# Climate change and MSP

## NESB Project Kick-off Meeting

Dr. **Catarina FRAZÃO SANTOS**

25 February 2025

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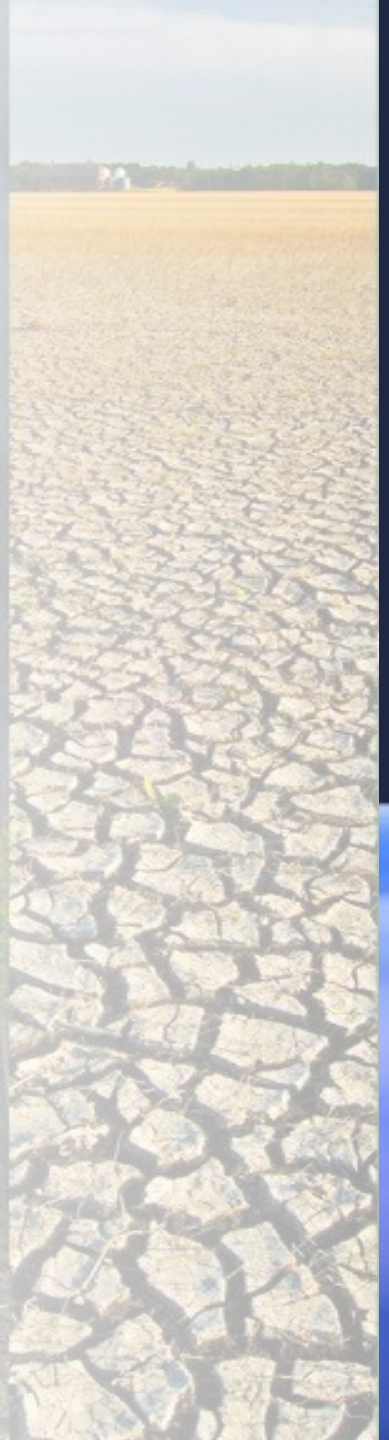
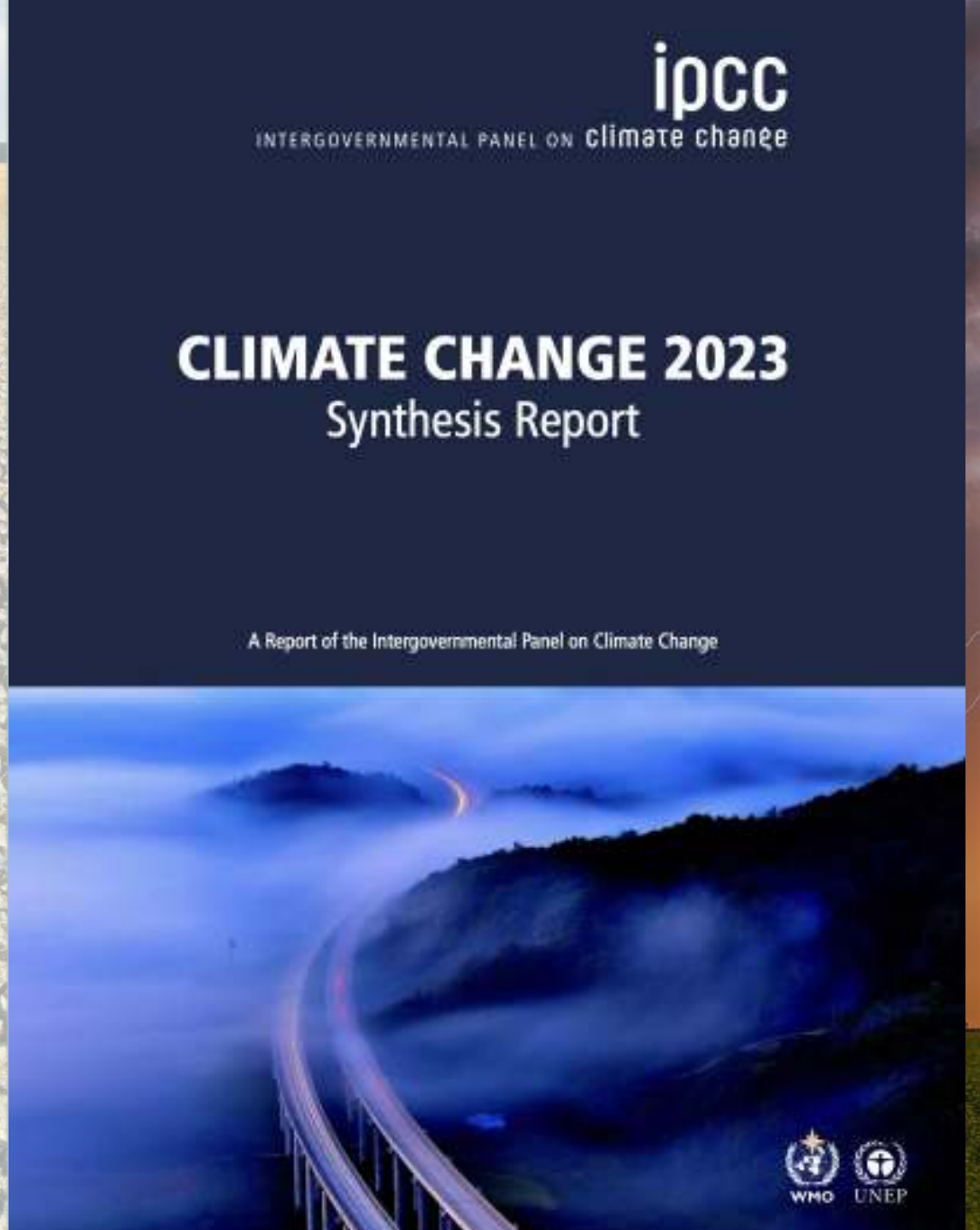
# Climate change



