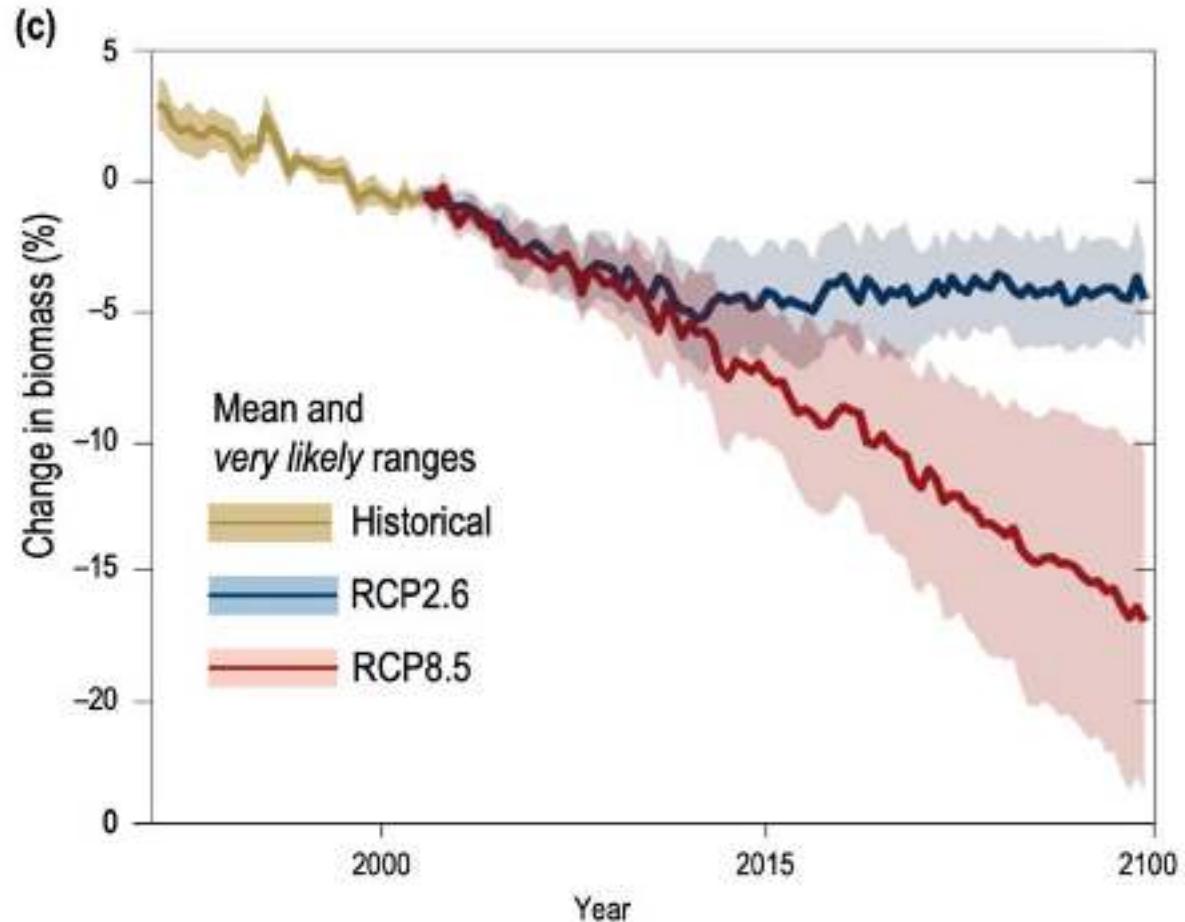
# Winds and currents



# Climate driven species redistribution



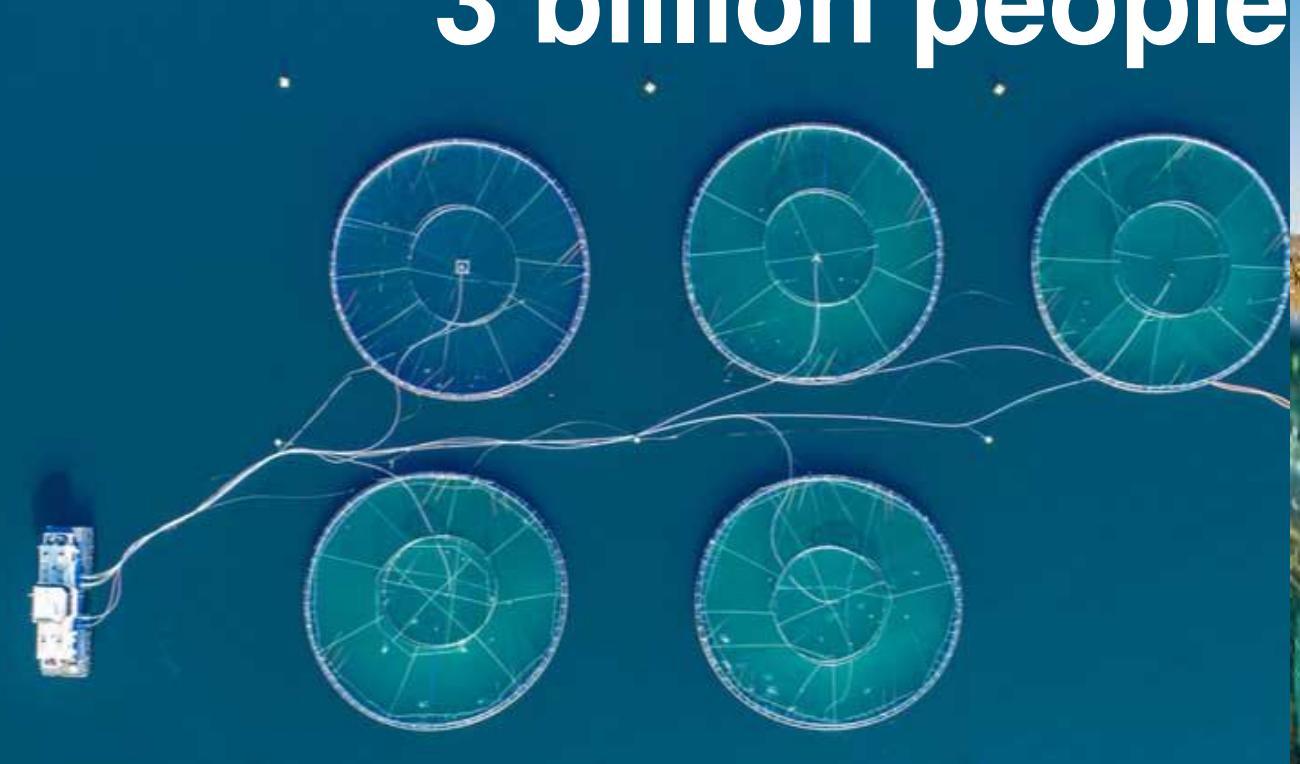
ECCWO (2018)



