HOLISTIC ANALYSIS OF MARINE ENVIRONMENTS AS SHARED SOCIAL-ECOLOGICAL SYSTEMS FOR INTEGRATIVE ECOSYSTEM-BASED MANAGEMENT.

Gemma Smith, Amanda Gregory, Jonathan Atkins, and Michael Elliott.

Funded by the European Union and UKRI, grant numbers 101058956/10050525

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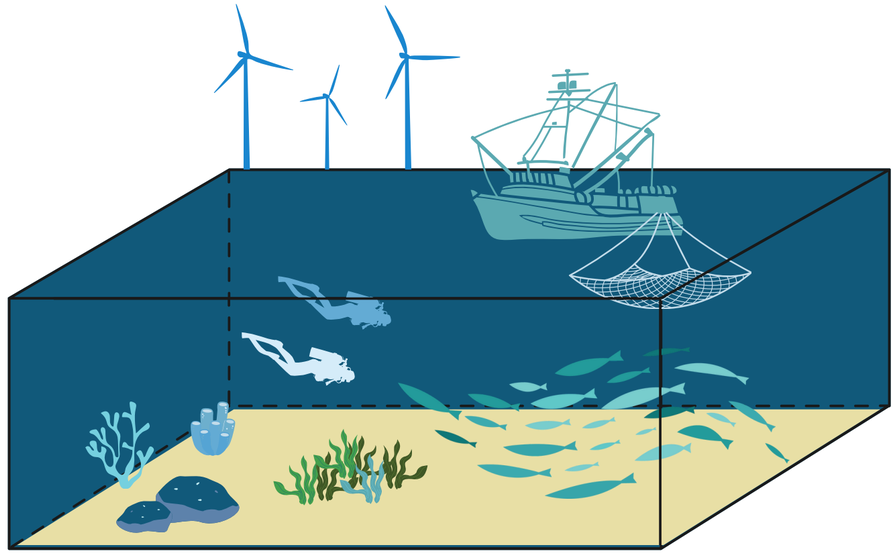
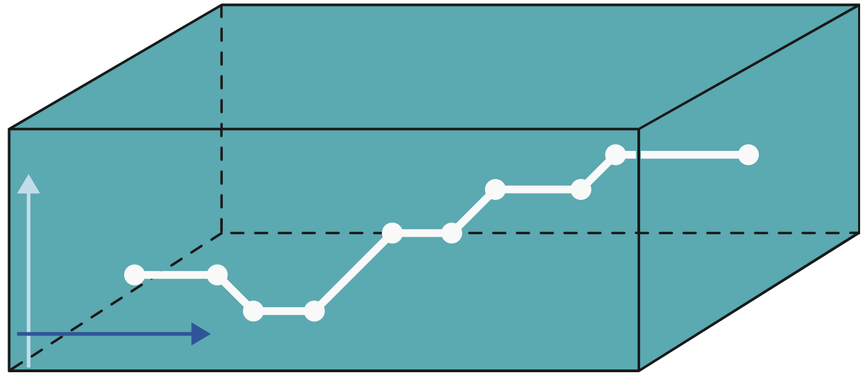
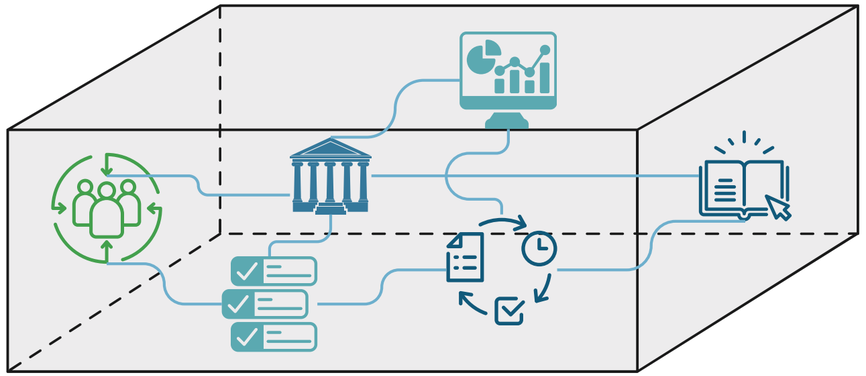
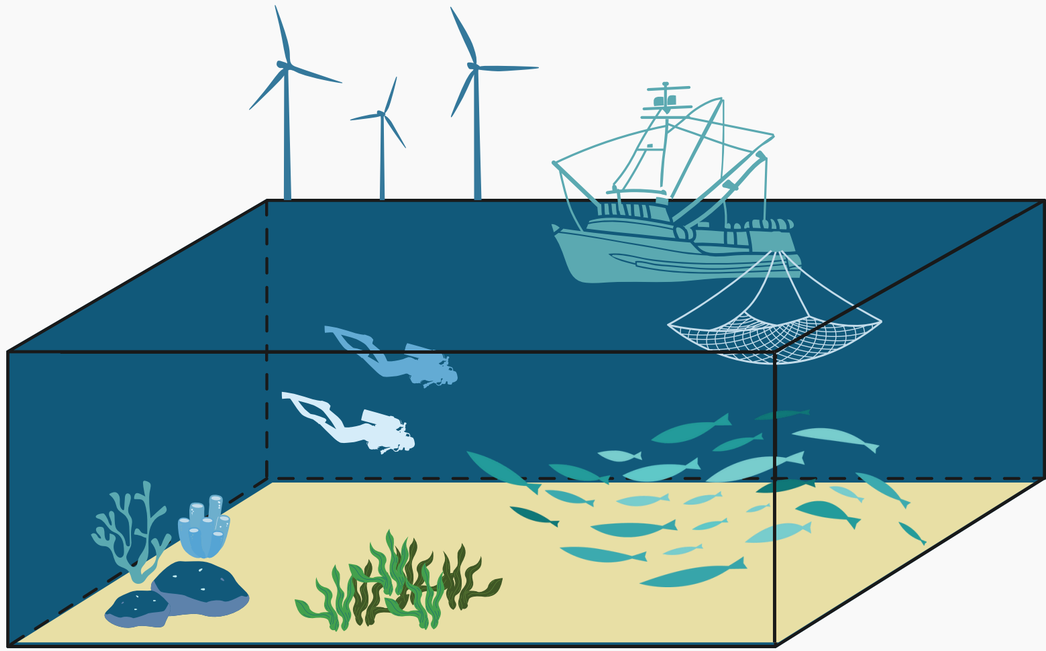