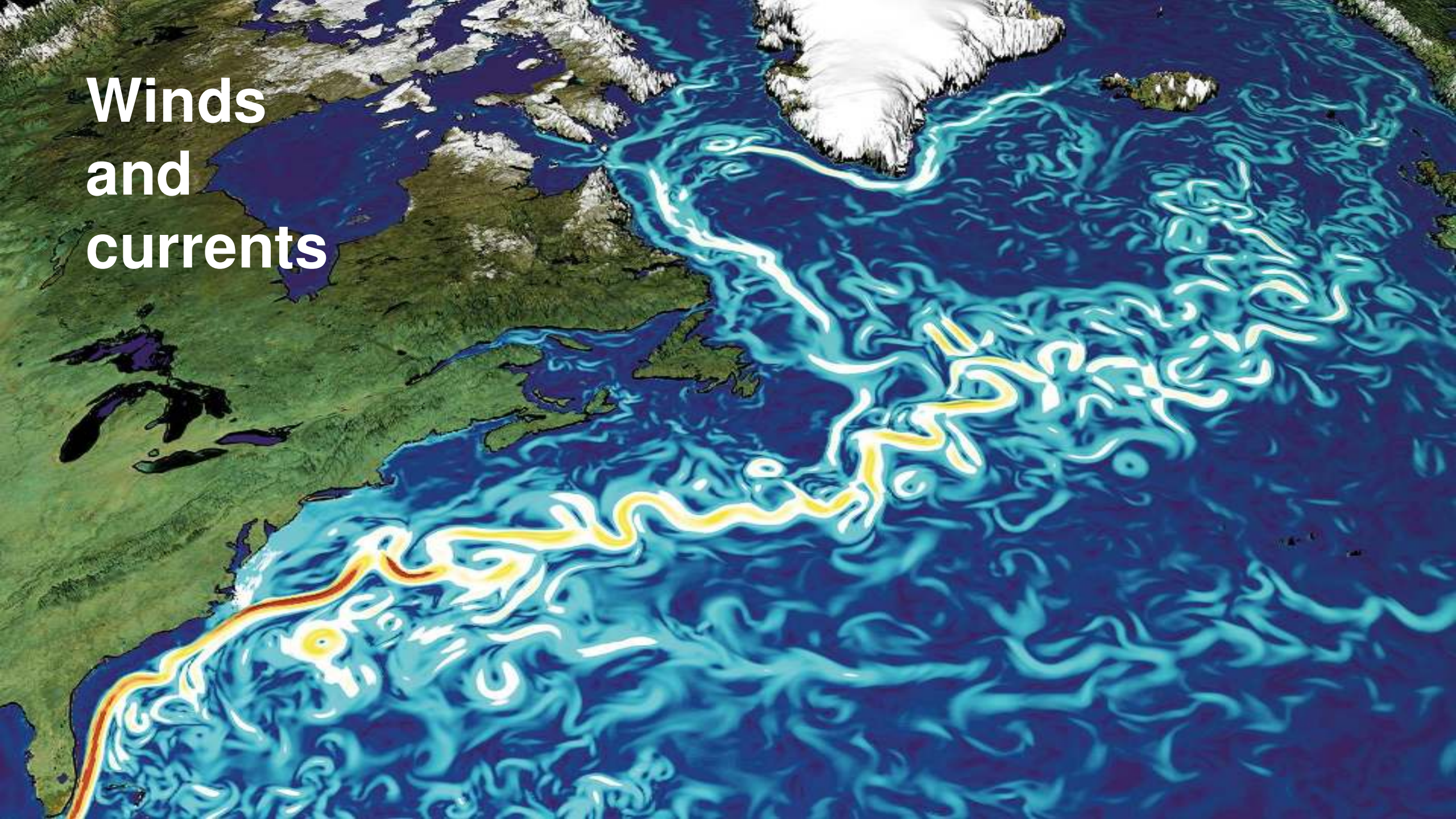



# Ocean warming

# Acidification

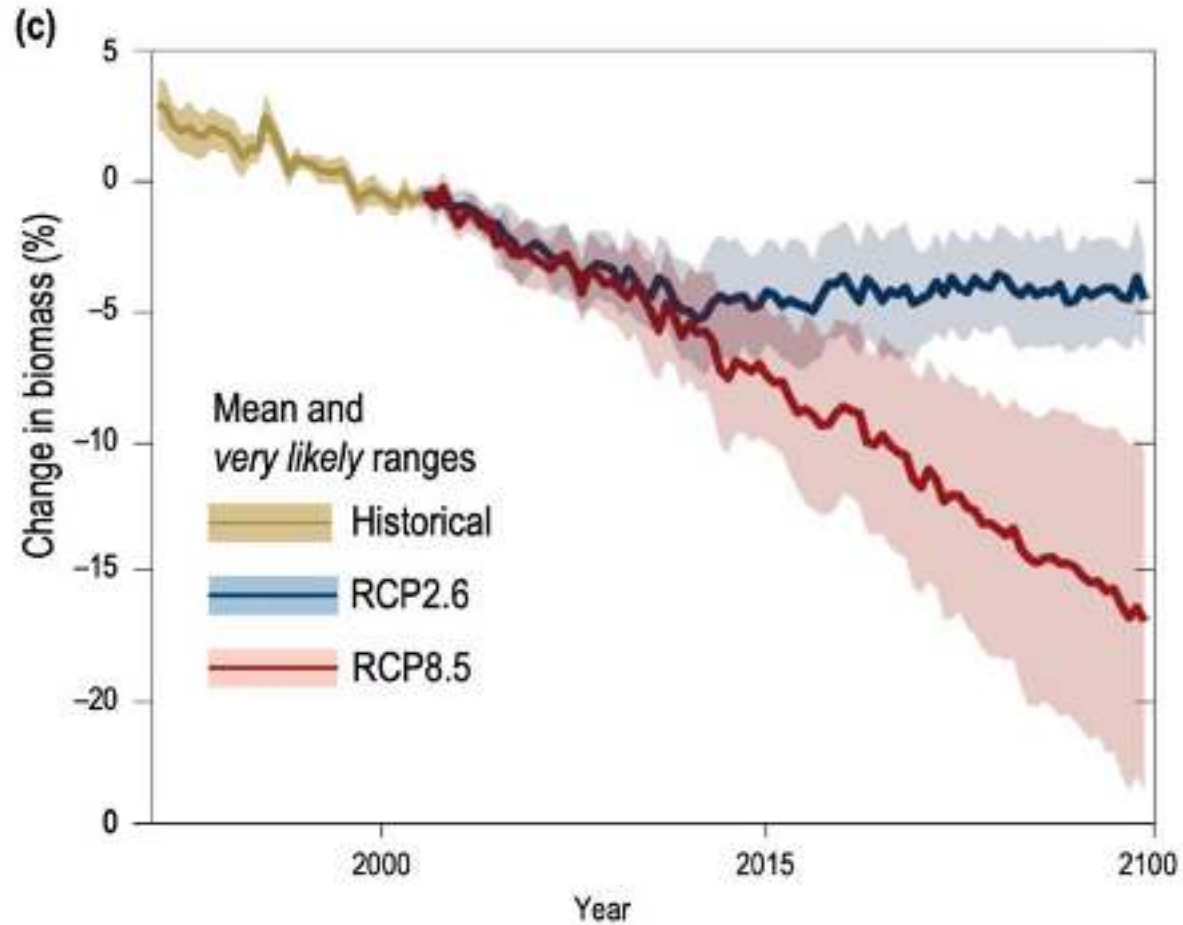
# Extreme events

# Winds and currents



# Climate driven species redistribution






ECCWO (2018)

