Ecologic Institute

Science and Policy
for a Sustainable World

Harnessing Social-Ecological Systems Thinking and Ecosystem-Based Management for Marine Biodiversity Conservation and Climate Benefits

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What to expect

- **Welcome & Tour de Table**
- **Setting the context**
- **Ecosystem based management**
  - Definitions
  - Principles
  - Frameworks and Operationalising
  - EBM response
- **Group work**
- **Insights from the Marine SABRES project**
- **Open discussion with Feedback / Q&A**
- **Wrap-Up & End**

Tour de Table

Participants background

What is your name and your home country?

20 21

- Chhaya, India
- Irene, Germany
- Ana - Brazil
- Amel from Tunisia
- Phiny from Uganda
- Aissatou Ndiaye, Senegal
- Ashish Kumar India
- Adam Kyomuhendo - UGANDA
- Andrew from Ghana
- Hermela,
- Analia, Paraguay
- Sukanya, India
- Sukma Larastiti-Indonesia
- Juan, Argentina
- Oladosu Adenike Nigeria
- Sarwar, India
- Gabriel Eugen Watson Kpaka from Sierra Leone
- Hao, from China
- Aster ,Ethiopia
- Victor

What is your professional background?

19 21

- International law
- Carbon Market
- Environmental management
- Environmental science
- Economics
- Lawyer, Litigator and Lecturer
- Environmental justice, conservation of lake Chad & gender equality
- Economics
- Geography Climate Risk, Event management, Film&Photography, project management, etc.
- Chemistry, spectroscopy
- Indigenous People
- Chartered Meteorologist
- Climate and energy scientists
- Conservation Science
- Lawyers and professor
- Urban Climate Governance
- Hydrology and Water resources Management Currently am working on Drought
- Transport planner
- Integrated Water Resources Management
- Climate extremes
- Carbon stabilization mechanisms

What comes to mind when you hear EBM?

More Mentimeter Results

What are the key challenges in managing marine ecosystems?

19 participants · 27 responses

- Capitalism :)
- International politics
- Lack of climate information for decision making
- Lack of research and knowledge of marine ecosystems.
- Over consumption
- Unequal access
- Lack of policy
- Geopolitics
- Political interference. Capitalism.
- Difficulty of the field
- Governance issue
- Difficulties in restoration
- Education
- Systems
- Uncertainty
- Temperature raise
- Capitalism
- Water quality
- Pollution Exploration
- Ghg emissions
- Marline borders
- Extractivism
- Behavior change, early education & teaching
- Politicians
- National administrator
- Education
- Water quality management

How can we integrate social, economic and ecological perspectives in marine management?

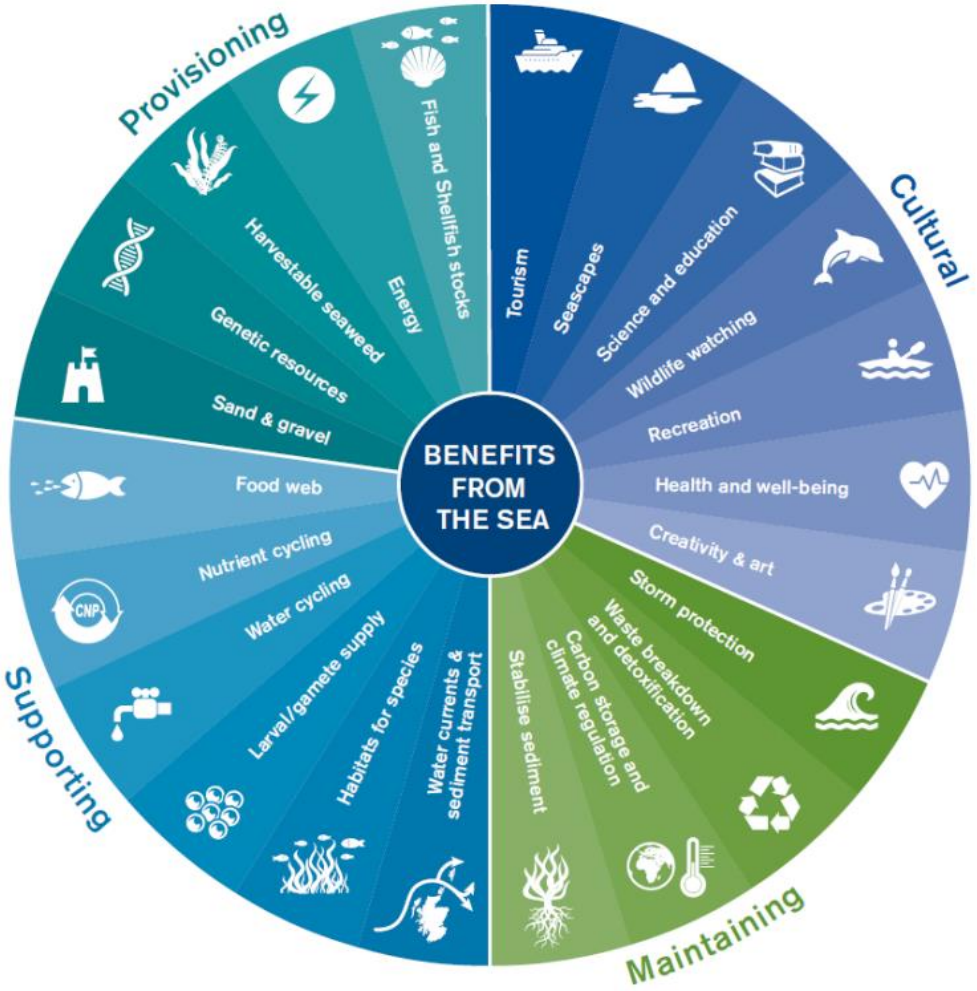
16 participants · 24 responses

- Incorporating indigenous knowledge systems.
- Through cocreation by involving diverse stakeholders
- Wirking
- Adopting an integrated framework
- Modelling result integration
- Inclusive approaches
- Consultaions.
- Through awareness and collaboration
- Supporting the development of agroforestry systems
- Just distribution of resources
- Impact assessments
- Participatory approaches
- Systems thinking approachs
- Formulation of framework
- Citizen involvement
- Working hard
- Based on community integration
- Multilateralism
- Collaborative approach
- Being aware of ecological costs of the energy transition
- Identification of optimal interface
- Co-creation
- Blue justice
- Social justice

Setting the context

- Life-support system
- State of marine biodiversity
- Key threats and challenges
- The ocean-climate nexus

The Biosphere provides life support systems and critical benefits to human societies and wellbeing

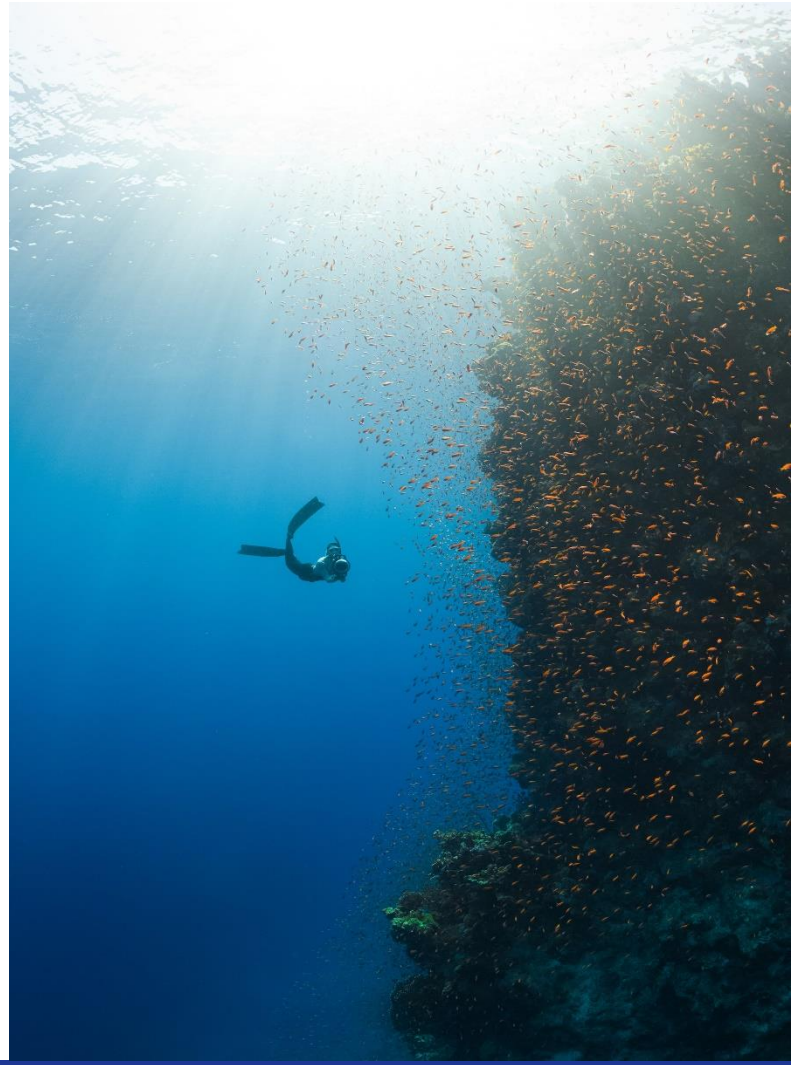


Economic, social, and environmental sustainability are not separate: they are interdependent and build upon one another

Source: Stockholm Resilience Centre

The ocean: life-support system & climate regulator

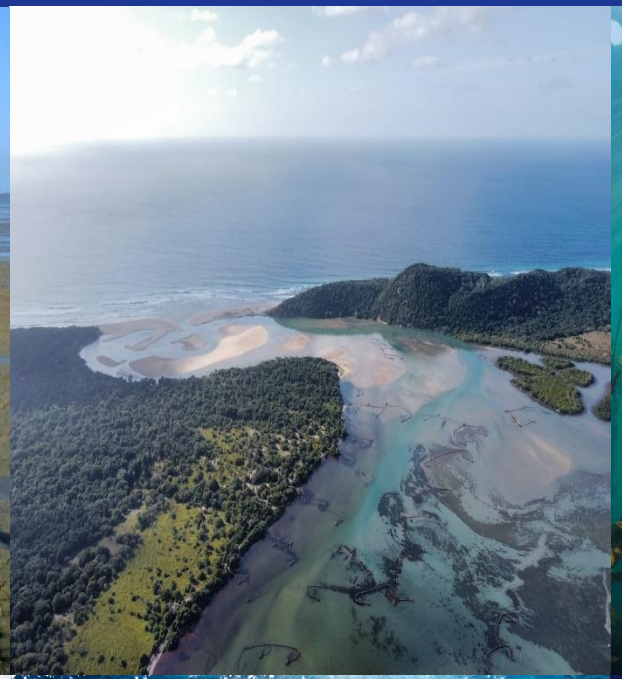
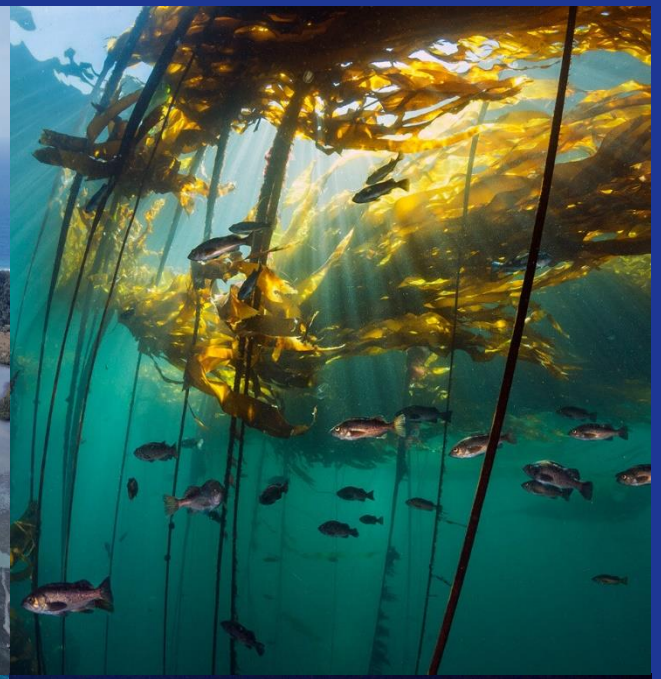
- Spanning **71%** of the planet, marine ecosystems provide a variety of **ecosystem services** that are essential to human well-being, including oxygen production, food and water supply, climate mitigation and adaptation, and host to **80% of global biodiversity**.
- **40%** of the global population resides within 100 km of the coast, steadily rising. Over **3 billion people**, primarily in developing nations, rely on marine and coastal biodiversity for their **livelihoods.** For **1 billion people**, food from the ocean is their primary source of protein.
- **Economic benefits** including jobs and finance in sectors such as fisheries, renewable energy, eco-friendly tourism, etc.