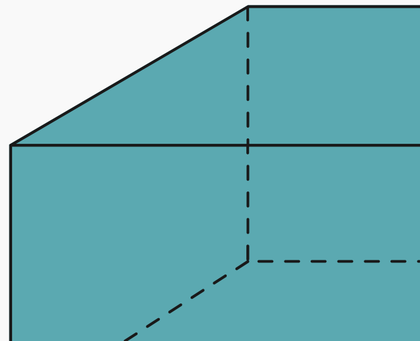


WHAT IS A SOCIAL-ECOLOGICAL PERSPECTIVE?

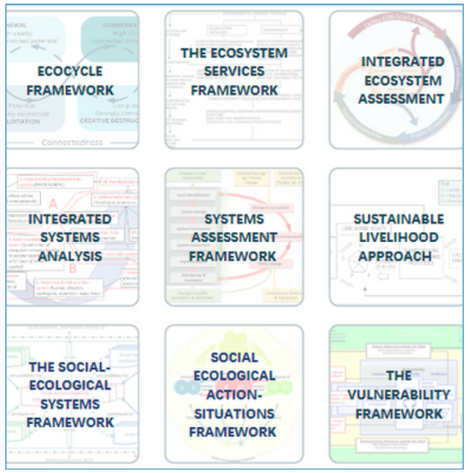


Approaches that intended to examine the relationship between people and nature as inter-linked, recognising that humans should be seen as a part of, not apart from, nature, and nature as inter-linked to social systems.

-Berkes & Folke, 1998, Cambridge University Press; Ostrom 2009, Science.)

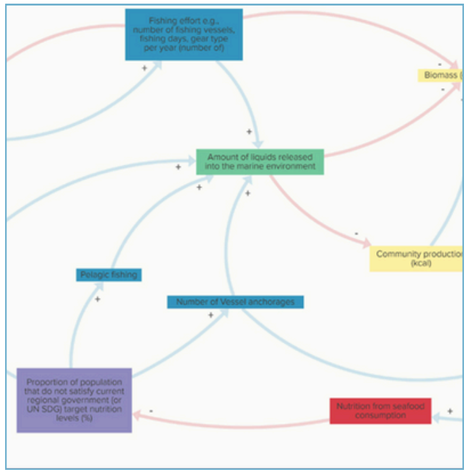


SIMPLE SOCIAL-ECOLOGICAL SYSTEM



Existing Social-Ecological Systems were reviewed.

We reviewed 9 existing SES approaches to explore the key components necessary to operationalise an approach.



Theories from Systems Thinking propose tools for understanding a complex system.