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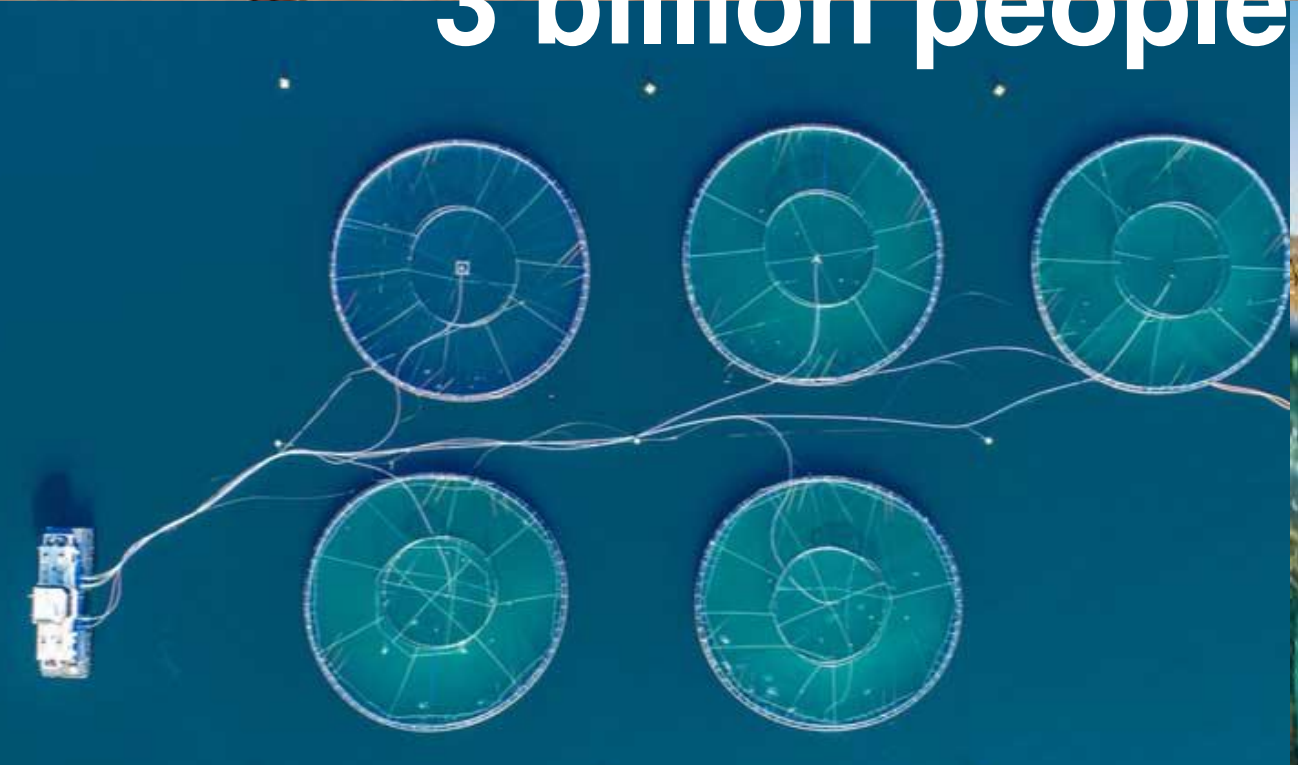
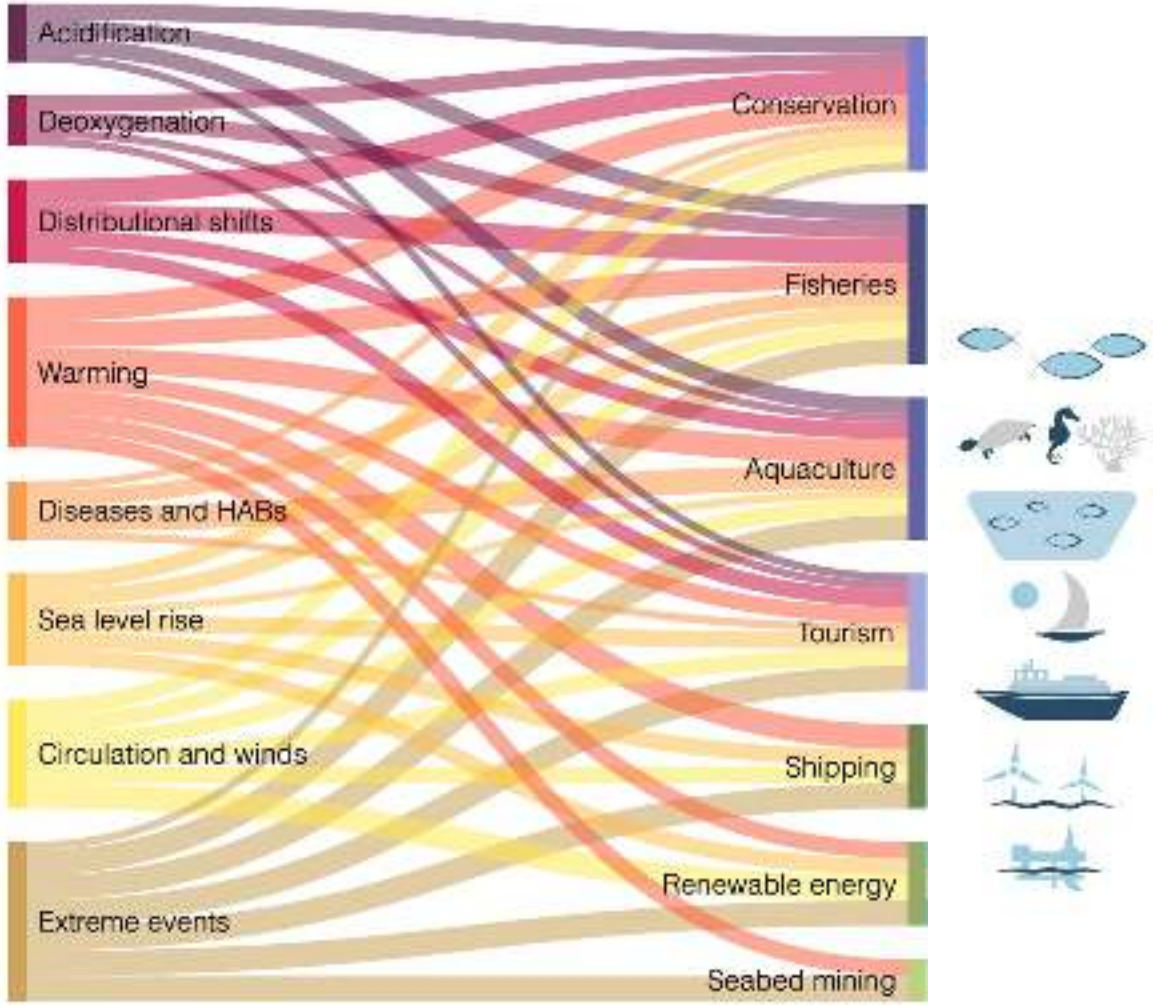
# 3 billion people