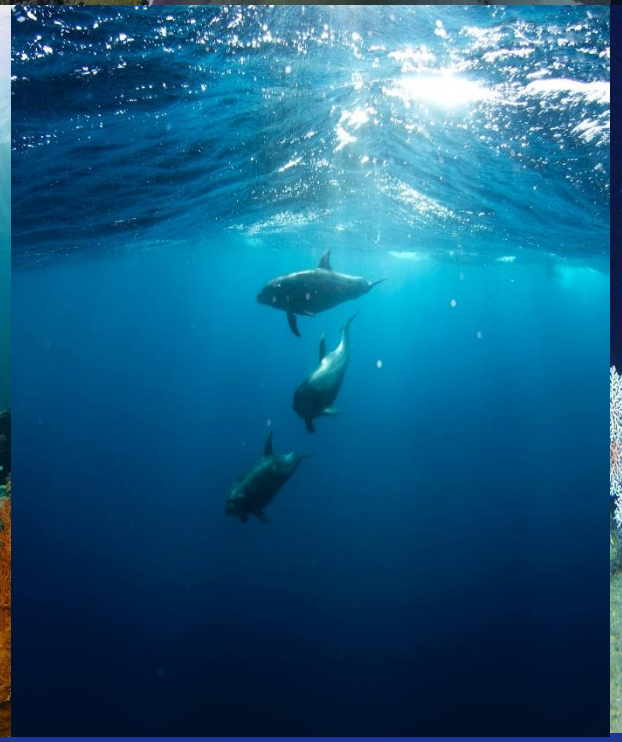
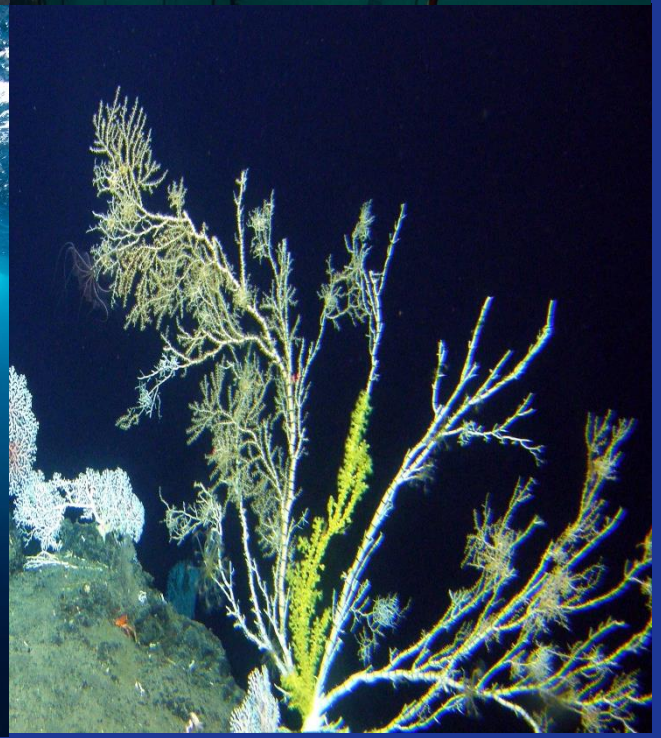


CBD, 2016; Lovelock & Duarte, 2019; Menéndez et al., 2020

Image: © Neon / Unsplash



”

The conservation, restoration and use of vegetated coastal habitats in eco-engineering solutions for coastal protection provide a promising strategy, delivering significant capacity for climate change mitigation and adaption.”

Clewell & Aronson (2012)

Example: Saltmarshes

- **Loss:** 50% of salt marshes worldwide have been either degraded or lost due to human activities
- **Services:** coastal protection, water purification, carbon sequestration, raw materials & food, maintenance of fisheries, biodiverse habitat, tourism, recreation, education & research

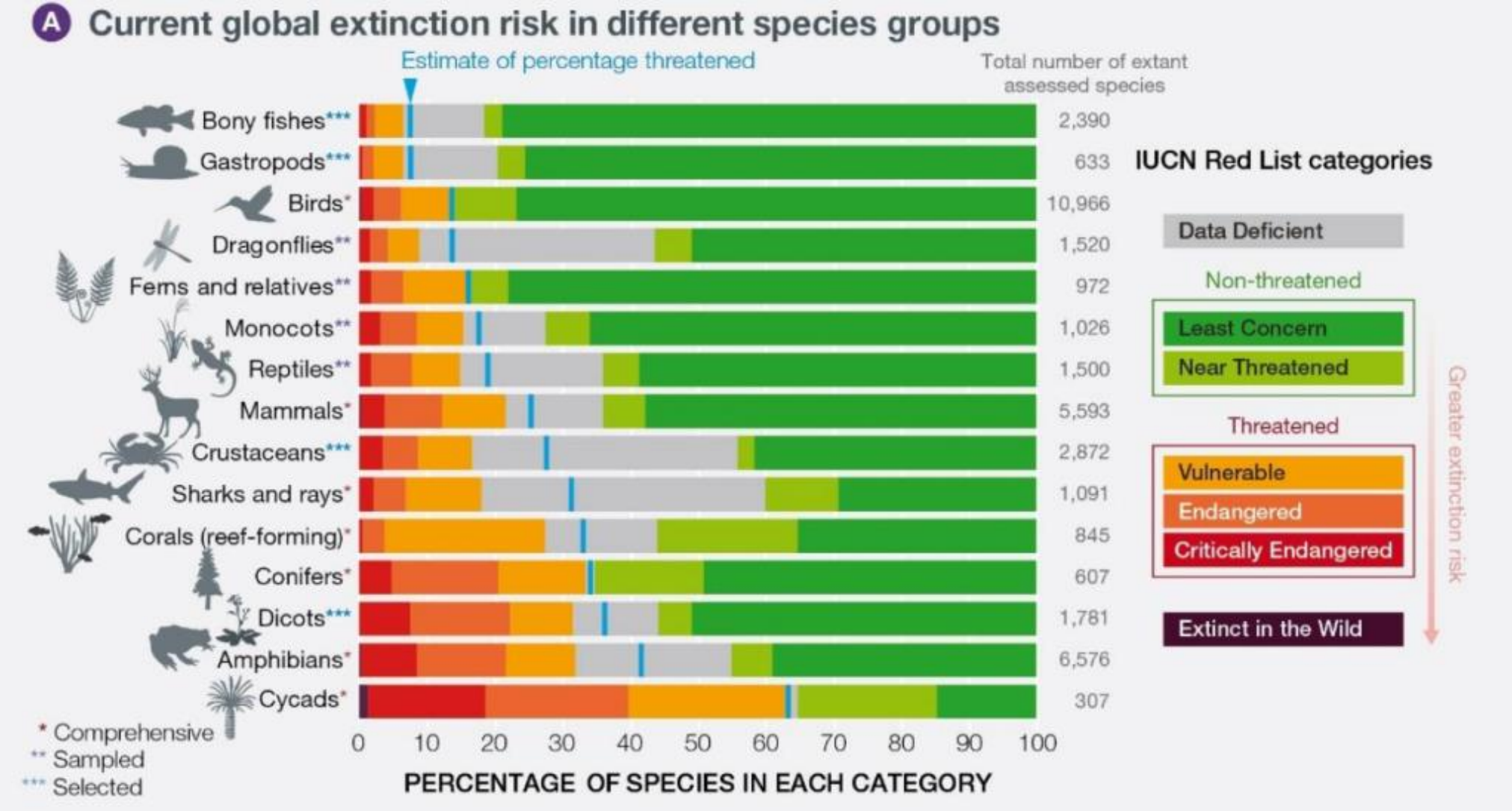
Table 2 | Carbon burial and soil stocks in vegetated coastal ecosystems.

Ecosystem	Local C burial rate (g C m^{-2} yr^{-1})	Local C stock in soil (Mg C ha^{-1})	Global C burial rate (Tg C yr^{-1})	Global C stock in soil (Pg C)
Salt marshes	218±24[5]	162 (259)[65]	4.8–87.3[5]	0.4–6.5
Mangroves	163[35]	255[64] (683.4)[38]	22.5–24.9[35]	9.4–10.4
Seagrasses	138±38[5]	139.7 (372)[39]	48.0–112[5]	4.2–8.4[39]

Mean and, when available, standard error of the mean (±s.e.m.) of organic carbon (C) burial and stock within the top 1 m of soil. Maximum local C stock is provided in brackets. Global C stocks are estimated from local C stocks and ecosystem extension (Table 1) unless indicated. Superscript numbers indicate the reference sources of data.

(Barbier et al. 2011; Duarte et al., 2013; Hansen and Reiss, 2015)

Global biodiversity at risk



Key drivers of marine biodiversity loss

Overexploitation: Over 1/3 of commercial fish species are severely depleted due to unsustainable fishing practices and bycatch, placing thousands of marine species at risk of extinction.

Habitat Destruction & Changes in Sea Use: Unregulated coastal development and harmful practices are causing extensive loss and degradation of critical habitats.

Climate Change & Ocean Acidification: Rising CO2 levels have led to increased ocean temperatures, acidity and amplified oxygen depletion, critically threatening marine organisms, particularly corals and shellfish.

Pollution: Marine ecosystems are compromised by pollutants like (micro)plastics, heavy metals, and excess nutrients, causing eutrophication, harming marine life, and disrupting the food chain.

Invasive Species: Influx of non-native species disrupts ecosystem equilibrium, leading to the decline or extinction of native species and habitat transformation.