Using the ‘minimum complexity necessary’ premise to achieve a holistic approach required use of systems theory.

THE INTEGRATED SYSTEMS APPROACH

PROCESS AND INFORMATION MANAGEMENT SYSTEM

This is a management system where we account for provenance in all social and ecological elements of the system and set the foundations for analysis.

PROBLEM STRUCTURING METHOD

A problem structuring cause-consequence -response framework to underpin the SES to define key elements. This is called the DAPSI(W)R(M) framework.

SYSTEMS TOOLS AND METHODOLOGIES

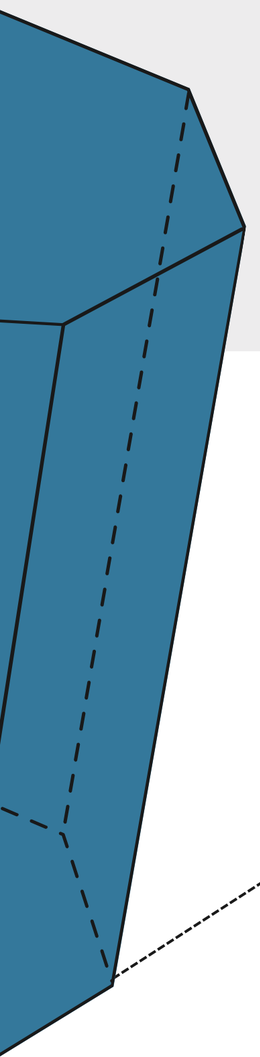
Qualitative systems tools such as Causal loop diagrams and Behaviour Over Time graphs complement the data driven approach. Alongside a critical approach to stakeholders and knowledge generation.