# Different uses, different impacts

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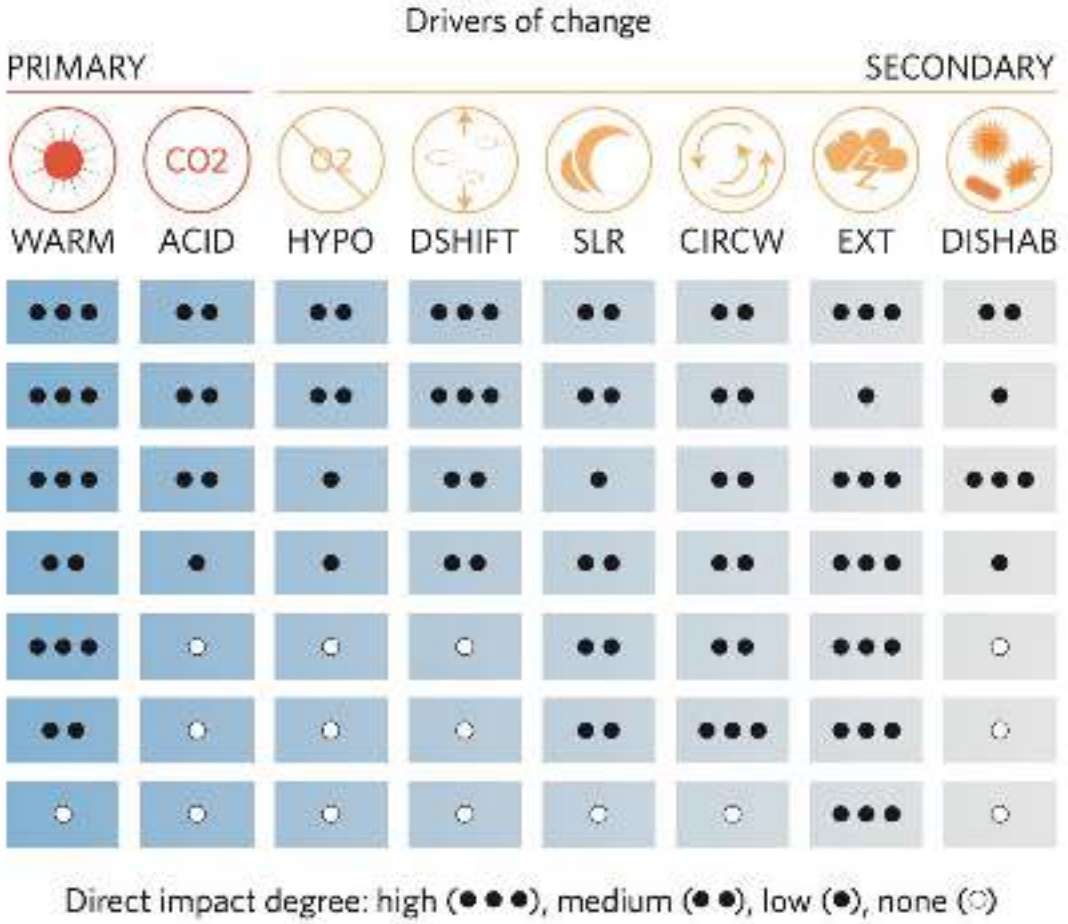


www.nature.com/articles/ngeo2821

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When We move (because of climate change)...
...Our Conservation AREa moves with us!
that's what I call flexible MSP!
STOP! Protection AREA!
Aqua tourism Zone
Aqua farm
So, now We finaly Have this new Route...
...thanks to the melting Polar...
... at a sudden EVERYbody shows up HERE!