(IPBES 2019; IPCC, 2019; FAO, 2022)

Urgent climate risks to marine and coastal ecosystems

- **Risks to marine and coastal ecosystems have reached critical levels and are the most severe, requiring urgent and decisive action to avoid becoming catastrophic**
- Combined effects of climate drivers (heatwaves, acidification) and human pressures (pollution, fishing) threaten marine biodiversity and ecosystem services
- Climate impacts include species migration and ocean layer changes disrupting food webs and reducing marine primary production
- Urgent need for EU and Member States to enhance policies to restore ecosystem resilience, especially in marine and coastal areas

Table ES.1 Assessment of major risks

Climate risks for 'Ecosystems' cluster	Urgency to act	Risk severity			Policy characteristics		
		Current	Mid-century	Late century (low/high warming scenario)	Policy horizon	Policy readiness	Risk ownership
Coastal ecosystems		+++	+++	+++	Medium	Medium	Co-owned
Marine ecosystems		+++	+++	++	Medium	Medium	EU
Biodiversity/carbon sinks due to wildfires (hotspot region: southern Europe)		+++	++	++	Medium	Medium	Co-owned
Biodiversity/carbon sinks due to wildfires		+++	++	++	Medium	Medium	Co-owned
Biodiversity/carbon sinks due to droughts and pests		+++	++	++	Long	Medium	Co-owned
Species distribution shifts (*)		+++	++	++	Medium	Medium	Co-owned
Ecosystems/society due to invasive species		+++	++	++	Medium	Medium	Co-owned
Aquatic and wetland ecosystems		+++	++	++	Medium	Medium	Co-owned
Soil health (*)		+++	++	++	Medium	Medium	Co-owned
Cascading impacts from forest disturbances		+	+	+	Long	Medium	Co-owned

Legends and notes

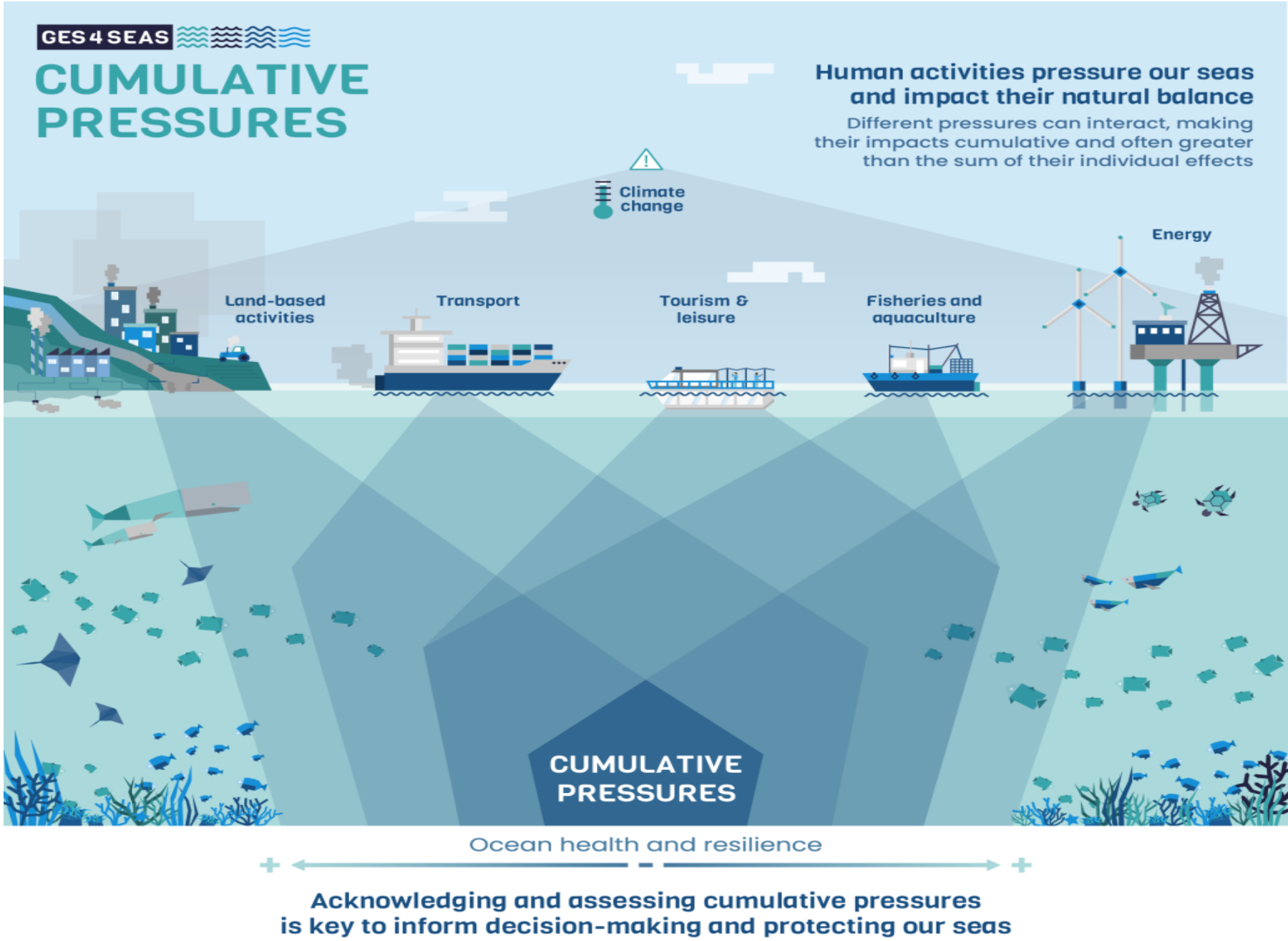
Urgency to act
- Urgent action needed
- More action needed
- Further investigation
- Sustain current action
- Watching brief

Risk severity
- Catastrophic
- Critical
- Substantial
- Limited

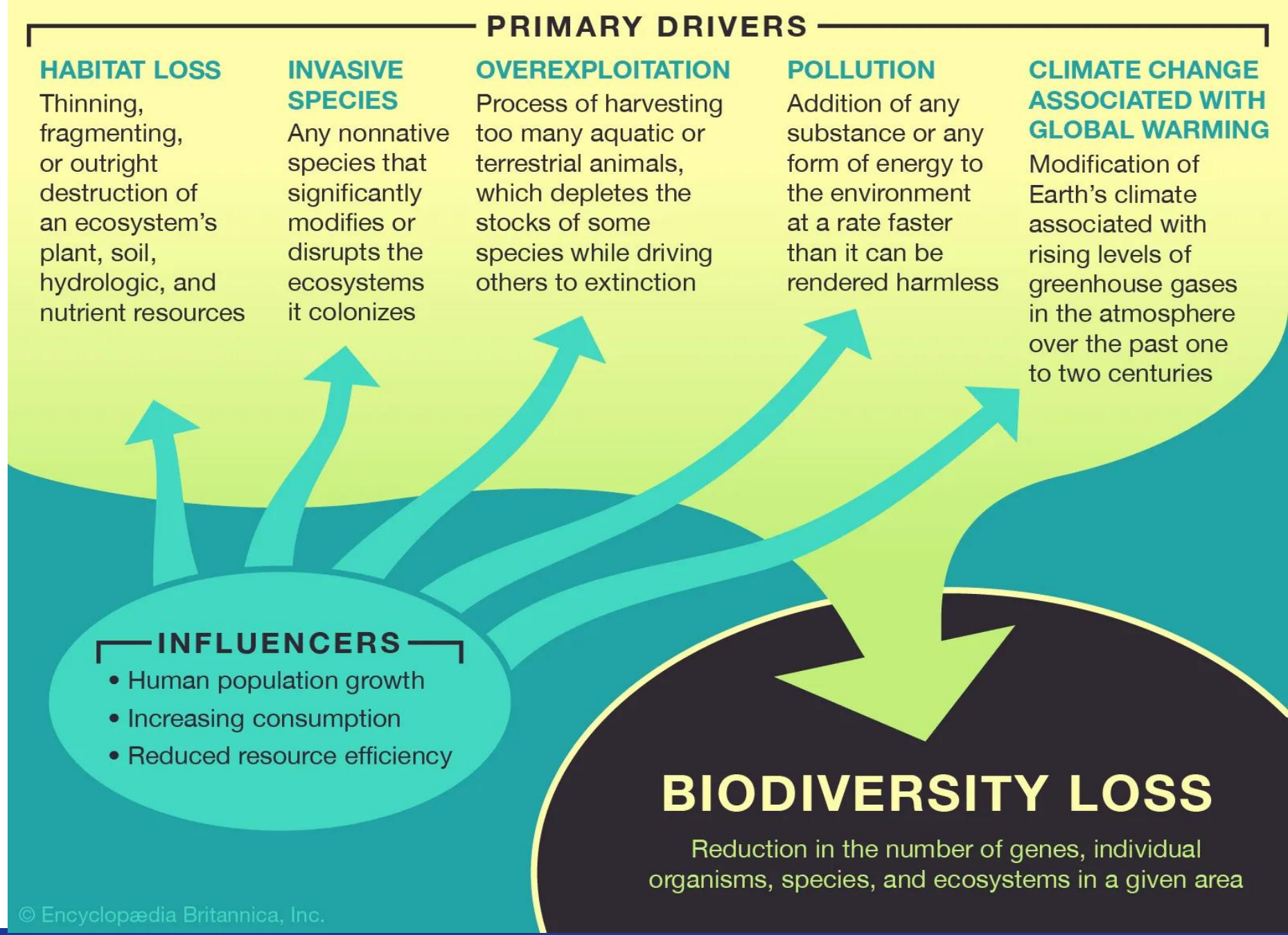
Confidence
Low: +
Medium: ++
High: +++

(*) Wide range of evaluations by authors and risk reviewers.

Cumulative pressures



Drivers of Loss



“Conserving nature and adapting to climate change are two sides of the same coin”

Inger Andersen,
Executive Director of the United Nations Environment Programme

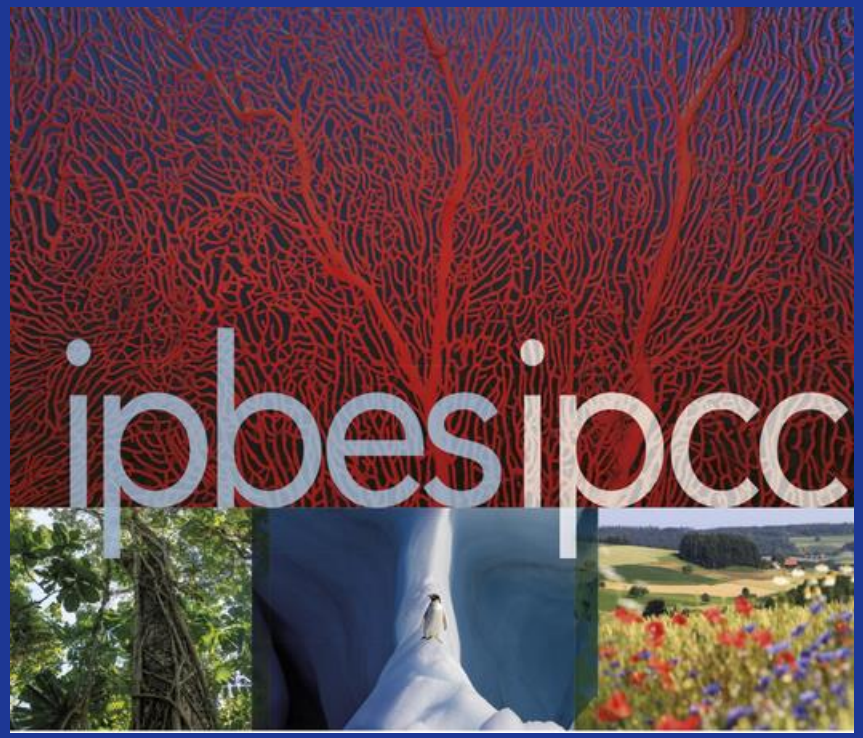
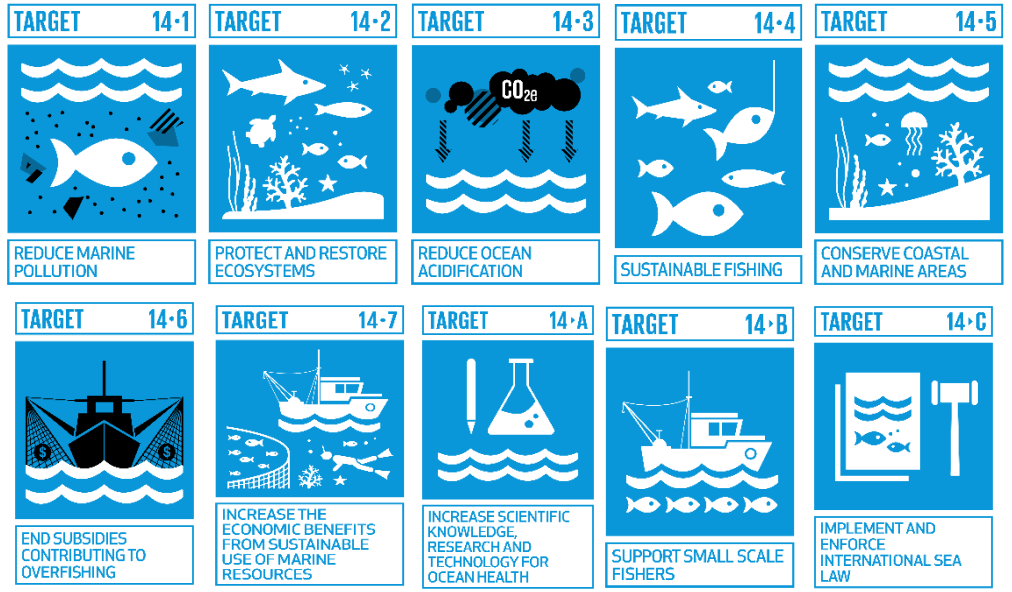


Image: IPBES & IPCC

Policy Framework

“Conserve and sustainably use the oceans, seas and marine resources for sustainable development“



Source: © https://sdgs.un.org/goals refers to all SDG icons

The UN Decades for Ecosystem Restoration & Ocean Science for Sustainable Development

Ecosystem Restoration

Aim: To prevent, halt, and reverse the degradation of ecosystems worldwide.