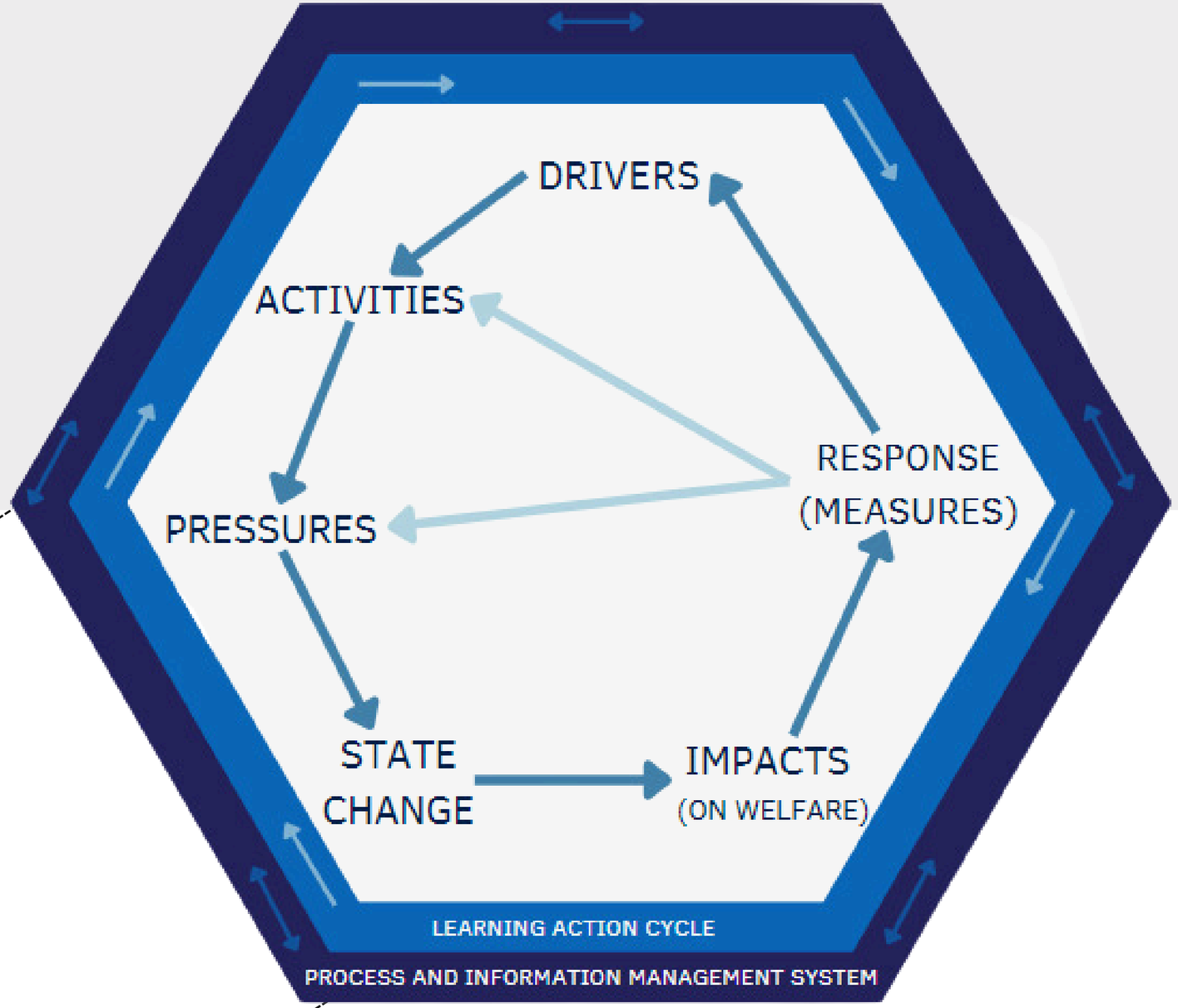
MANAGEMENT MEASURES

After learning more about the system in focus, and how this behaves as a whole, management measures can be designed with the knowledge of unintended consequences in mind and feedback loops within the system.

(Elliott, 2020 Ocean Coast. Man.; Gregory, et al., 2023)

THE SIMPLE SES



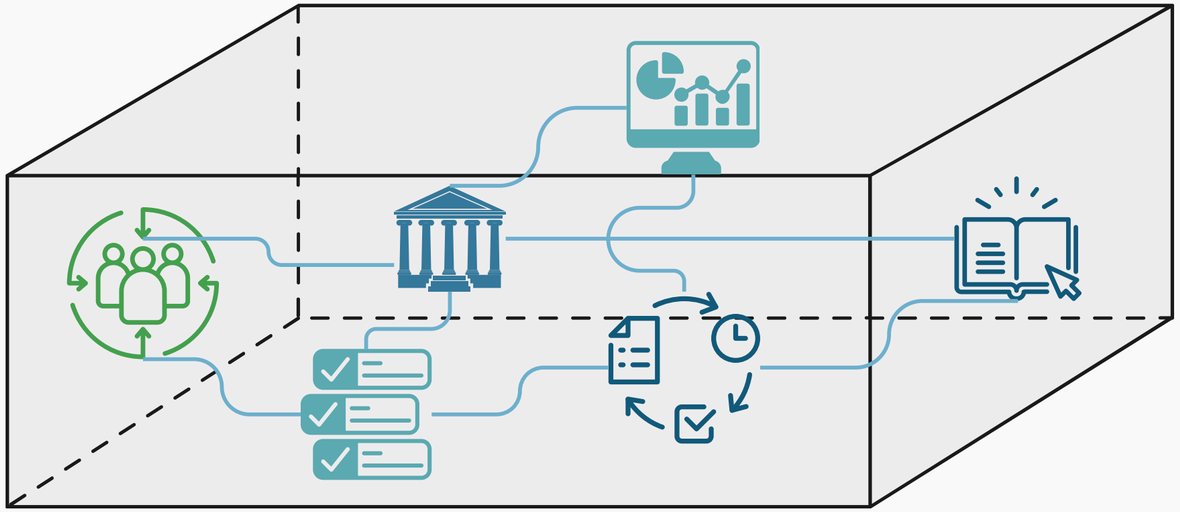


(Gregory, et al., 2023)

The foundations of the analysis.

THE PROCESS AND INFORMATION MANAGEMENT SYSTEM

- Process and Resource Management
- Stakeholder engagement and management
- Data provenance
- Governance
- Evaluation (outcome and process)