# 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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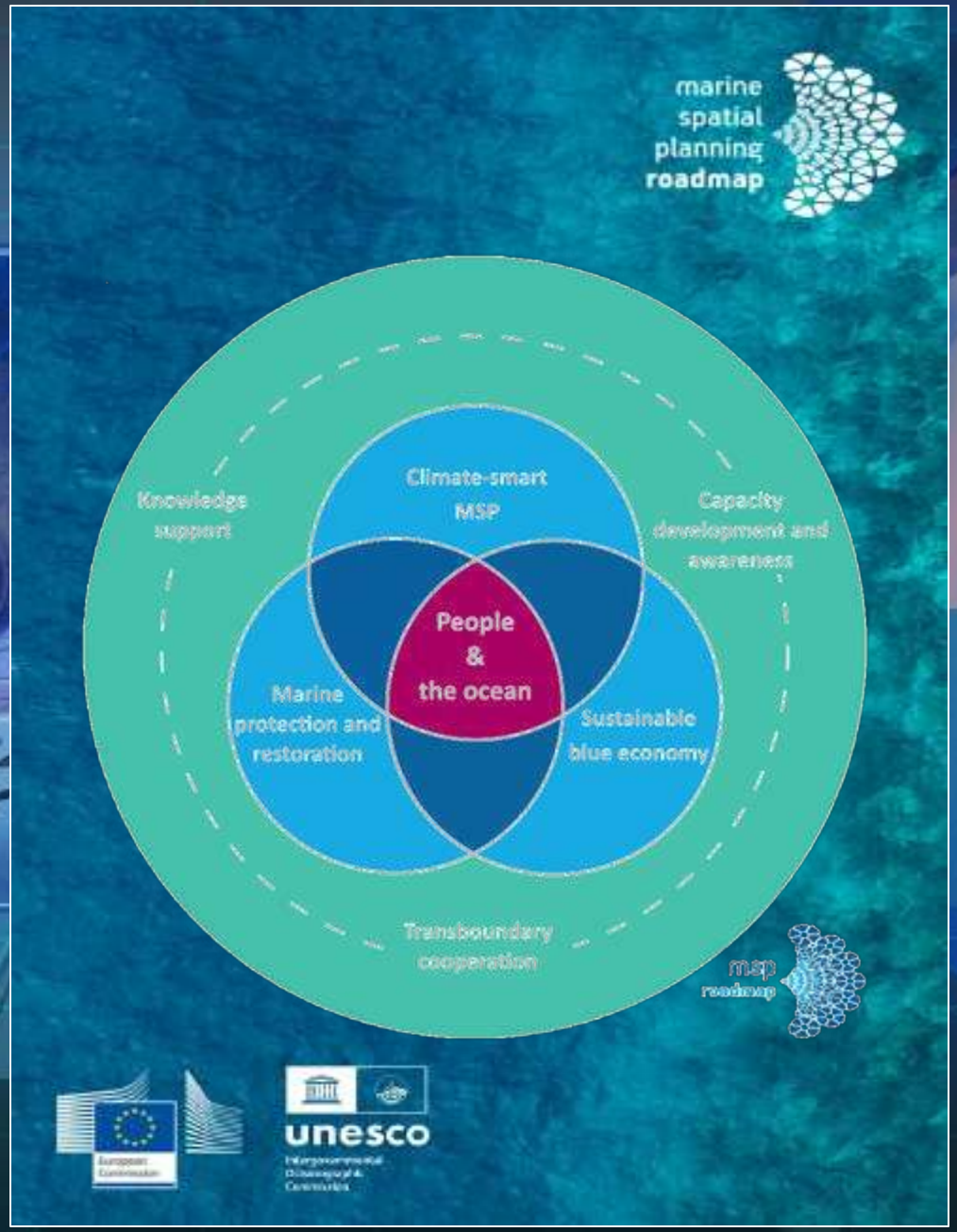


# Moving towards Climate-smart MSP


Setting the agenda in research

Comment

nature

To save the high seas, plan for climate change

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


Science

POLICY FORUM

OCEAN

Taking climate-smart governance to the high seas

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

# Climate-smart MSP

# 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

—

# 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

# 10 Key components Climate-smart MSP

1. Prioritizing ecosystem health

2. System interactions and dynamics

3. Social data, equity and change

4. Integrate climate-related knowledge

5. Develop proactive, future-looking plans

6. Supporting flexible and adaptive planning

7. Balancing flexibility and legal certainty

8. Supporting climate adaptation and mitigation actions

9. MSP and climate-related policies

10. Building common narratives

nature npj | ocean sustainability

# Operational pathways

1. Prioritising ecosystem health

2. System interactions and dynamics

3. Social data, equity and change

4. Integrating knowledge on climate change

5. Future-looking plans

6. Supporting flexible and adaptive planning

7. Balancing flexibility and legal certainty

8. Supporting climate adaptation and mitigation actions

9. MSP and climate-related policies

10. Building common narratives

# Foundational principles

1. Prioritizing ecosystem health

2. System interactions and dynamics

3. Social data, equity and change

4. Integrating knowledge on climate change

5. Future-looking plans

6. Supporting adaptive planning

7. Balancing flexibility and legal certainty

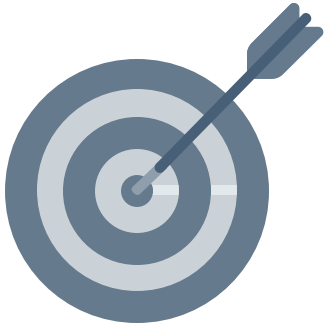
8. Supporting climate adaptation and mitigation actions