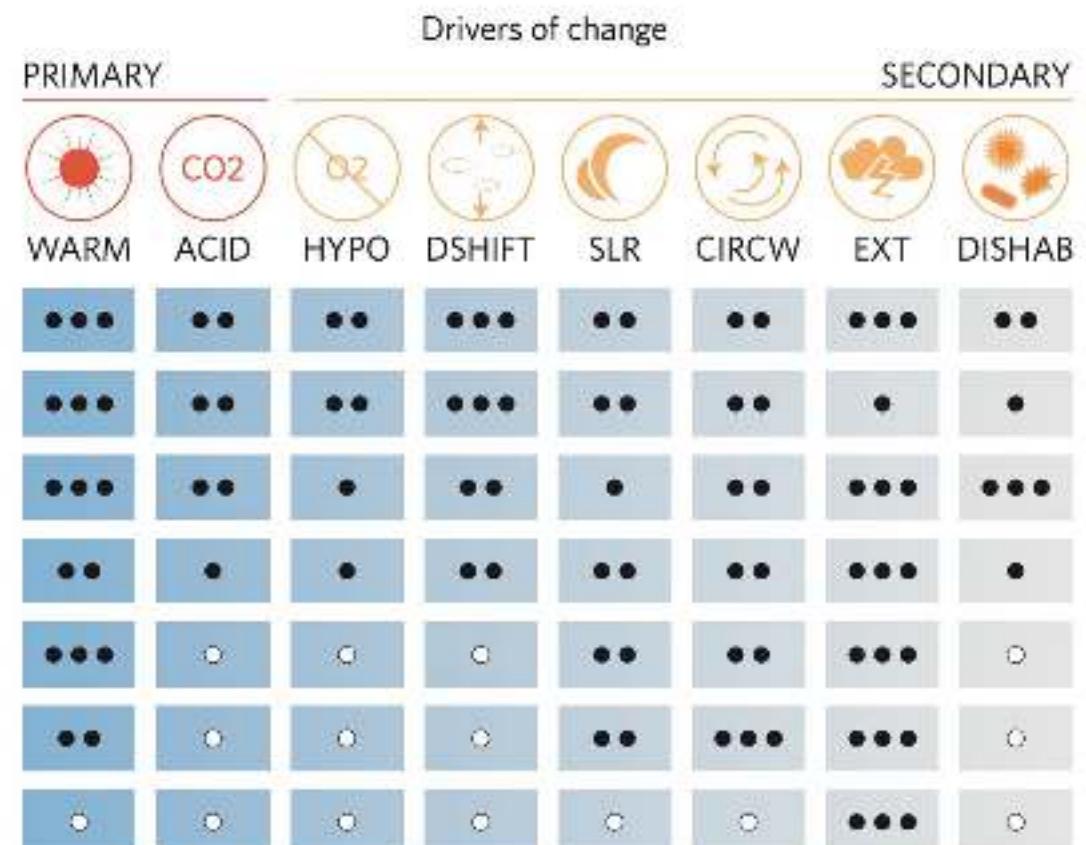
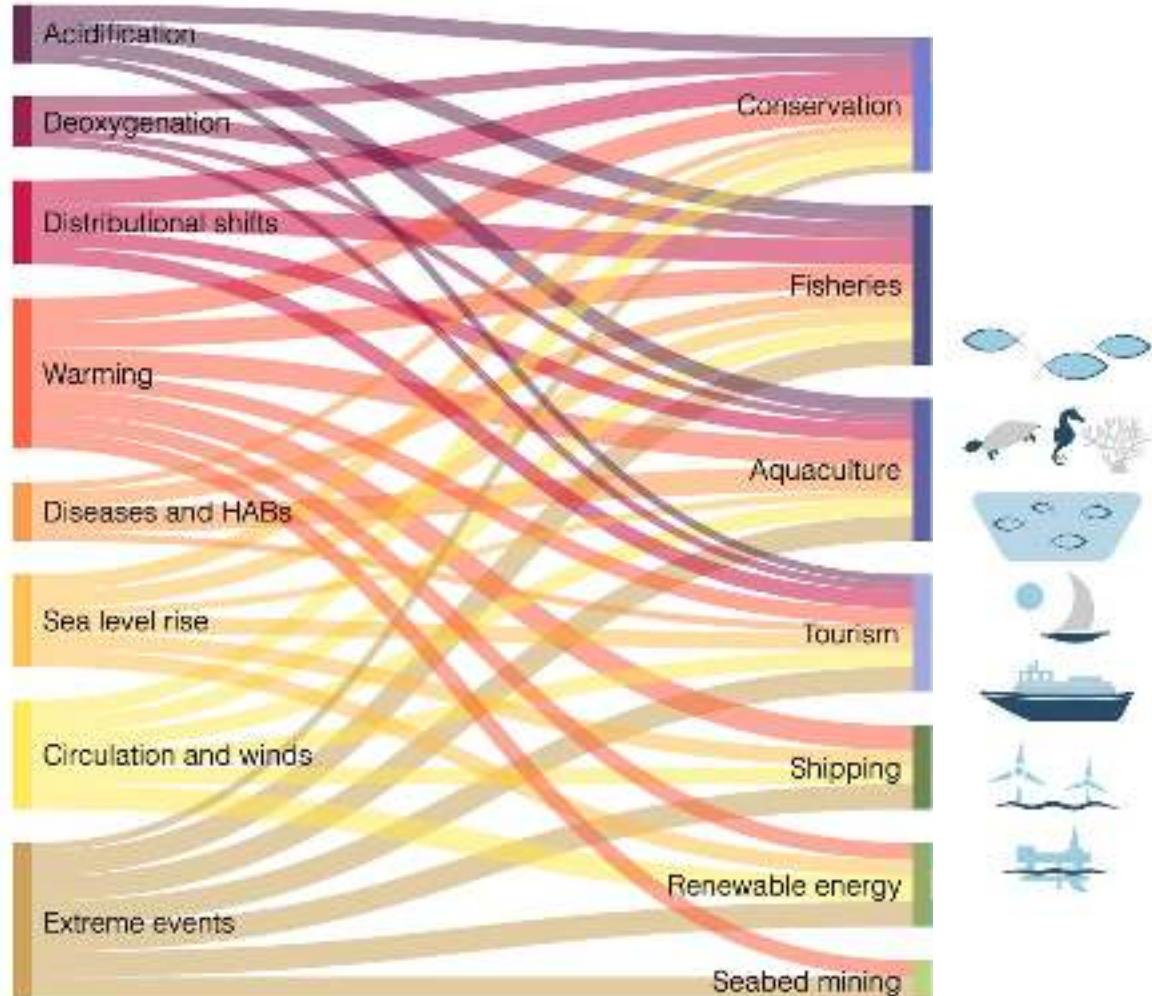
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3 billion people