Approach: By driving political and societal support that foster large-scale restoration practices, the Decade aims to enhance ecosystem resilience, improve biodiversity, and create a healthier environment.

- **Initiatives:** Bonn Challenge and its regional initiatives AFR100 (Africa) and Initiative 20x20 (Central and South America)
- Promoting ”green" **jobs, partnerships and cooperation** at all levels from international to local to achieve ambitious restoration targets

Ocean Science

Aim: To support efforts to reverse the decline in ocean health and gather ocean stakeholders worldwide behind a common framework for sustainable ocean science.

Approach: Science-policy interface / science-based management. The Decade aims to improve the scientific understanding of the ocean to inform policies and management practices. This will help in developing and implementing more effective marine restoration strategies.

- **Role of Restoration:** Marine ecosystem restoration as a key strategy for mitigating climate change, bolstering biodiversity, and sustaining blue economies.
- **Capacity Building and Knowledge Sharing**

The Global Biodiversity Framework (GBF)

- At the 15th Conference of the Parties to the Convention on Biological Diversity (**CBD COP15**) in Montreal in December 2022, the new GBF was adopted with 4 long-term targets by 2050 (Goals A-D) and 23 action-oriented targets by 2030 (Targets 1-23).
- The target on ecosystem restoration is found under **Goal A Target 2**:
  - **By 2030, at least 30%** of degraded ecosystems should undergo restoration actions, including to improve their ecological functions and connectivity. This includes marine and coastal systems.
  - The specification of 30% of degraded area represents a **doubling** of the 15% target of the previous Aichi Target 15, which was not achieved.
  - It remains to be seen whether the Parties will succeed this time in translating the GBF targets into **national targets and successfully implementing systematic monitoring and adaptive management** through mainstreaming in all sectors

Perino et al., 2022

Ecosystem based management

- Definitions
- Principles
- Frameworks: SES, DAPSIWRM
- Selecting an appropriate EBM response
- Group work

The Ecosystem Approach

- Aspects of the ecosystem approach can be traced back to the **Stockholm Declaration** on the Human Environment in 1972, which called for cooperation on conservation, protection and restoration of the Earth's ecosystem.
- The two key international legal instruments of relevance to EBM are the UN Convention on Biological Diversity (**CBD**) and the UN Convention on the Law of the Sea (**UNCLOS**)
- Implementation of the Ecosystem Approach is facilitated through 12 interlinked principles, known as the **Malawi Principles**

EBM: Definitions

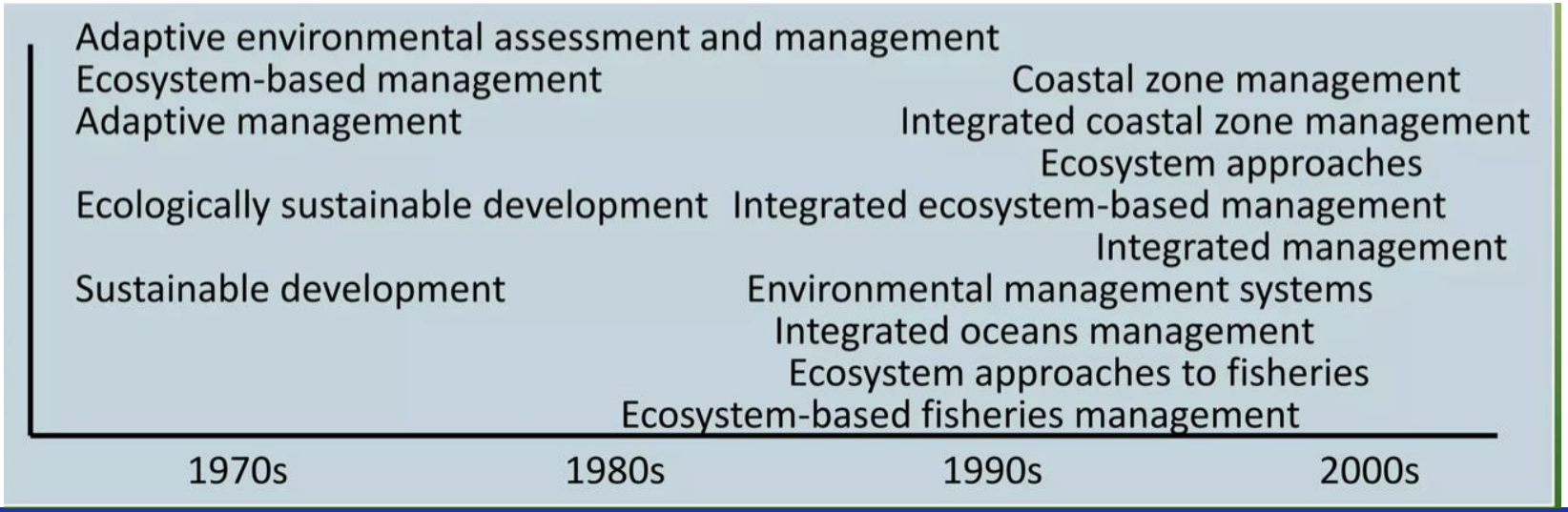
- EBM is a **reversing the order of management priorities** to start with the ecosystem rather than the target species (Pikitch et al. 2004)
- Essentially the rationale for EBM is that **whilst the ecosystem itself may not be fully managed, the human uses and activities that interact and impact upon the ecosystem may be managed** so as to conserve biodiversity and ensure sustainable development (Long 2012)
- EBM also necessitates adaptive management in order to deal with dynamic ecosystems and the absence of complete knowledge or understanding of their functioning.
- “and its dynamics, in order to identify and take action on influences which comprehensive integrated management of human activities based on the best available scientific knowledge about the ecosystem are critical to the health of marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity.” OSPAR, Helsinki and ICES and Artic Council

EBM: Definitions

Ultimately the **aim is to preserve ecosystem structure and functioning** so as to ensure the **ongoing provision of products and services**. Therefore, management of the impacts of human activities must focus on the **entire system** and not its component parts. This necessitates a move away from traditional sectoral management approaches towards those that are **integrated, adaptive and coherent across policy domains** so as to take account of social, economic and environmental aspects. EBM recognises that new forms of **valuation and assessment** are needed, and that different sectors of society will view ecosystems from their own **environmental, economic and societal needs**.

EBM in the marine environment

- Marine EBM involves recognizing and addressing interactions among different spatial and temporal scales, within and among ecological and social systems, and among stakeholder groups and communities interested in the health and stewardship of coastal and marine areas.
- EBM necessitates a move away from traditional sectoral focussed management as policy-makers need to manage for multiple ecosystem services that cannot be achieved if a single sectoral or policy ‘lens’ is taken



Leslie, H. M., & McLeod, K. L. (2007).

Principles of EBM

1. Consider Ecosystem Connections
2. Appropriate Spatial and Temporal Scales
3. Adaptive Management
4. Use of Scientific Knowledge
5. Integrated Management
6. Stakeholder Involvement
7. Account for Dynamic Nature of Ecosystems
8. Ecological Integrity and Biodiversity
9. Sustainability
10. Recognise Coupled Social-Ecological Systems
11. Decisions reflect Societal Choice
12. Distinct Boundaries
13. Inter-disciplinarity
14. Appropriate Monitoring
15. Acknowledge Uncertainty

EBM is highly interdisciplinary balancing ecological, social, and governance considerations, which is key to ensuring sustainable resource use

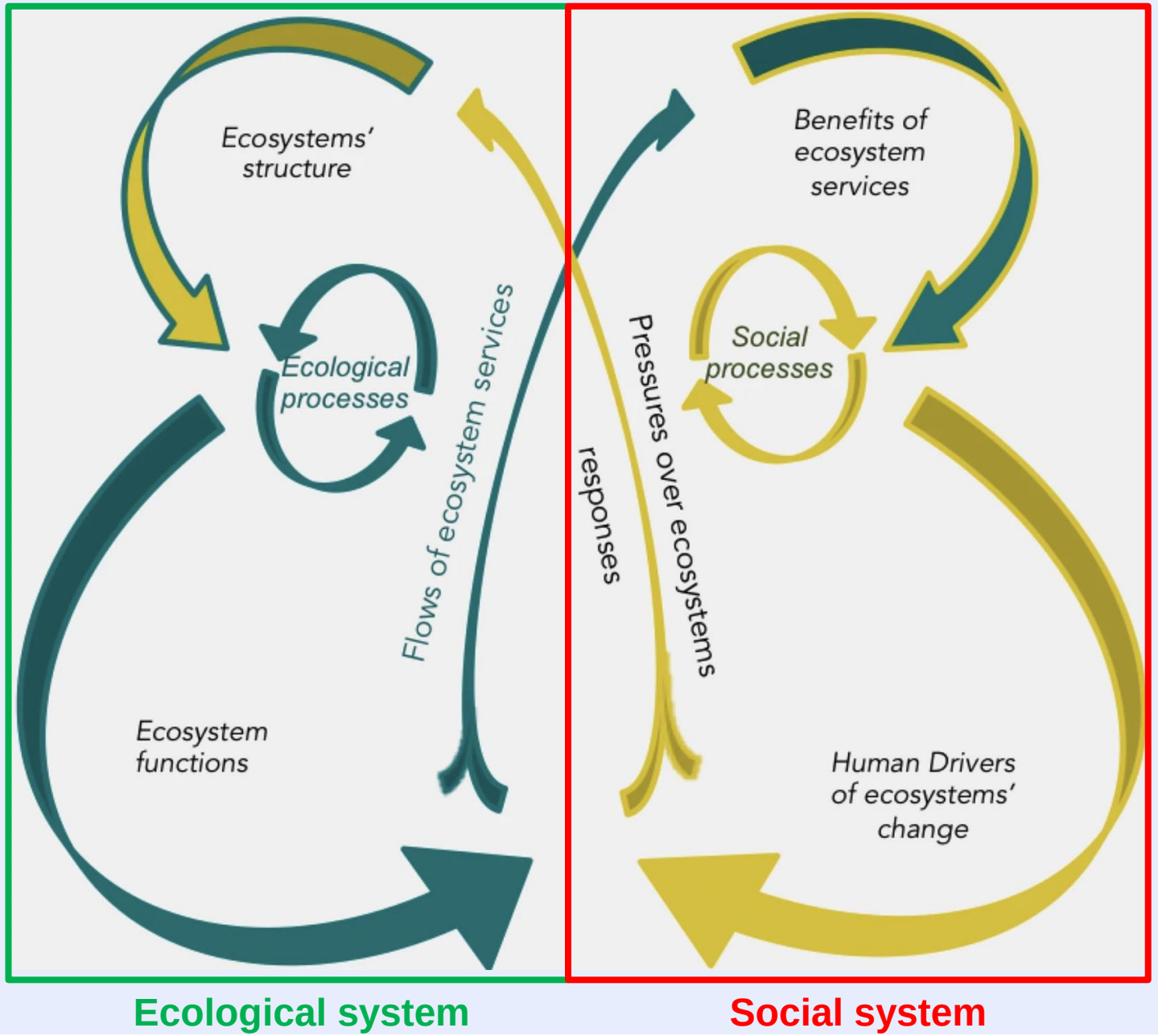
Importance of applying EBM at the right time and in the appropriate geographical context, ensuring that strategies are suited to specific areas and timescales