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**

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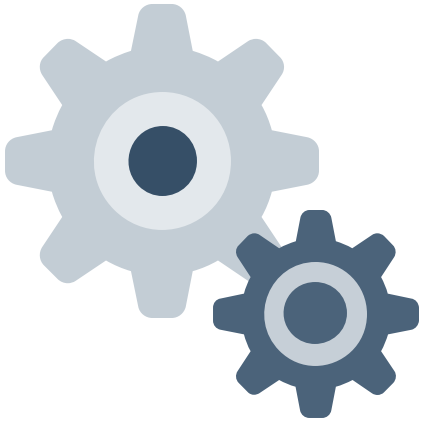
## 6. Promote adaptive and dynamic planning



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

## 7. Balancing flexibility with legal certainty

**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**

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## 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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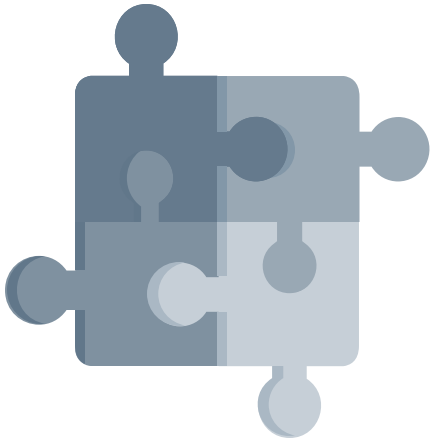

## 2. Understand system interactions and dynamics

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

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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

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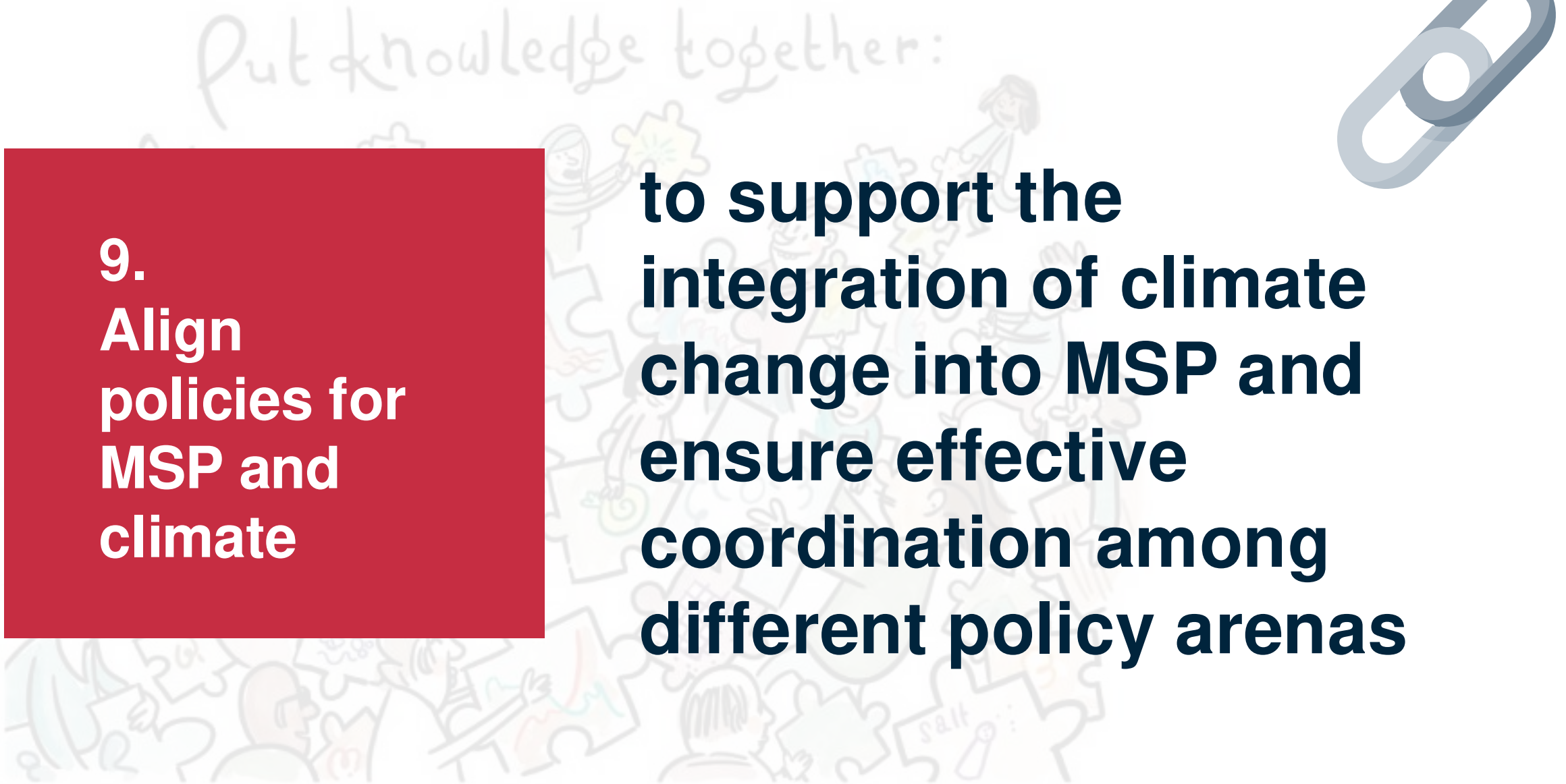