# Different uses, different impacts



Direct impact degree: high (•••), medium (••), low (•), none (○)

[www.nature.com/articles/ngeo2821](http://www.nature.com/articles/ngeo2821)



# Climate-smart planning



# Climate-smart MSP

**“integrates climate-related knowledge, is flexible and adapts to changing conditions, and supports climate adaptation and mitigation actions”**

Frazão Santos et al. 2024



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# Moving towards Climate-smart MSP

**PROBLUE** 

**INTEGRATED SEASCAPE MANAGEMENT** Knowledge Partnership Series | 47

## Climate-Informed Marine Spatial Planning

**Supporting Mitigation and Resilience**

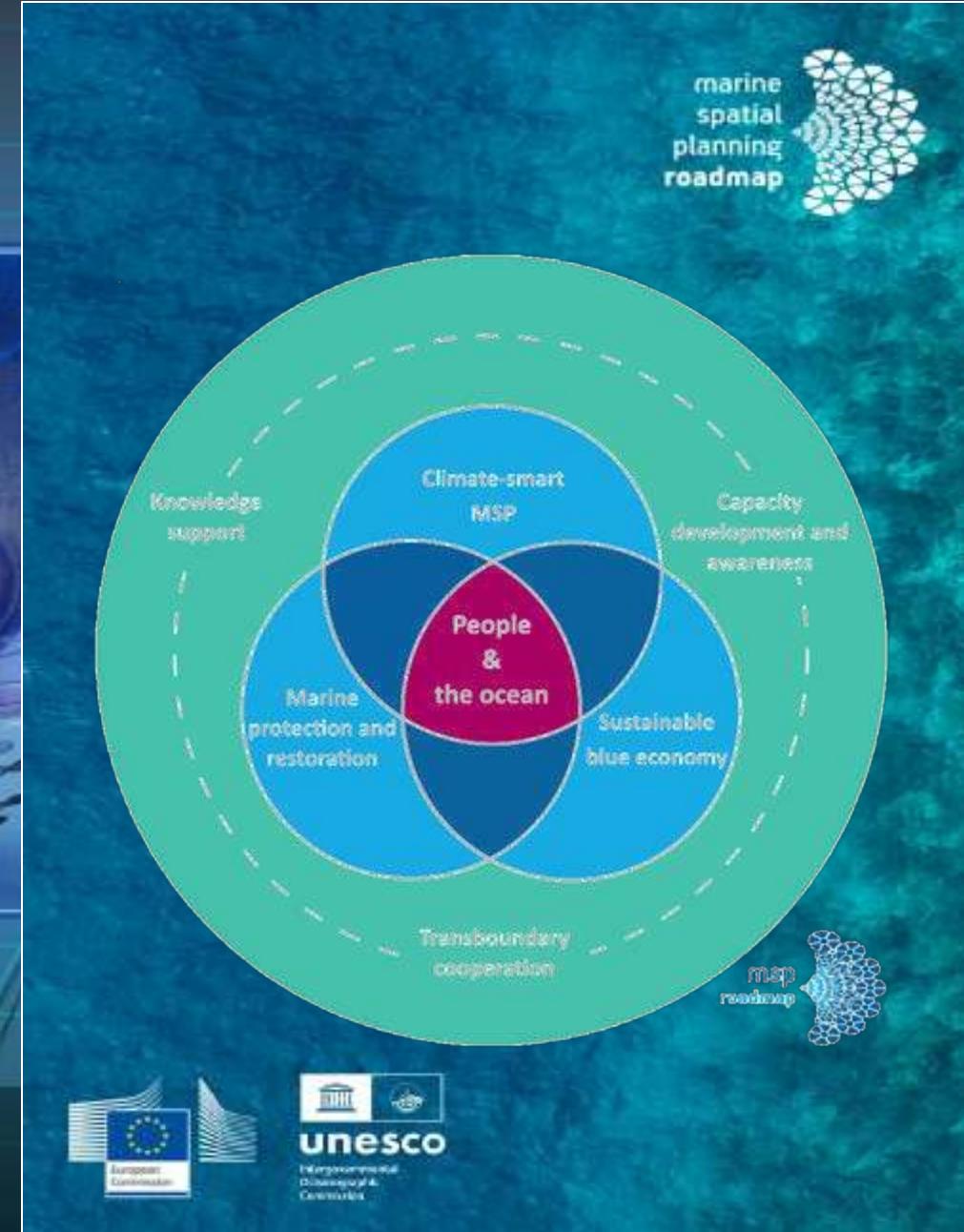


**WHAT IS CLIMATE-INFORMED MSP?**

Climate-informed marine spatial planning (MSP) is a participatory process that considers current and future climate risks and opportunities during design, planning, and implementation. While climate-informed MSP is key to building the Blue Economy, this process is particularly important for increasing climate and environmental resilience and enables the World Bank Group to Implement for Climate Change Action (I4C) (2019). Climate-awareness in MSP facilitates the necessary operationalization of the decarbonization pathway, while responding to the growing challenges of climate change through adaptation and integrated ocean management.

**WHAT IS THE VISION OF CLIMATE-INFORMED MSP?**

Climate-informed MSP is a process that integrates climate information and climate resilience into the design, planning, and implementation of MSP. It is a participatory process that considers current and future climate risks and opportunities during design, planning, and implementation. It is a process that is informed by climate science and climate resilience, and that is designed to be adaptive and responsive to climate change. It is a process that is informed by climate science and climate resilience, and that is designed to be adaptive and responsive to climate change.



# Climate-smart MSP

Setting the agenda in research

## Comment

**nature**



This is no sustainable fisheries project without a longer-term, multi-jurisdictional vision owing to climate change.

### To save the high seas, plan for climate change

Lucia Härkönen, Anna Ilyina, Jason Edels, Michaela Gessner, Oliver, Thomas Finkler, Daniel Thompson, Grace Revilla, Helene Gauthier, James Herdendorf & Ryan Rasmussen

Species are already on the move as waters warm. Conservation plans need to take this into account.