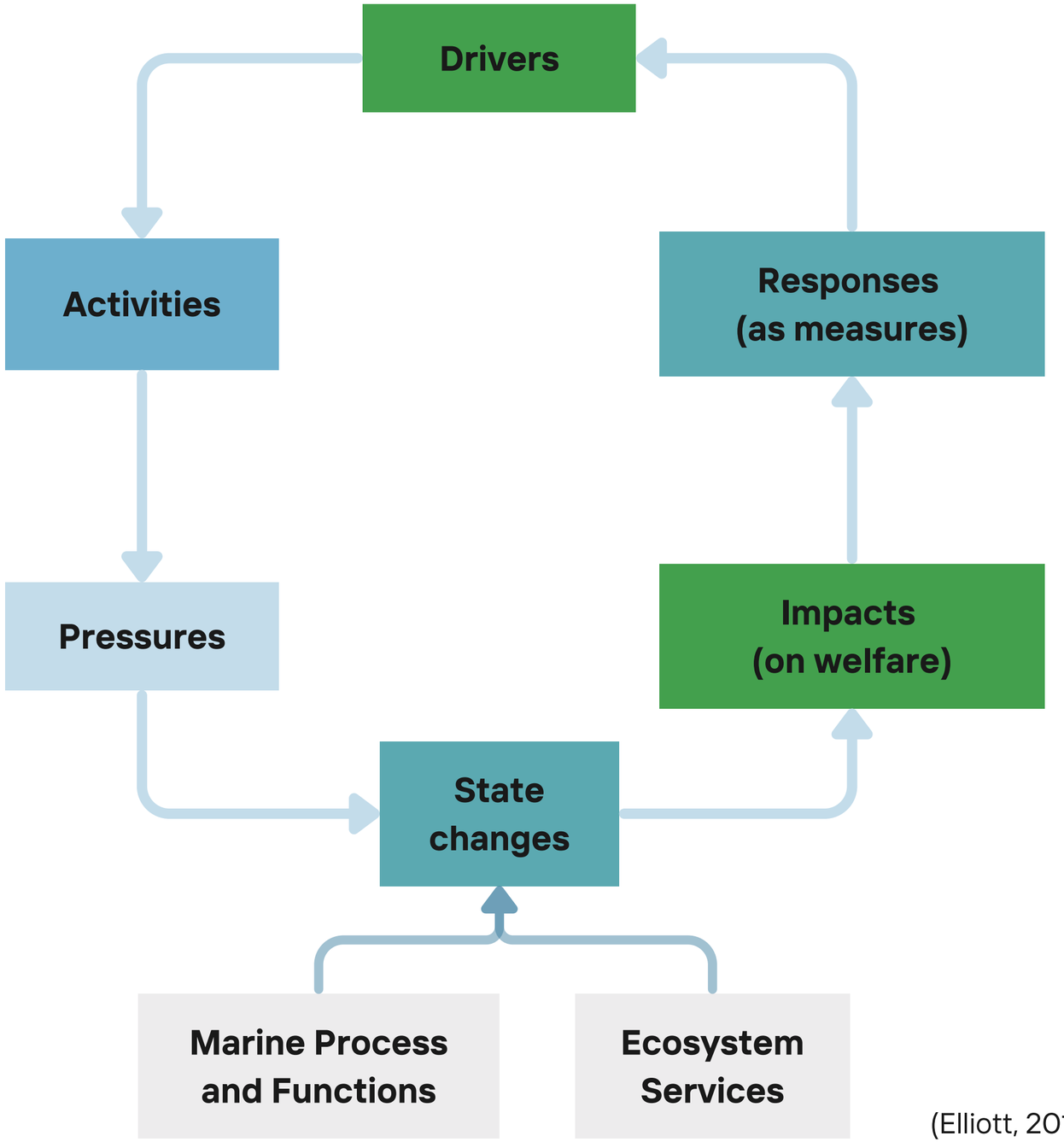


(Gregory, et al., 2023)

The problem structuring method.

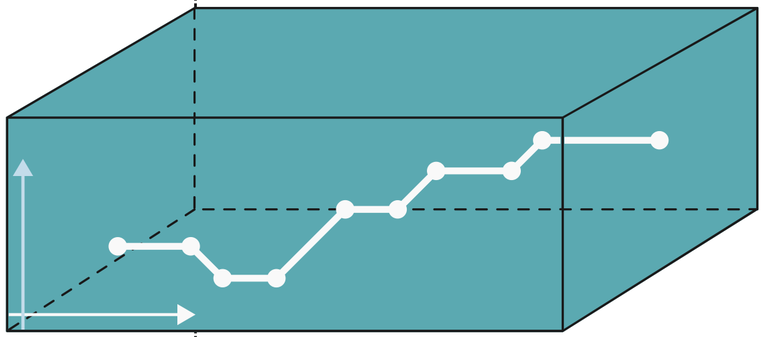
DAPSI(W)R(M)

- Pronounced *“dap-see-worm”*
- This cause-consequence - response framework structures the variables of an SES
- Ensures the various elements are accounted in management considerations
- Use indicators for the elements for proxy measures of the system.