**9.**
**Align policies for MSP and climate**

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

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## 10. 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**

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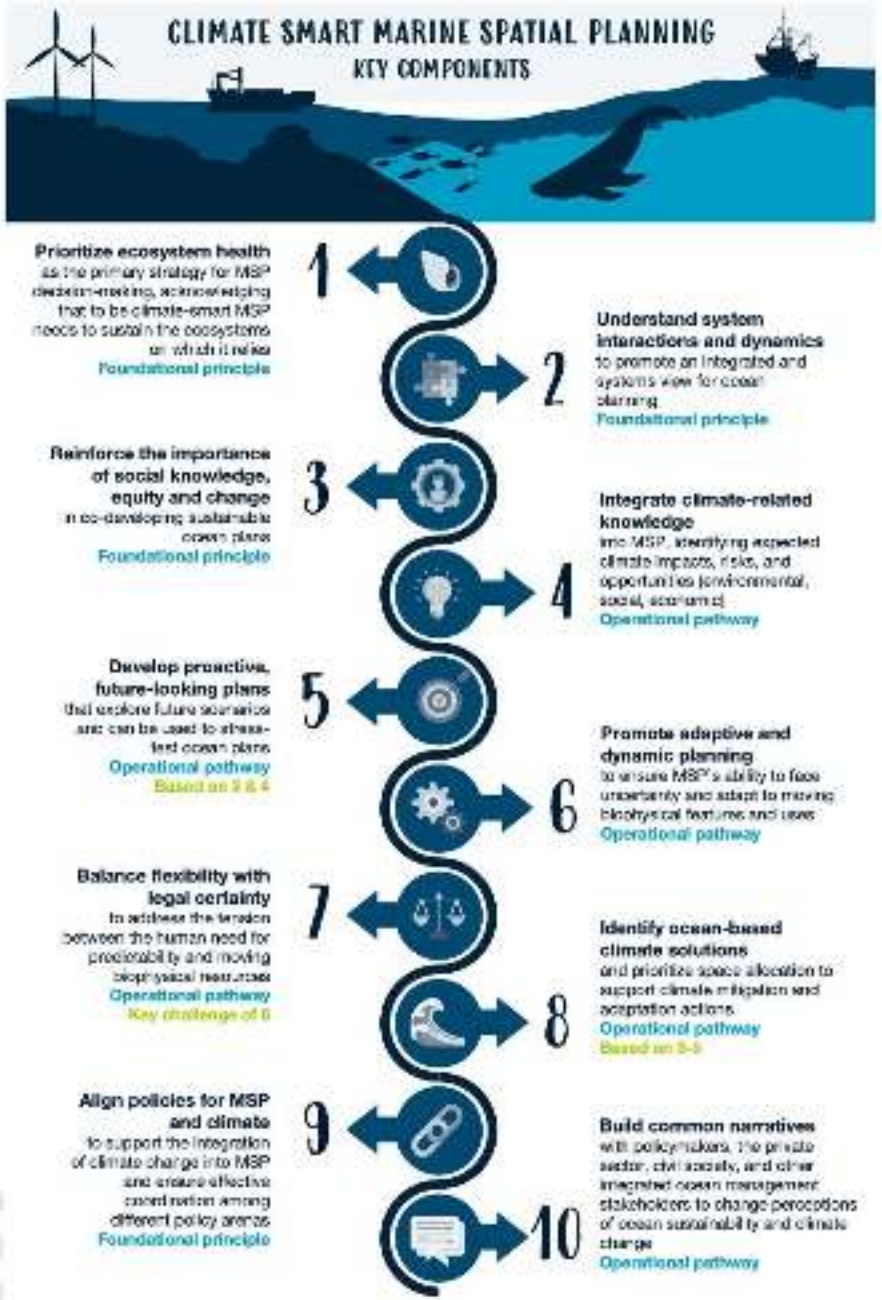


# Deeply interrelated

# 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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Integrative Organismal Biology A Journal of the Society for Integrative and Comparative Biology

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