**C**onservation biology is the discipline of science that studies the distribution and abundance of living organisms in their natural environment. There is a concern that climate change is causing a massive loss of global biodiversity and that conservation of biological diversity (CBD) — the Convention on Biological Diversity — is failing. In 2010, when all countries that had ratified the Convention adopted a 'Strategic Plan for Biodiversity 2011–2020', one of the priorities was to 'Address the adverse effects of climate change on biodiversity and ecosystem services'.

Policy-making for biodiversity conservation must take climate change into account. This is not only because the Convention on Biological Diversity (CBD) is the only international environmental agreement that covers all components of biodiversity, but also because climate change is a major threat to biodiversity.

Species are already on the move as waters warm. Conservation plans need to take this into account.

2010 | Nature | Vol 462 | 16 June 2009



#### POLICY FORUM

##### OPINION

### Taking climate-smart governance to the high seas

Comprehensive spatial planning in international waters is key to achieving ocean sustainability

By Catherine Padoa-Schioppa,<sup>1,2</sup> Tomáš Rignot,<sup>3</sup> Cassandra Broome,<sup>4</sup> Barbara M. Rydell,<sup>5</sup> Cyprien Pommerehne,<sup>6</sup> Luis M. Rodriguez,<sup>7</sup> James C. Sanchirico,<sup>8</sup> and Jerry D. Sander<sup>9</sup>

<sup>1</sup> Institut des Hautes Études Scientifiques, Paris, France; <sup>2</sup> Institut d'Aménagement des Ressources en Eau et des milieux aquatiques (IARE), Paris, France; <sup>3</sup> University of California, Los Angeles, CA, USA; <sup>4</sup> National Oceanic and Atmospheric Administration, Seattle, WA, USA; <sup>5</sup> University of Washington, Seattle, WA, USA; <sup>6</sup> University of California, Santa Barbara, CA, USA; <sup>7</sup> University of California, Santa Barbara, CA, USA; <sup>8</sup> University of Maryland, College Park, MD, USA; <sup>9</sup> University of California, Santa Barbara, CA, USA

Published online 11 June 2009; doi:10.1038/462063a

spatial planning policy, <sup>1,2</sup> will be presented in the high seas in the form of a new code of conduct of climate-smart governance and operation. At that time, the 2006 Maritime Parks in the Antarctic Treaty area, established under the Antarctic Treaty, will be an opportunity to demonstrate the success of this approach to ocean governance in 2009.