EBM is data-driven and responsive to the dynamic and uncertain nature of ecosystems

Long et al. (2015)

*The **social-ecological systems (SES)** approach considers institutions and governance as an integral part of the ecosystem, not separate from it. For example, the governance of a fishery cannot be separated from the fish, as management affects the supply of fish, and the fish population levels in turn shape the management measures that may be taken.*

The social-ecological system (SES)



Operationalizing ecosystem-based management

- There is a need for an agreement on how EBM can be implemented in practice at EU and national levels
- There is a critical need for clarity on what EBM actually requires, on how implementation progress can be measured and sharing of successful ‘better’ EBM practices

  - *What really is marine EBM?*
  - *Is it really different from status quo management?*
  - *How should it be properly applied?*
  - *How do I ensure EBM plans are implemented?*

From O’Hagan in Delacámara et al. 2020

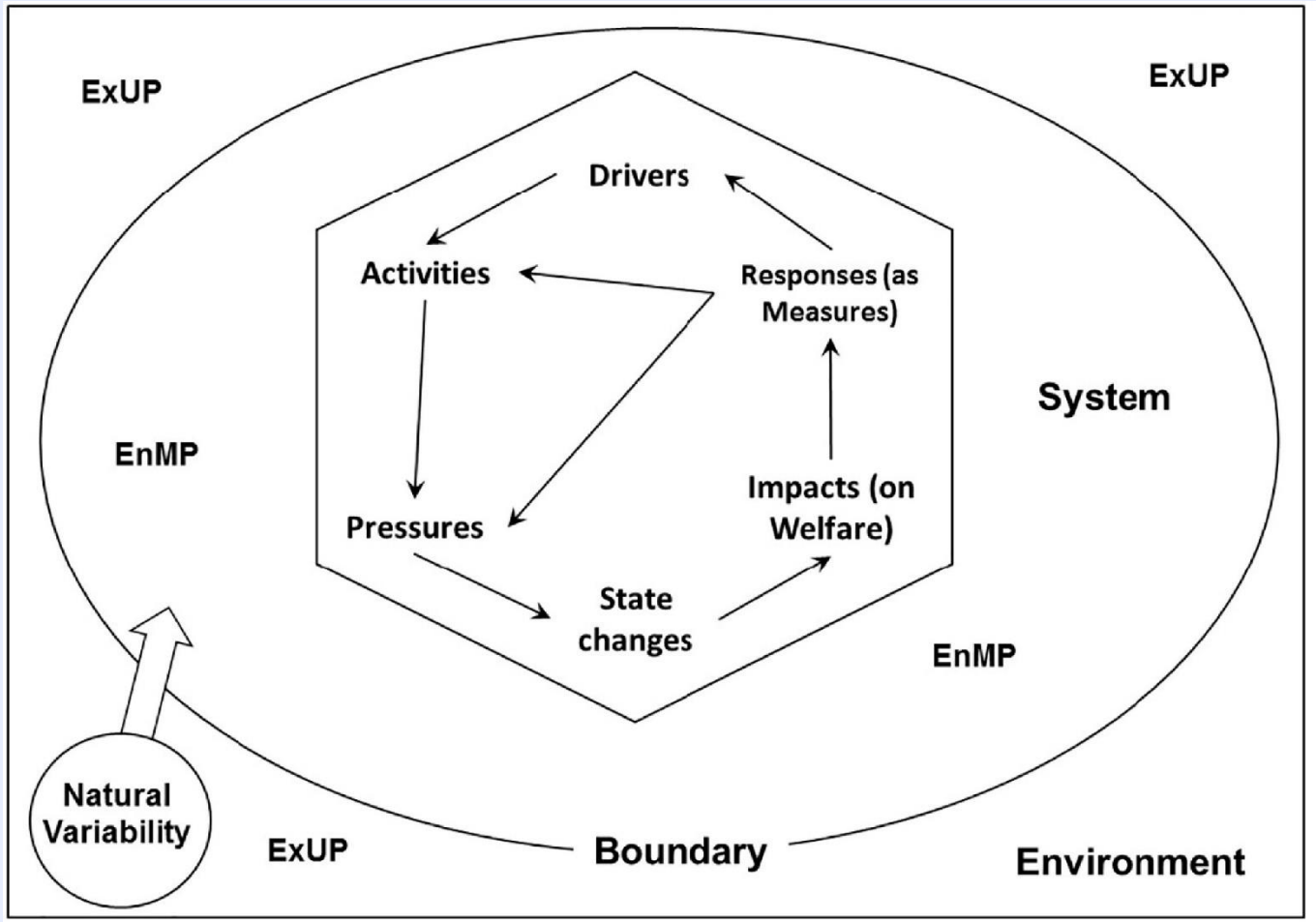
Operationalizing ecosystem-based management

- EBM is an incremental process, not a sudden shift from traditional management
- Key to its success is adopting **adaptive management** and **social-ecological systems** (SES) thinking to guide biodiversity conservation
- EBM approach evolves with each management cycle, improving over time
- The goal is to develop **operational EBM** that informs decision-making and achieves societal objectives

Delacámara et al. 2020

The DAPSI(W)R(M) Framework

...understand and address the complex interactions between human activities and the marine environment



Key: ExUP = Exogenic Unmanaged Pressures; EnMP = Endogenic Managed Pressures (see text for explanation)

It helps managers and policymakers identify where human activities cause pressures on the marine environment, evaluate the state of the ecosystem, and decide on effective responses and measures to achieve sustainability. It ensures that the social, economic, and environmental aspects are considered together for better long-term outcomes.

Elliot et al. 2017

- **D** – **Drivers**: These are the social, economic, or cultural factors that motivate human activities, like tourism, fishing, or shipping.
- **A** – **Activities**: The specific actions or human uses of the marine environment, such as fishing, oil drilling, or recreational boating.
- **P** – **Pressures**: The impacts that these activities create on the marine environment, like pollution, habitat destruction, or overfishing.
- **S** – **State**: The condition of the marine ecosystem, including its health, biodiversity, and water quality, as affected by the pressures.
- **I** – **Impact**: The consequences of the changes in the ecosystem's state, which can affect both the environment (e.g., loss of biodiversity) and society (e.g., reduced fish stocks).
- **W** – **Welfare**: The well-being of people and communities that depend on the marine ecosystem, influenced by the state of the environment and the services it provides (like food or coastal protection).
- **R** – **Response**: Management measures and the amendment or creation of policies, together with behavioural changes taken to address the negative impacts, such as implementing protected areas, regulating fishing, or reducing pollution.
- **M** – **Measures**: Specific policies, regulations, or actions put in place to manage the ecosystem and reduce pressures (e.g., marine protected areas, fishing quotas, clean energy transitions).

Scenario planning to scope for appropriate responses

- Scenarios offer coherent and plausible trajectories of system futures to assess current practices and explore new opportunities
- Alternative scenarios evaluate the performance (incl. long-term effects) of different management strategies on ecosystems
  - Identification of indicators and their targets
  - Forecasting and scenarios
  - Evaluation of specific options versus alternatives
- In SES, societal responses emerge from feedbacks and interact with ecological systems through management strategies
- Models ensure strategies align with both ecosystem and societal needs
- A baseline and alternative policy scenarios guide management decisions/responses

Identification of the potential management strategies

- Policy instruments do not work in isolation. Thus, one, two or more policy instruments may be used purposefully collectively to tackle a particular pressure or driver, as part of a well designed policy mix
- each management measure is defined by a specific configuration, i.e. human activity(s), pressure(s) and ecosystem component(s), that determines its interaction with the ecological system
- it requires at least one policy instrument to initiate its implementation (but in practice there may be several)

5 Steps of selecting an appropriate EBM RESPONSE

- Step 1: Identifying your goals
- Step 2: Defining and analysing existing conditions / understanding the system
- Step 3: Inventory of existing management measures and policy instruments
- Step 4: Screening further potential EBM measures
- Step 5: Selection of Management Strategies for further evaluation

Note: Effective EBM plans combine various management measures and policy instruments to address multiple pressures on ecosystems simultaneously.

Implementation, Monitoring, and Evaluation

Once the EBM plan is put into action, the focus shifts to monitoring and evaluating its progress. Its key to identify relevant monitoring programs and assess how well they:

- **Improve knowledge**: Help build a better understanding of the ecosystem using system-focused criteria
- **Evaluate success**: Compare baseline and alternative management scenarios with societal goals using indicators and targets
- **Revision of strategies** and targets if necessary
- **Compliance monitoring** whether strategies are being followed

EBM and Marine Spatial Planning (MSP)

- **Integrate EBM in MSP** to ensure sustainable development and conservation of marine ecosystems.
- **Making EBM operational at each MSP stage**, includes setting clear ecological objectives, stakeholder engagement, adaptive management, and continuous monitoring and evaluation.
- **Step-by-Step MSP Approach**: (1) Scoping and baseline assessment, (2) Vision and objectives formulation, (3) Plan development, (4) Implementation, and (5) Monitoring and review.
- **Challenges in EBM Implementation**: data limitations, conflicting stakeholder interests, governance complexities, and the need for interdisciplinary collaboration in applying EBM within MSP.
- **Unique Features of EBM in MSP:** considering ecosystem connectivity, cumulative impacts, and the precautionary principle to address uncertainties and ensure resilience in MSP