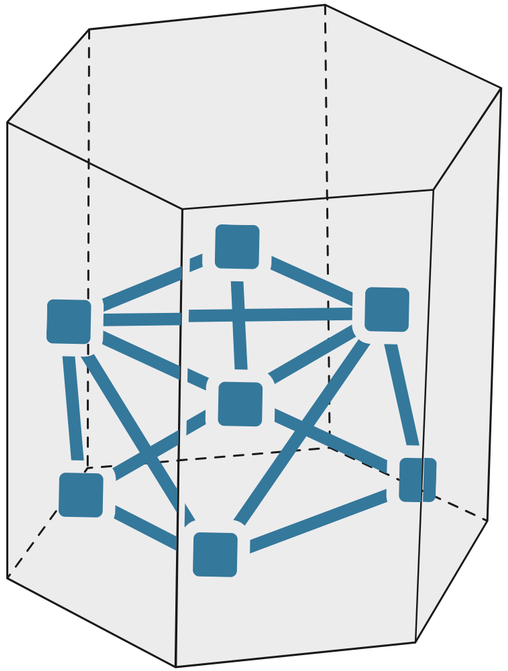
(Elliott, 2017
Mar. Pol.. Bull.)

CAUSAL THEORY BUILDING



BEHAVIOUR OVER TIME

Similar to a Time series, a BOT graph is a qualitative tool to help build causal theories to how a variable is behaving over time.

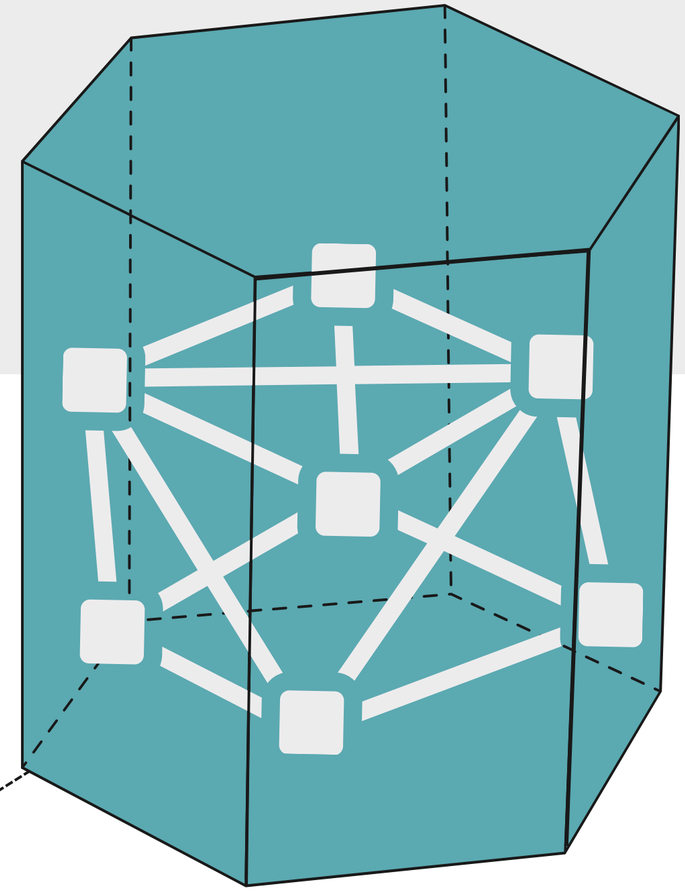


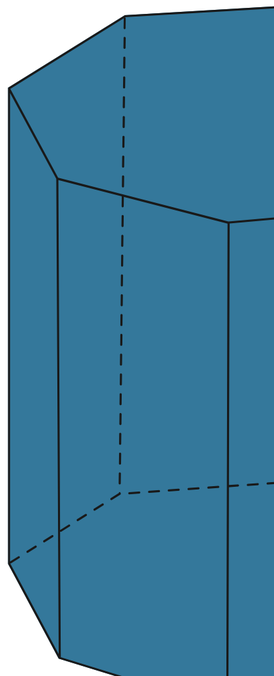
CAUSAL LOOP MAPPING

Presents a view of how our system acts as a whole. Also, allows for the tracing of behaviours and the identification of feedback loops

UNDERSTANDING THE SYSTEM

Now we have developed causal theories using available data, literature, stakeholder information and expert opinion, we can begin view the system as a whole.