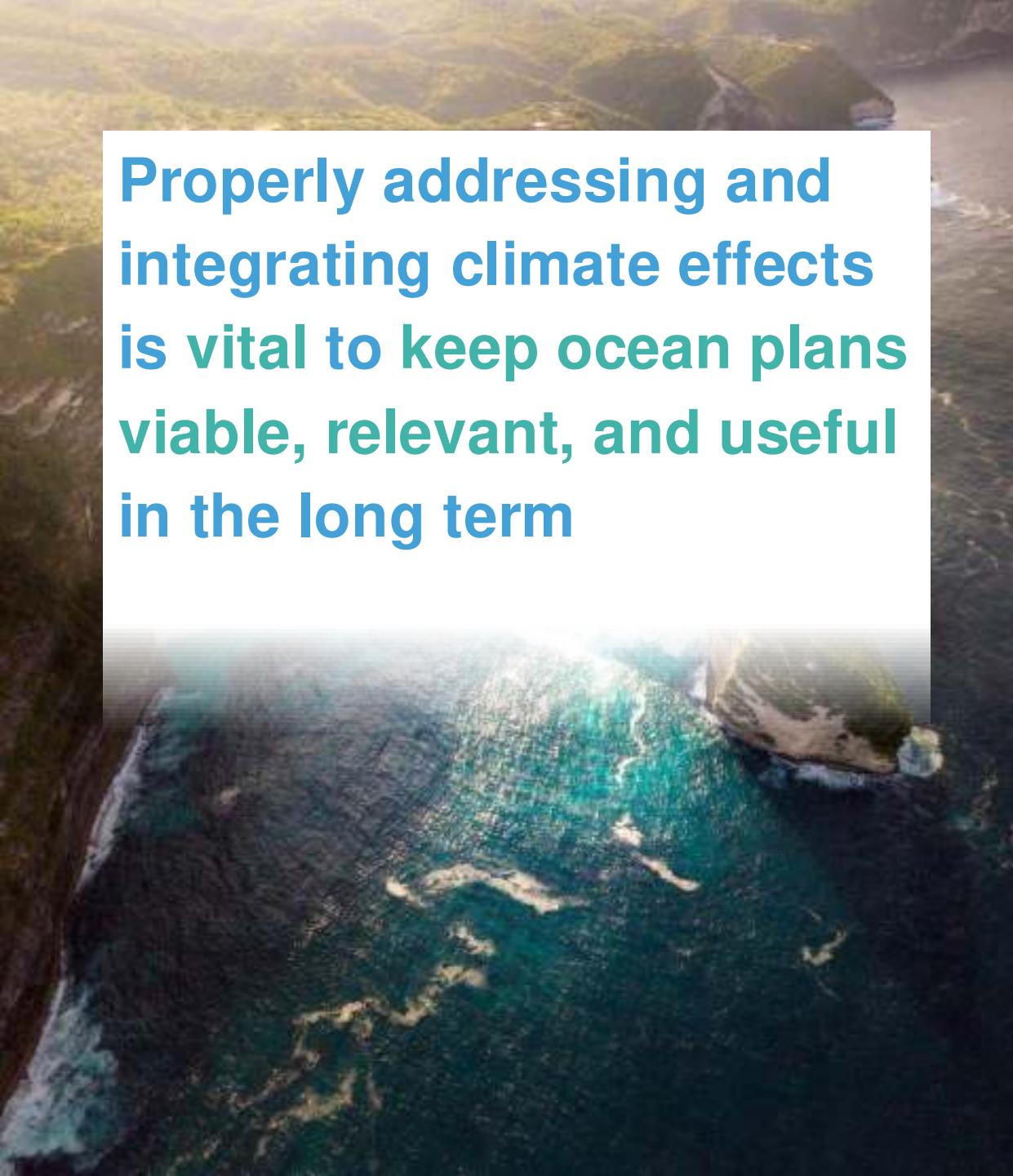
The high seas are prime habitat for 30% of the global ocean fish catch, 60% of total global marine oil and gas output and 90% of total global shipping tonnage. These areas are now under increasing demand for communications, oil and gas, and technological advances, coupled with growing human populations, increasing greenhouse-gas emissions and climate change. The high seas are also characterized by the lack of a clear governance structure, with the International Maritime Organization (IMO) addressing the interface between climate change and marine health, fisheries, marine



Published online 11 June 2009; doi:10.1038/462064a



Why do we need  
to address  
climate change  
in MSP?



Properly addressing and integrating climate effects is vital to keep ocean plans viable, relevant, and useful in the long term



When developed with explicit climate-related considerations, MSP can support climate adaptation and mitigation actions

# Integrating climate change into MSP

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## How to?



# Practical Guidance



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**Collection**

## Moving towards Climate-smart Ocean Planning

**Submission status**

Open

**Submission deadline**

30 November 2023

The need to integrate climate knowledge into marine spatial planning (MSP) has been globally acknowledged in recent years. Yet, few of the existing marine spatial plans consider climate change explicitly. This is a critical oversight in a rapidly changing world. Areas where human activities are most amenable to take place today, together with conservation areas, will be modified under a changing ocean thus challenging established ocean plans. There will be new use-use conflicts, new environmental pressures, and new legal issues. To respond to these changes and effectively support a sustainable and equitable use of the ocean, MSP initiatives will need to become "climate-smart", integrating climate-related information and foreseeing adaptation pathways, along with truly supporting biodiversity conservation and ecosystems health. — [show all](#)