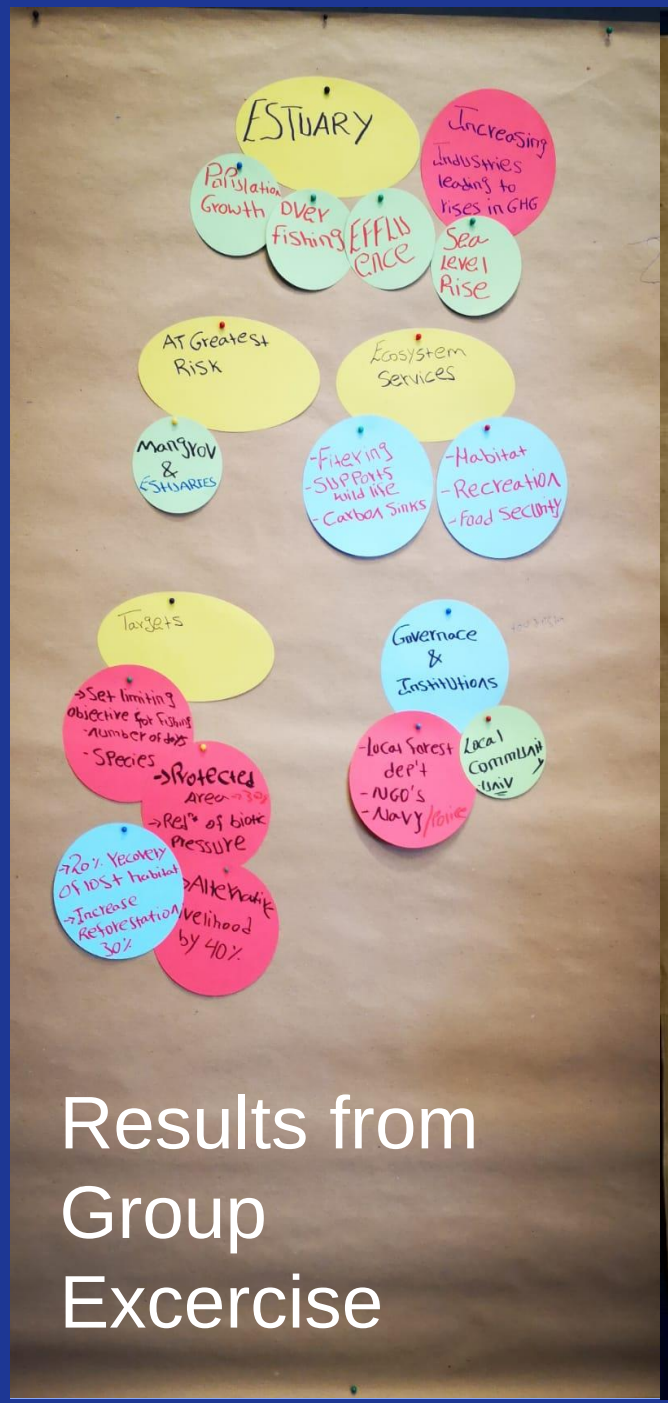
EBM - Lessons learned

- Regional Conventions have been instrumental in developing understanding of EBM and ES but can be limited by their individual remits
- In the EU, EBM is partially implemented and in a top-down manner giving Member States significant discretion and often resulting in extensive differences between countries
- Many existing EU policies in their current form contradict the commitment to implementing EBM and preserving ecosystem services, such as measures and activities under Common Agricultural Policy and Common Fisheries Policy

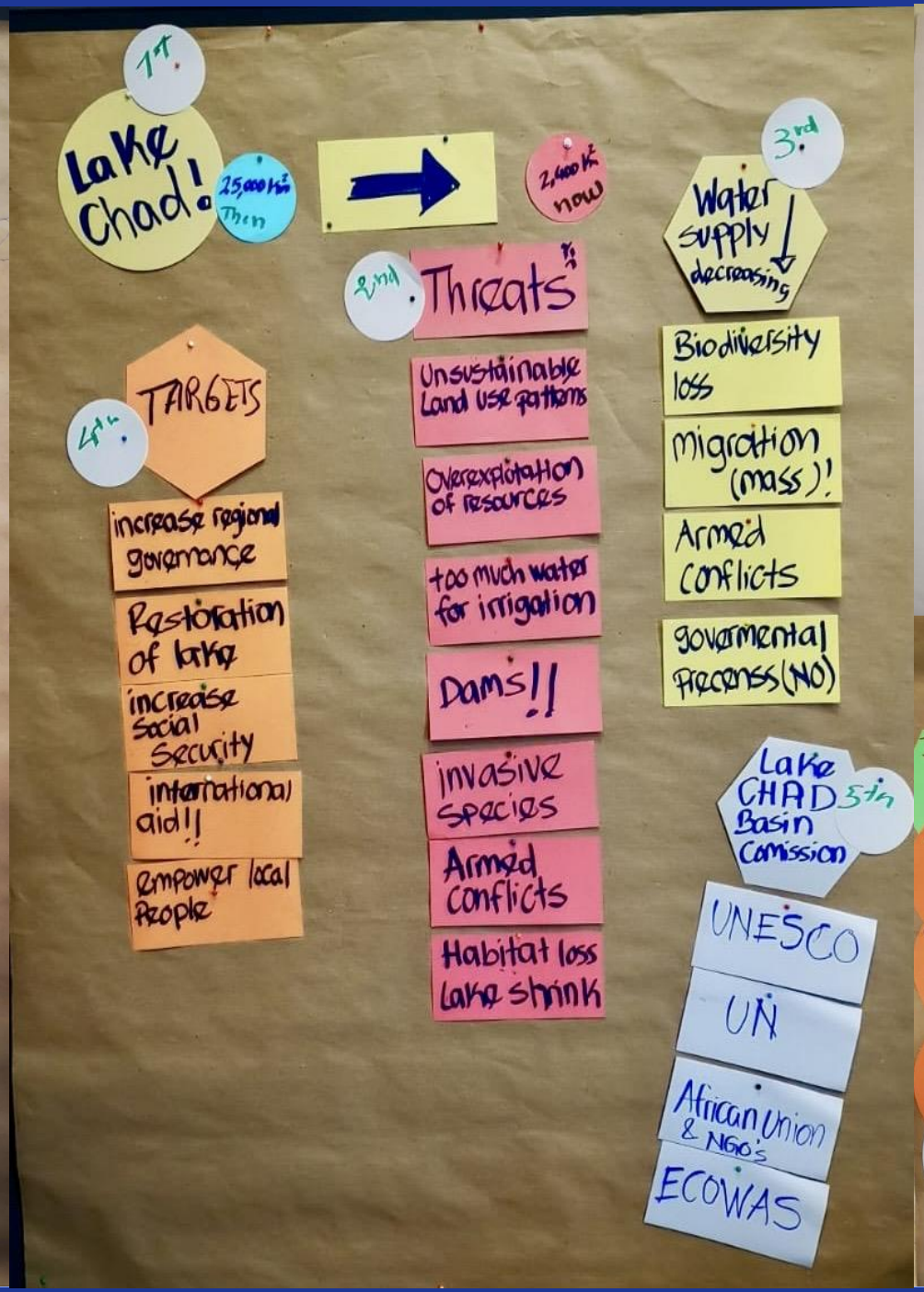
From O'Hagan in Delacámara et al. 2020

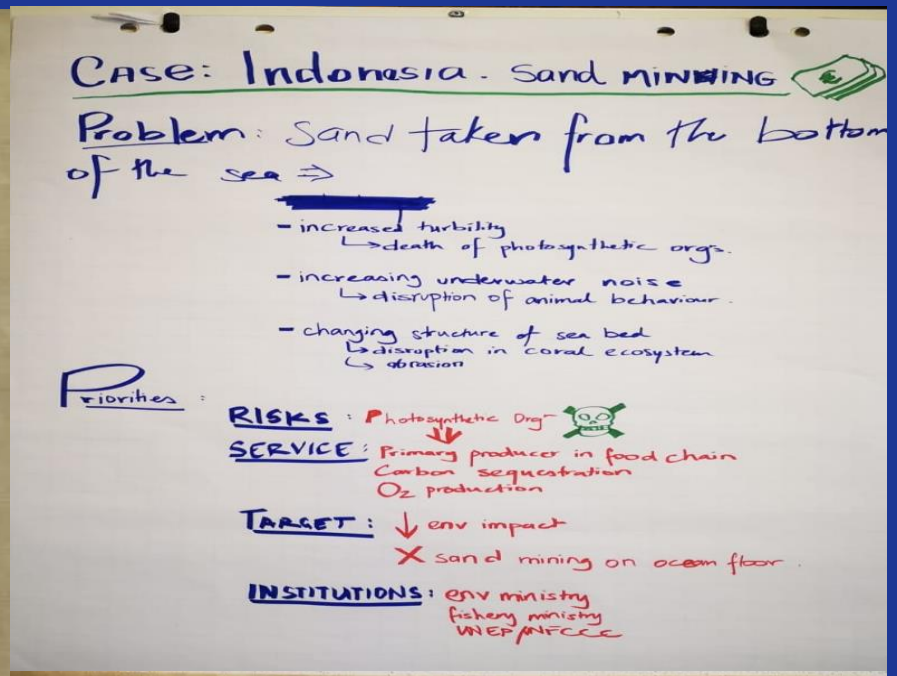
Work in small groups - Part I

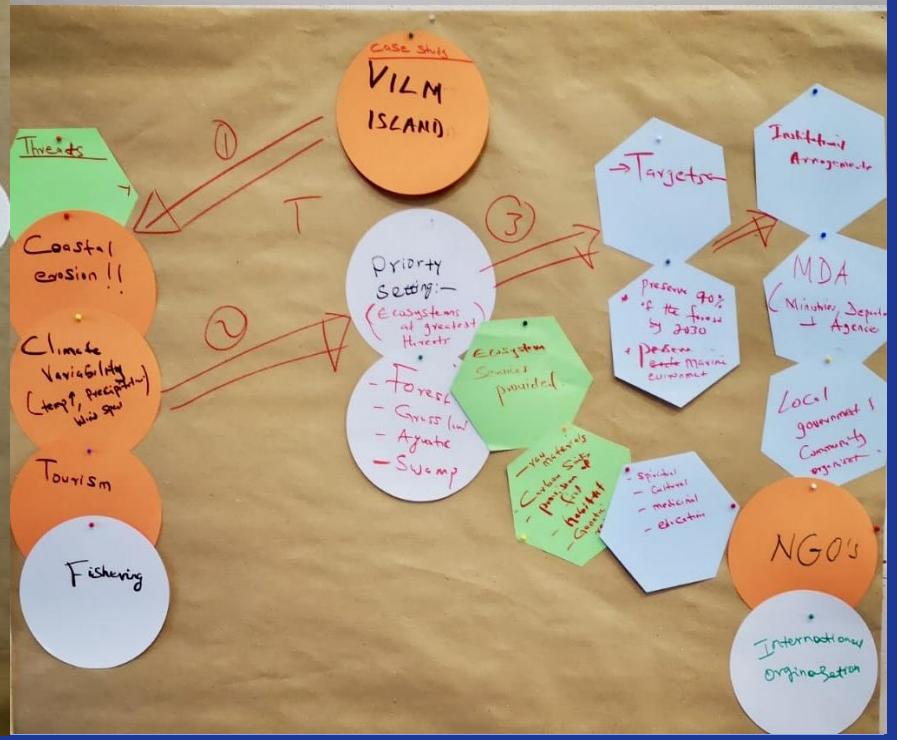
- Select a case study region (real or hypothetical)
- Identify key threats (human activities and their pressures) impacting marine biodiversity
- Priority setting: Determine what ecosystems are at the greatest risk and the ecosystem services they provide
- Select targets (according to goals) for objectives (to inform management)
- Identify governance and institutions relevant for the achievement of targets



Results from Group Excercise







Marine SABRES

MARINE SABRES

MARINE SABRES

Systems **A**pproaches for **B**iodiversity **R**esilience and **E**cosystem **S**ustainability

Overarching Aim:

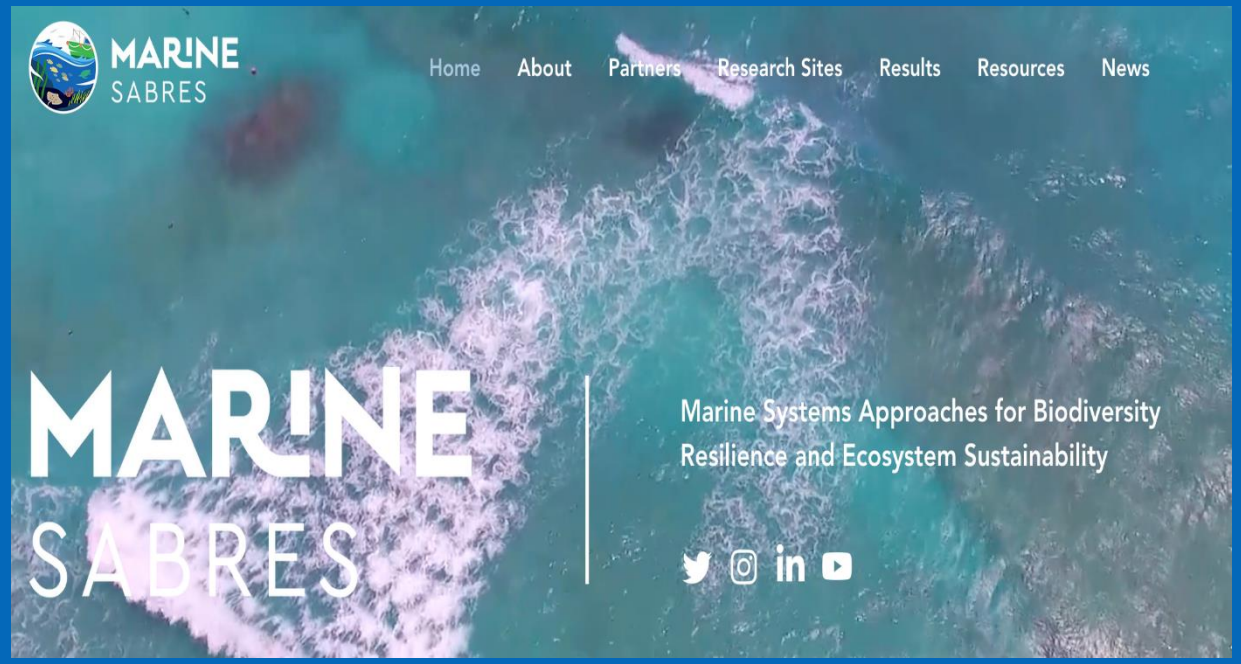
"To conserve and protect biodiversity by integrating Sustainable Ecosystems and a Resilient Blue Economy"

Funded by the European Union's Horizon Europe programme under grant agreement No.101058956.

UCC University College Cork, Ireland Coláiste na hOllscoile Corcaigh

Environmental Research Institute

MaREI Energy · Climate · Marine



Integrating marine biodiversity conservation with a resilient blue economy.

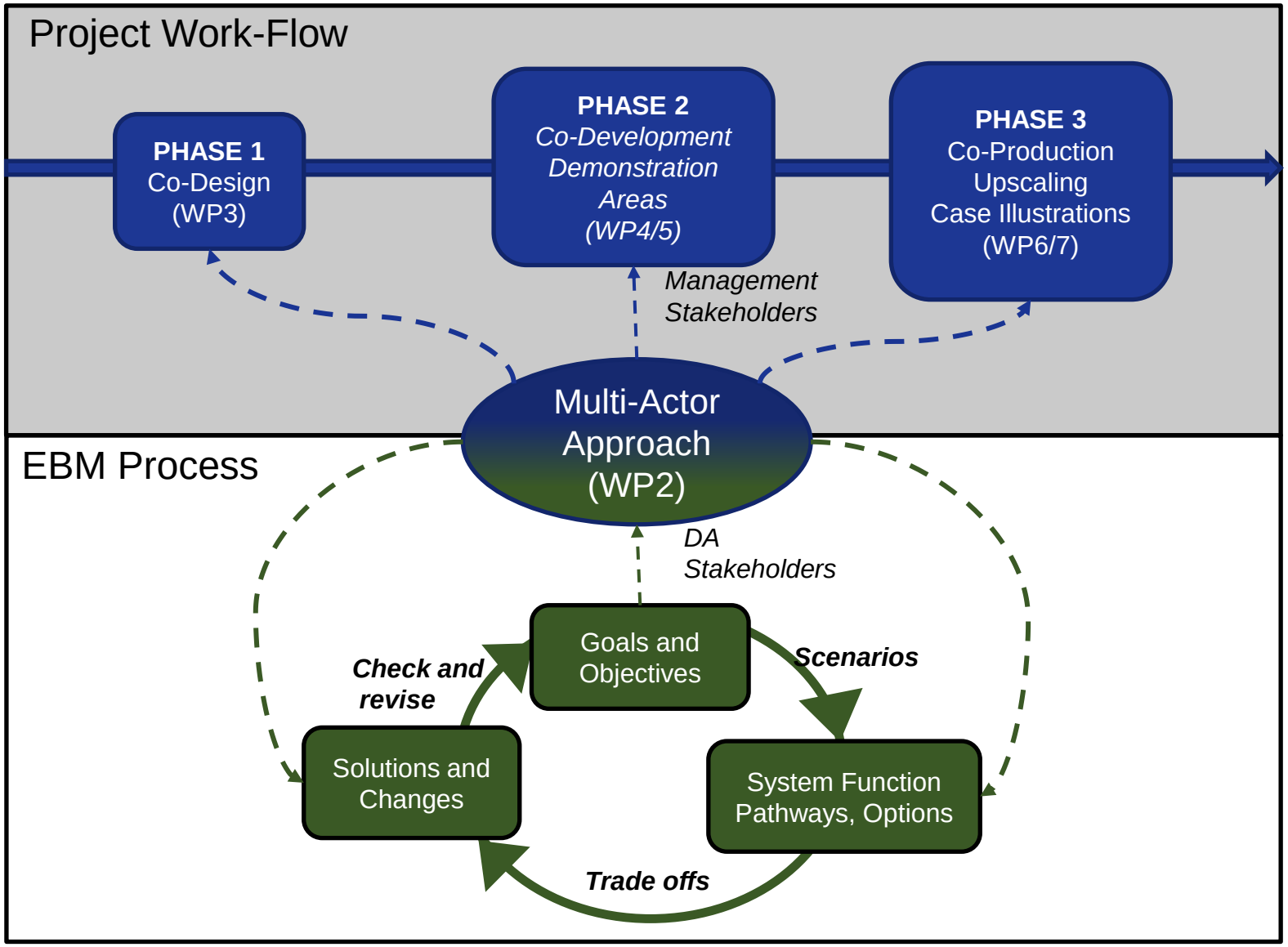
Marine SABRES is an EU-funded research project that brings together 21 research partners to restore marine biodiversity and support a sustainable blue economy by increasing the uptake of ecosystem-based management in Europe.

To make ecosystem-based management more achievable and implementable, we need to comprehensively study and analyse marine social-ecological systems. Marine SABRES is therefore co-developing and testing a simple socio-ecological system in collaboration with local people in three European marine regions: the Arctic Northeast Atlantic, the Tuscan Archipelago, and Macaronesia.

Funded by the European Union's Horizon Europe programme under grant agreement No.101058956.

The novelty of Marine SABRES is…….

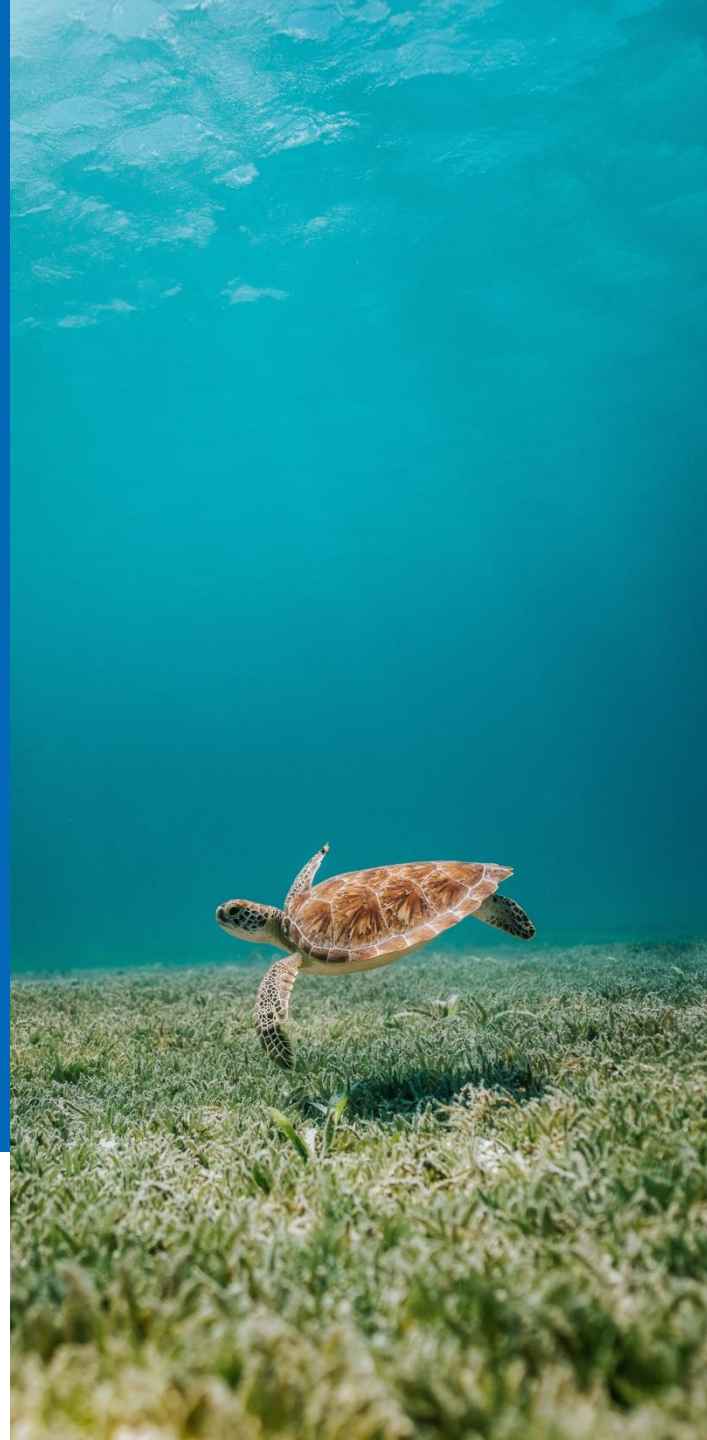
……its use of the Multi-Actor Approach to design tools specifically aimed for practical use by managers. Marine SABRES goes beyond the state of the art by **fully incorporating user needs and requirements** in the development of ALL aspects of the project, i.e., co-design, coproduction and co-delivery, ensuring that the products will be **credible, salient, legitimate, usable**, and will be used to better **formulate and implement** European and international marine conservation and management **policies**….