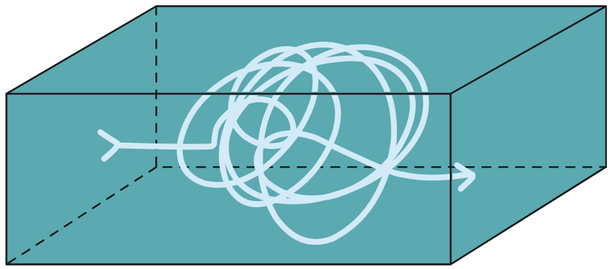




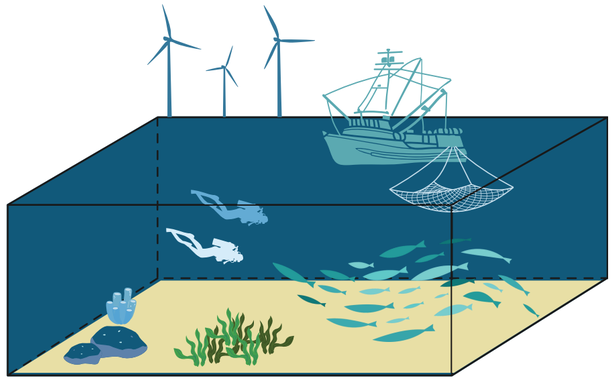
- Identify vicious or virtuous feedback loops
- Trace possible solutions to look for unintended consequences of management measures.
- Find points of leverage within the system for cost effective measures.

Why do we need an SES approach?

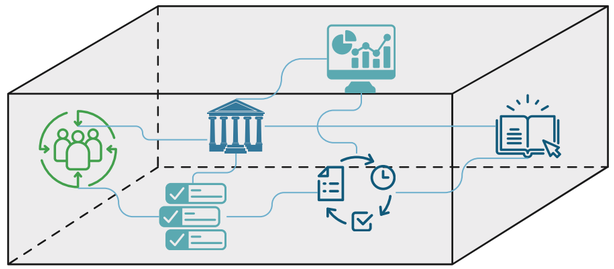
THE VALUE OF A SIMPLE SES



A minimum complexity necessary approach promotes accessibility of Ecosystem Based Management (EMB) to a wide range of practitioners.



Promote sustainable development in coastal and marine sectors and the uptake of EBM.



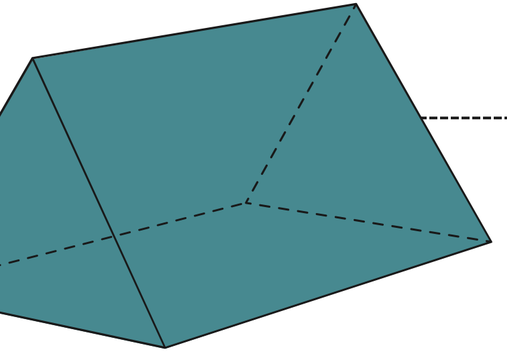
It merges different systems used across sectors (science, policy, socio-economic) to reach holistic management solutions.

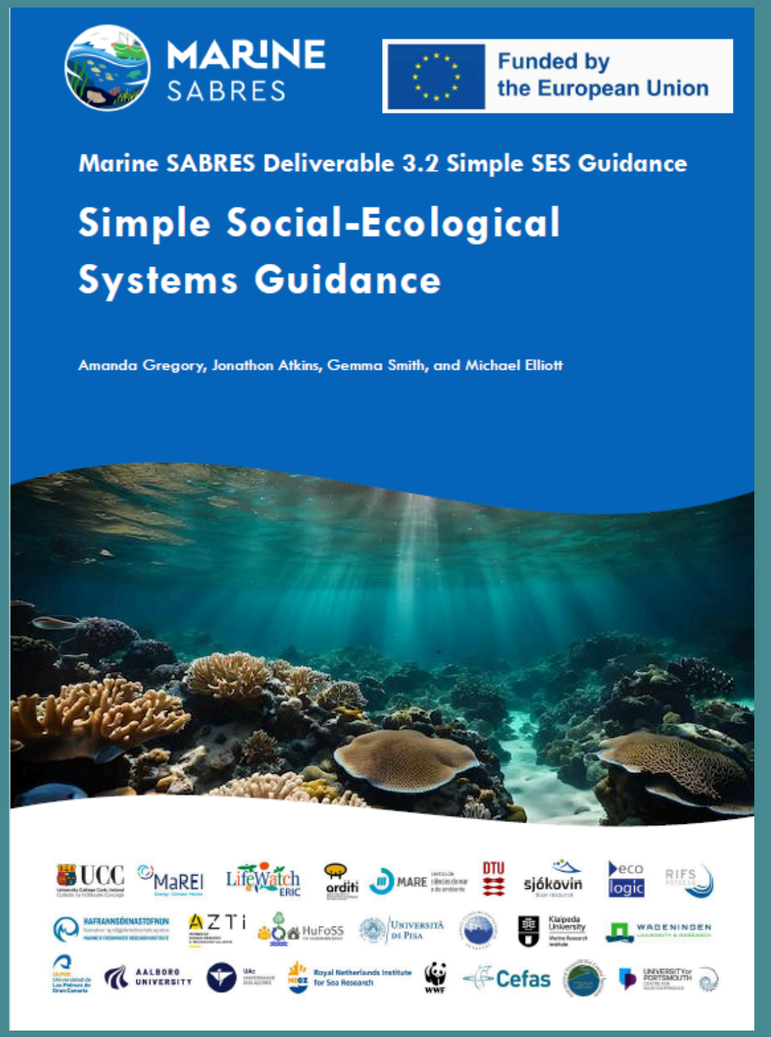
MARINE SABRES

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"