1.  
Prioritizing  
ecosystem  
health

2.  
System  
interactions  
and dynamics

3.  
Social data,  
equity and  
change

# 10 Key components Climate-smart MSP

4.  
Integrate  
climate-related  
knowledge

6.  
Supporting  
flexible and  
adaptive  
planning

8.  
Supporting  
climate  
adaptation  
and mitigation  
actions

5.  
Develop  
proactive,  
future-looking  
plans

7.  
Balancing  
flexibility and  
legal certainty

9.  
MSP and  
climate-related  
policies

10.  
Building  
common  
narratives



**nature**  
**npj** | ocean  
sustainability

1.  
Prioritising  
ecosystem  
health

# Operational pathways

2.  
System  
interactions  
and dynamics

4.  
Integrating  
knowledge  
on climate  
change

6.  
Supporting  
flexible and  
adaptive  
planning

8.  
Supporting  
climate  
adaptation  
and mitigation  
actions

3.  
Social data,  
equity and  
change

5.  
Future-looking  
plans

7.  
Balancing  
flexibility and  
legal certainty

9.  
MSP and  
climate-related  
policies

10.  
Building  
common  
narratives

Climate-smart  
coastal  
management

Capacity

Bridge together:



1.  
Prioritizing  
ecosystem  
health

2.  
System  
interactions  
and dynamics

3.  
Social data,  
equity and  
change

# Foundational principles

4. Integrating  
knowledge  
on climate  
change

5. Future-looking  
plans

6. Supporting  
innovation  
and adaptive  
management

7. Balancing  
flexibility and  
legal certainty

8. Supporting  
climate  
adaptation  
and mitigation  
actions

9. MSP and  
climate-related  
policies

10. Building  
common  
narratives



## 4. Integrate climate- related knowledge

into MSP, identifying  
expected climate impacts,  
risks, and opportunities  
(environmental, social,  
economic)



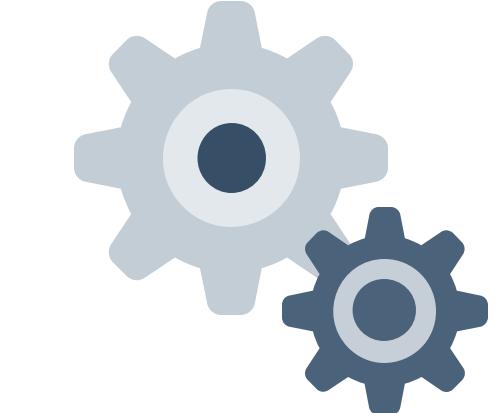
5.  
Develop  
proactive,  
future-looking  
plans

**that explore future  
scenarios and can be  
used to stress-test  
ocean plans**



## 6. Promote adaptive and dynamic planning

**to ensure MSP's ability to face uncertainty and adapt to moving biophysical features and uses**



## 7. Balancing flexibility with legal certainty

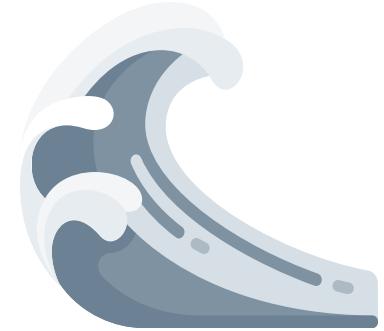
*Put knowledge together:*

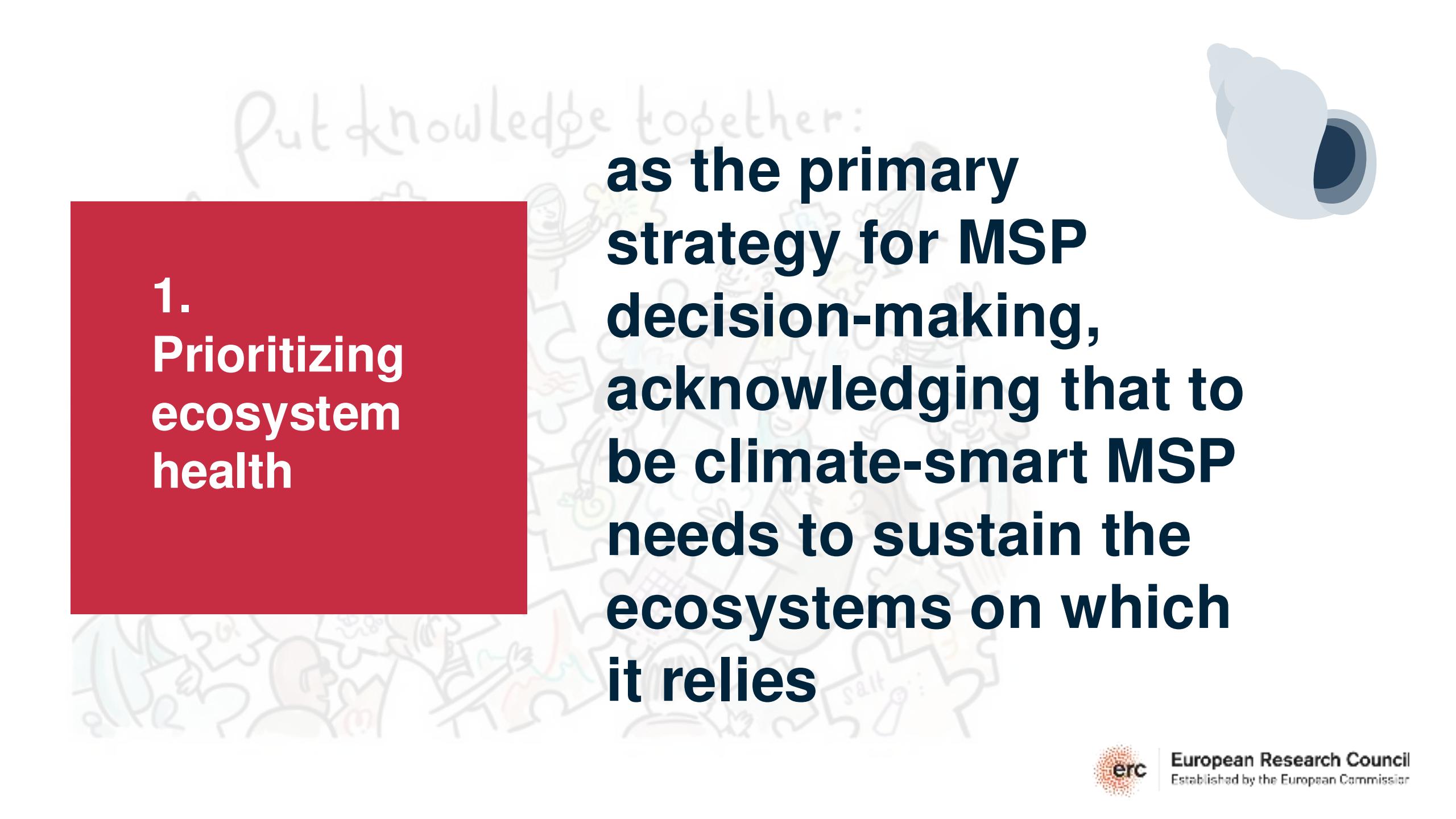
**to address the tension  
between the human  
need for predictability  
and moving biophysical  
resources**