Project Work-Flow
PHASE 1
Co-Design
(WP3)
PHASE 2
Co-Development
Demonstration
Areas
(WP4/5)
PHASE 3
Co-Production
Upscaling
Case Illustrations
(WP6/7)
Management
Stakeholders
Multi-Actor
Approach
(WP2)
EBM Process
DA
Stakeholders
Goals and
Objectives
Scenarios
System Function
Pathways, Options
Trade offs
Solutions and
Changes
Check and
revise

MARINE SABRES

Work Package 5
Task 5.2-Economic opportunities and costs

Manuel Lago, Gregory Fuchs, Fenja Kroos, Julia Maund
ECOLOGIC INSTITUTE



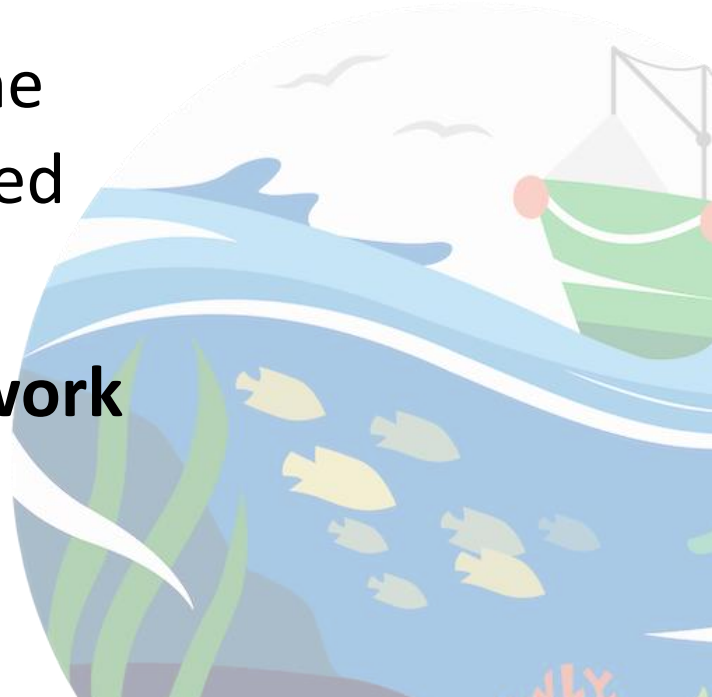
Funded by the European Union's Horizon Europe programme under grant agreement No.101058956.

Task 5.2 (Economic Opportunities and Costs)

MARINE SABRES

Objectives:

- Assess the the **scale of potential impacts from management scenarios** in the Das
  - Evaluation of responses
  - Cost and benefits
- Provide **evidence-based advice** to policymakers on the consequences of different interventions to reach stated scenarios
- Use a **stepwise economic impact assessment framework to analyse responses**, using **evaluation criteria**



WP5 Developing targeted solutions

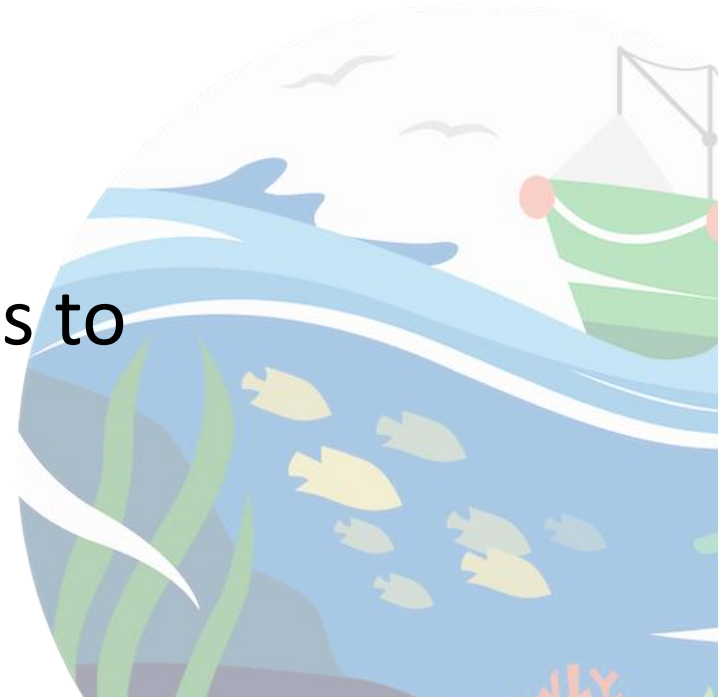
MARINE SABRES

Objectives of other Tasks in WP5:

T5.1/AP4: Validation and upscaling of the scenarios through a co-creation process.

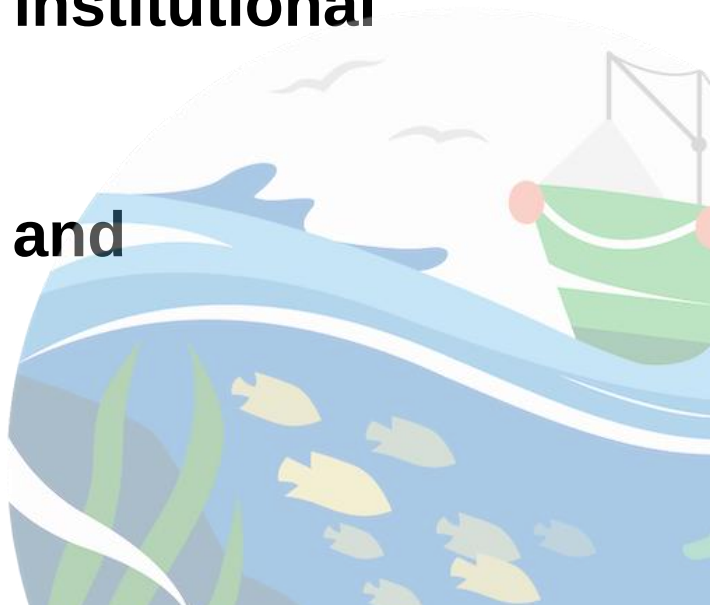
T5.3: Quantify incentives and behavioral change required for the management scenarios.

T5.4: Develop innovative governance approaches to achieve climate, biodiversity and sustainability targets



Baseline required:

- **Best possible understanding of the system** in different components (environmental, social, economic) & ongoing **processes/interactions**
- **Identifying key threats** (human activities and their pressures**) that have significant impacts** on the ecosystem or communities involved
- **Identifying drawbacks of traditional approaches and institutional setups**
- **Identifying gaps or inefficiencies in existing policies and management practices**
- Assess **stakeholder preferences**



Economic Impact Assessment

"Assessing is about evaluating, making (analytical) judgements or statements… It is not just about measuring, describing or informing. For that purpose, we need to understand processes and causes, rather than just describing and measuring states."

Goal: to collect evidence (including evaluation results) that would allow for an informed assessment and future recommendations.

Method: "Ex ante" (before): Assess the current situation under the baseline management scenario before implementing changes, comparing it to societal objectives.

Why conduct an Impact Assessment?

- To evaluate the potential **positive and negative impacts** of different management interventions

- To ensure that decision-makers have a clear understanding of the **costs, risks and benefits** associated with various courses of action

- To analyse <u>(potential) trade-offs:</u>
  - **Environmental vs. economic growth**: Increasing tourism may generate revenue but could risks damaging sensitive marine habitats
  - **Social equity vs. conservation**: Some interventions, such as stricter regulations in MPAs, may benefit conservation but could negatively affect local communities reliant on fishing or tourism

What is the focus of the DAs?

From D4.1:

- **1. Arctic DA: The focus of this DA is on sustainably manage the pelagic ecosystem of the Northeast Atlantic, namely the commercial pelagic fisheries as a main anthropogenic driver of ecological (marine ecosystem) impacts across three countries (Iceland, Greenland and the Faroe Islands).**
- **2. Macaronesia DA: The balance between the economic and societal benefits of tourism and its ecological impact on Macaronesia coastal habitats was identified as a major challenge in the region. Therefore, the primary connections modelled were those between tourism, society and coastal marine ecosystems, with an emphasis on the conservation of Marine Protected Areas (MPAs).**
- **3. Tuscany DA: Focus of the study is to balance tourism and the conservation of seagrass meadows in the Tuscan Archipelago National Park (TANP). Therefore the main connections between tourism, society, and coastal marine ecosystems were modelled within the SSES framework, with the ultimate aim of identifying effective management options for the conservation and protection of seagrasses and the Ecosystem Services (ES) they provide, as well as considering the requirements to adapt to climate change and the challenges of implementing Marine Protected Areas (MPAs) in a complex governance landscape.**

Input to ask from the DAs

Rating the importance of interventions (matched existing management and policy measures; suggested new ones)

Examples for the Macaronesian DA:

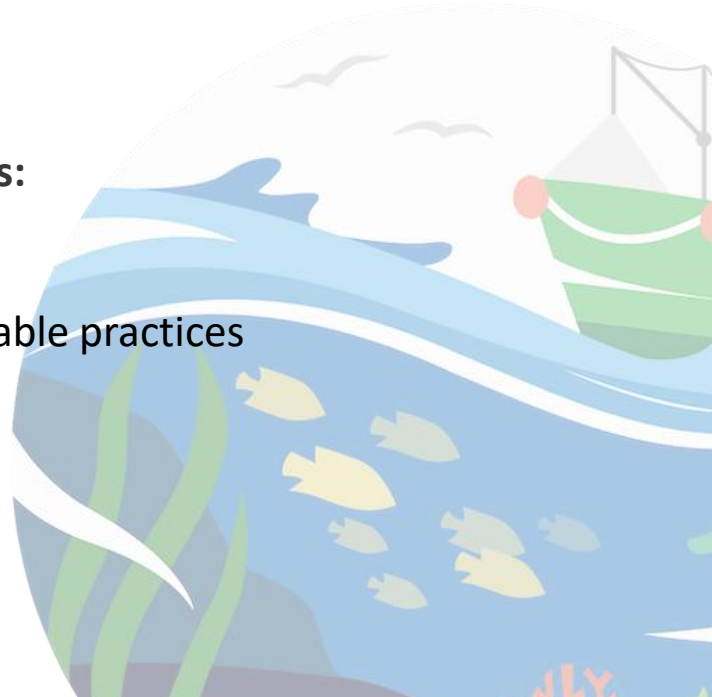
- Expand and effectively manage MPAs
- Promoting sustainable tourism
- Community engagement and empowerment
- Education and awareness programs
- Policy and regulation enforcement
- Etc.

Linking interventions to (activities and their pressures, causing) **impacts**

Positive impacts:

- Economic growth
- Environmental health
- Job creation
- Conservation awareness
- Research opportunities

- **Negative pressures and impacts:**
  - Ecological degradation
  - Overfishing and unsustainable practices
  - Habitat destruction
  - Pollution
  - Cultural disruption



The **10-tenets** of adaptive management and sustainability

- A holistic framework for understanding and managing the socio-ecological system
- The assessor (who could be a project leader or decision-maker) will review each management strategy based on these basic criteria. If the strategy doesn't meet these minimum standards, it's recommended to **reconsider the measure—** especially if there are alternative strategies that could better meet the goals.
- These questions are intended to be discussed with stakeholders (like local communities, environmental experts, policymakers) to gather a well-rounded view of whether the strategy meets the necessary criteria.
- In a pre-screening, they are essentially minimum requirements. For more thorough assessments, quantitative and qualitative methods are applied

Barnard & Elliott 2015

10 criteria/tenets for pre-screening & assessment	Questions	
1. Ecologically sustainable/effective	• Does the measure contribute to achieving environmental targets?	Quantifiable
2. Technologically feasible	• Is the necessary technology available and proven? • Are there plans for its operation and long-term maintenance?	Quantifiable
3. Financially feasible	• Who will fund the measure? • Is the funding sufficient for long-term success, and can beneficiaries contribute? • Is public financial support viable at local, national, or regional levels?	Quantifiable
4. Economically efficient	• Is it good value for money compared to other alternatives? • Does it offer good value, not just the lowest cost?	Quantifiable
5. Socially desirable/tolerable	• Will stakeholders support the measure, or might there be resistance?	Narrative
6. Ethically defensible	• Is the measure ethically sound and morally correct?	Narrative
7. Culturally inclusive	• Are local customs and practices adequately addressed?	Narrative
8. Legally permissible	• Does the measure comply with laws and regulations?	Quantifiable
9. Administratively achievable	• Are the administrative processes and transaction costs manageable?	Quantifiable
10. Political feasibility	• Can the measure be openly discussed, and does it align with the current political landscape?	Narrative

Adapted from Barnard & Elliott 2015

Summary and reflection, questions, feedback

Ecologic Institute

Science and Policy
for a Sustainable World

Thanks! Any more Questions?

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