Access the guidance here:
https://www.marinesabres.eu/results

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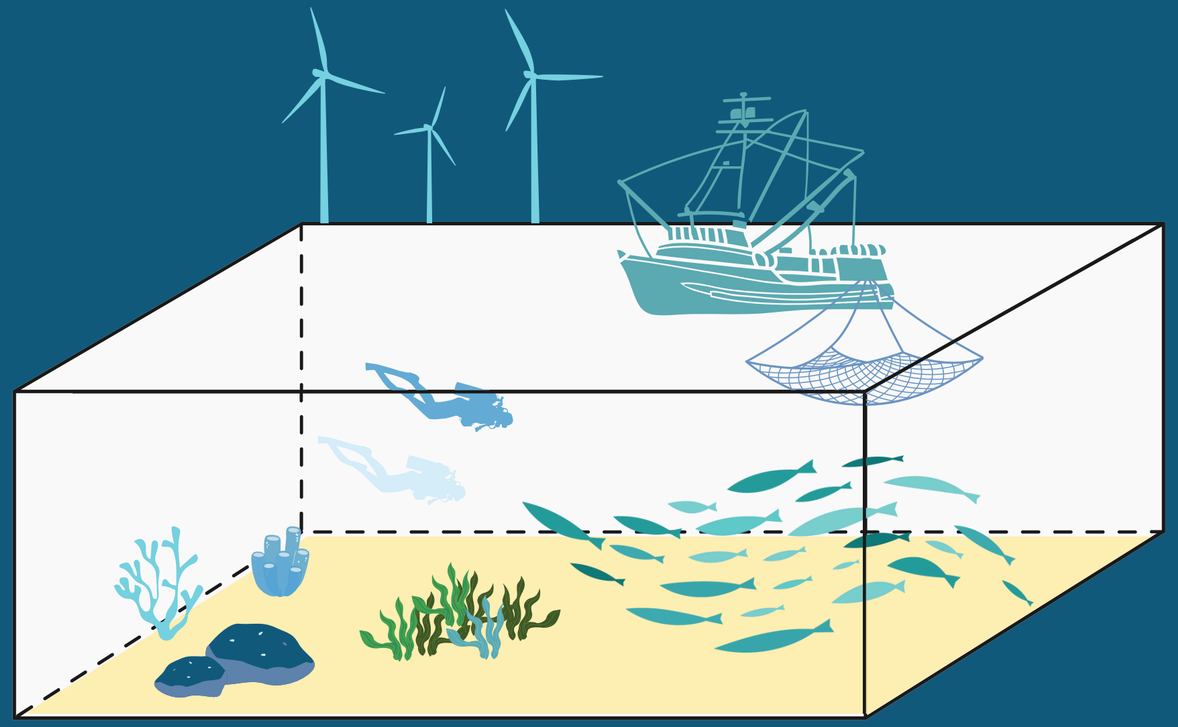

THANK YOU!

Any questions?

Gemma Smith

Gemma.Smith@iecs.ltd

International Estuarine and Coastal Specialists Ltd.

@MarineSABRES

@MarineSABRES

Linkedin.com/company/MarineSABRES

MARINE SABRES

INTERNATIONAL ESTUARINE AND COASTAL SPECIALISTS IECS

UKRI

UCC University College Cork, Ireland Coláiste na hOllscoile Corcaigh

MaREI Energy · Climate · Marine

LifeWatch ERIC

arditi

MARE centro de ciências do mar e do ambiente

DTU DTU Aqua National Institute of Aquatic Resources

sjókovin blue resource

eco logic

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HuFoSS For a sustainable future

Università di Pisa

Klaipeda University Marine Research Institute

ULPGC Universidad de Las Palmas de Gran Canaria

WAGENINGEN UNIVERSITY & RESEARCH

AALBORG UNIVERSITY

UAc UNIVERSIDADE DOS AÇORES

NIOZ Royal Netherlands Institute for Sea Research

WWF

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References

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