# 8. Identify ocean-based climate solutions

and prioritize space allocation to support climate mitigation and adaptation actions





## 1. Prioritizing ecosystem health

**as the primary strategy for MSP decision-making, acknowledging that to be climate-smart MSP needs to sustain the ecosystems on which it relies**

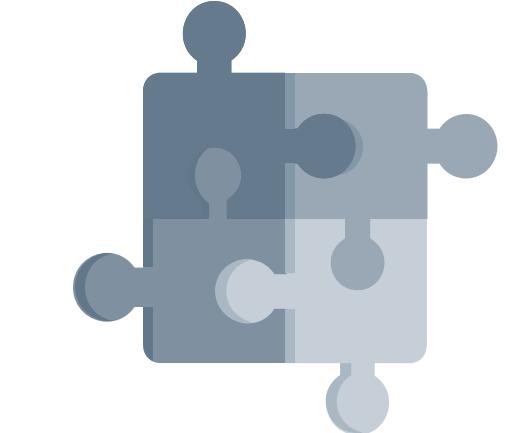
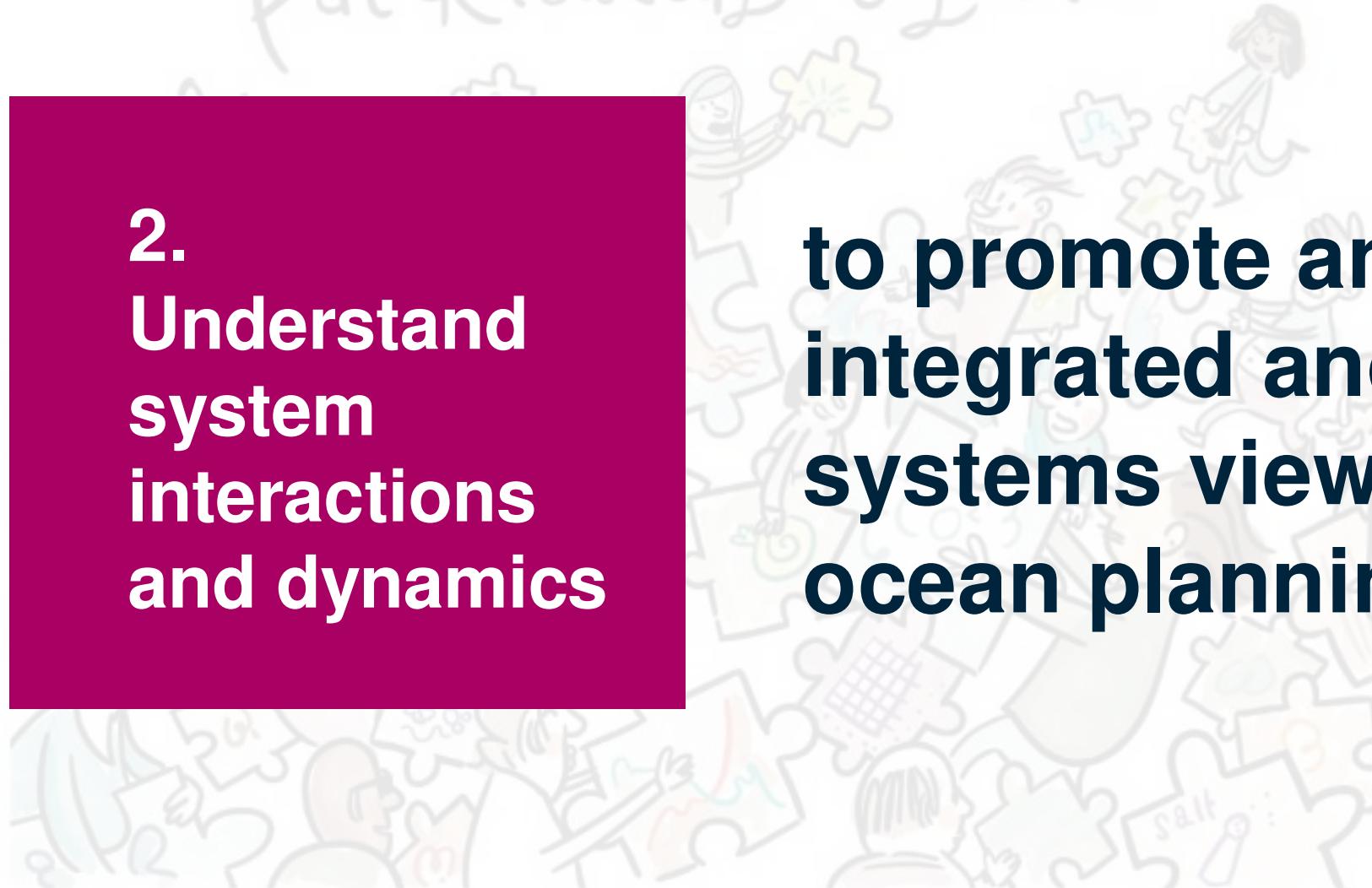


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## 2. Understand system interactions and dynamics

**to promote an  
integrated and  
systems view for  
ocean planning**

Put knowledge together:



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### 3. Social knowledge, equity and change

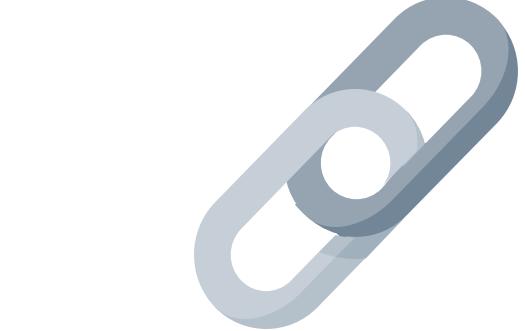
**Reinforce the  
importance of social  
knowledge, equity and  
change in co-developing  
sustainable ocean plans**





## 9. Align policies for MSP and climate

**to support the  
integration of climate  
change into MSP and  
ensure effective  
coordination among  
different policy arenas**





## 10. Build common narratives

*Put knowledge together:*

**with policymakers, the private sector, civil society, and other integrated ocean management stakeholders to change perceptions of ocean sustainability and climate change**



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Prioritize ecosystem health as the primary strategy for MSP decision-making, acknowledging that to be climate-smart MSP needs to sustain the ecosystems on which it relies  
**Foundational principle**

Reinforce the importance of social knowledge, equity and change in co-developing sustainable ocean plans  
**Foundational principle**

Develop proactive, future-looking plans that explore future scenarios and can be used to address ocean plans  
**Operational pathway**  
Based on 3 & 4

Balance flexibility with legal certainty to address the tension between the human need for predictability and moving biophysical resources  
**Operational pathway**  
Key challenge of 6

Align policies for MSP and climate to support the integration of climate change into MSP and ensure effective coordination among different policy arenas  
**Foundational principle**

Understand system interactions and dynamics to promote an integrated and systems view for ocean planning  
**Foundational principle**

Integrate climate-related knowledge into MSP, identifying expected climate impacts, risks, and opportunities (environmental, social, economic)  
**Operational pathway**

Promote adaptive and dynamic planning to ensure MSP's ability to face uncertainty and adapt to moving biophysical features and uses  
**Operational pathway**

Identify ocean-based climate solutions and prioritize space allocation to support climate mitigation and adaptation actions  
**Operational pathway**  
Based on 3-5

Build common narratives with policymakers, the private sector, civil society, and other integrated ocean management stakeholders to change perceptions of ocean sustainability and climate change  
**Operational pathway**

# Deeply interrelated



## Context specific



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## Box 1 | Checklist for measuring ‘climate-smartness’ of marine spatial planning (MSP) initiatives

A number of simple queries can be made to any particular MSP initiative to rapidly assess the extent to which climate change is being recognized and integrated (or not) into planning. Such queries — which link to the ten key components proposed — can be further used as a baseline to develop a more detailed system of ‘SMART indicators’ (i.e., specific, measurable, achievable, relevant, and time-bound) to be used in the monitoring and evaluation of marine spatial plans, and on the assessment of their the ‘climate-smartness’.

Some examples are provided below:

- Does the plan address climate change in its objectives?
- Does the plan prioritize ecosystem health, contributing to biodiversity conservation and climate action? (component 1)
- Do plans address land-ocean interactions? (component 2)
- Does the plan include social considerations, data, and diverse knowledge systems? (component 3)
- Does the plan have equity considerations and concerns? (component 3)
- Is the plan co-produced with stakeholders and rightsholders? (component 3)
- Is the plan using climate-related modeling tools to assess current/future spatial temporal changes in ocean uses? (component 4)
- Is the plan using climate-related modeling tools to assess current/future spatial temporal changes in ecosystem goods and services? (component 4)
- Is the plan using climate-related vulnerability and risk tools to assess environmental, social, economic, and governance consequences of change? (component 4)
- Is the plan using scenario building processes (e.g., ‘visioning’ or ‘foresighting’) to assessing planning alternatives? Does the plan clearly outline the planning timeframe and the likely climate-scenario(s) (e.g., ‘business-as-usual’) to be considered over that timeframe? (component 5)
- Does the plan have adaptive mechanisms for management decisions? (component 6)
- Does the plan include monitoring indicators related to climate change effects? (component 6)
- Does it allow for areas allocated to a certain use to move following shifting conditions? (components 6 and 7)
- Does it prioritize space for ocean-climate solutions? (component 8)
- Does the plan identify nature-based approaches for climate change, such as conservation and restoration of blue carbon ecosystems? (component 8)
- Does the plan identify areas for renewable ocean energy production? (component 8)
- Does the plan refer to other instruments (plans, policies, strategies) that relate to climate change? (component 9)
- Does it promote ocean-climate literacy close to stakeholders? (component 10)



# “Climate-smartness”



Multiple  
pathways

# Thank you !



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Biology  
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Comparative Biology



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