

The Minimum Complexity Necessary: the value of a Simple Social-Ecological Systems Analysis in holistically managing the Marine Environment.

Gemma Smith, Professor Michael Elliott, Dr Amanda Gregory, Professor Jonathan Atkins.

IECS Ltd.











SES definition & Review

2 Operationalisation

3 The Simple SES





# Simple SES Definition

Human aspects
within the system,
e.g. fishing, tourism,
and policies

The scope of focus where the different aspects interact, e.g. an ecosystem or a specific area

# SIMPLE SOCIAL-ECOLOGICAL SYSTEM



The minimum complexity necessary to make informed decisions

Natural aspects within the system, e.g. habitats, species, and marine functions.



# Appropriate characteristics



### **CREDIBLE & LEGITIMATE**

Evidence-based through robust data, and on data that is unbiased and gathered inclusively.

### **RESILIENT & ADAPTIVE**

To have the ability to adapt and provide users with the decision support tools to take in and use new information.

#### **HOLISTIC**

Applying a multi-sectoral approach will ensure an integrated approach will be communicable between actors and encourage management measures uptake.



"Comprising of basic elements necessary to achieve the objectives in an easily conducted and understood manner."

## **CONSISTENT**

Consistency in approaches, terminology, and reporting will aid accessibility, application, and information sharing on larger scales.

### STAKEHOLDER INCLUSIVE

Including the relevant actors to influence the understanding and decision making.



Throughout this study,
we conducted a
literature review
combined with a SWOT
analysis and applied
appropriate
characteristics criteria
to existing SES
frameworks



#### Criteria

Simple in application

Resilience and adaptive features

Unbiased

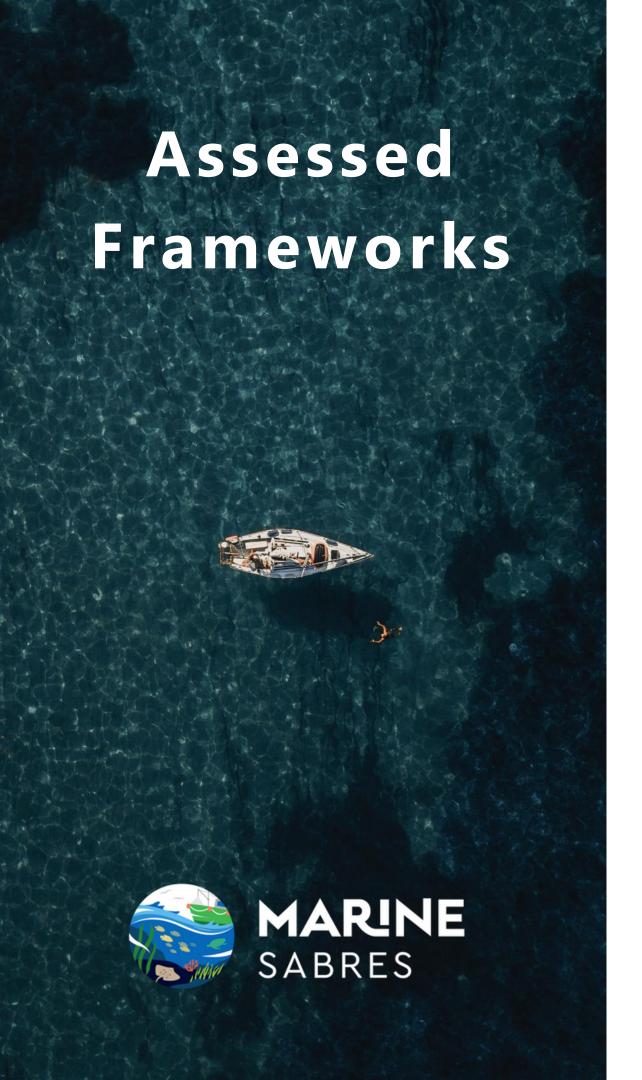
Cross-scale

Holistic

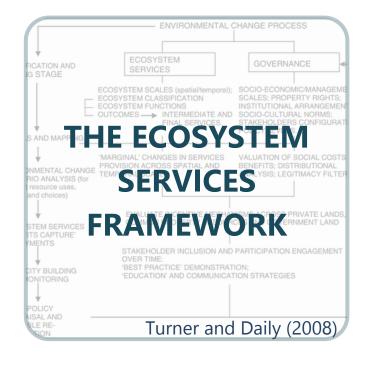
Learning from implementation in practice

Stakeholder inclusive

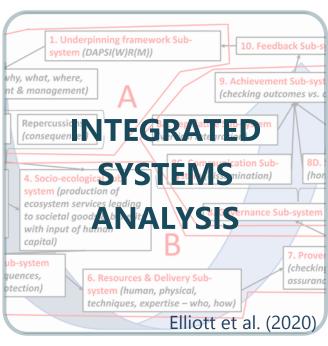
Applied in the marine environment

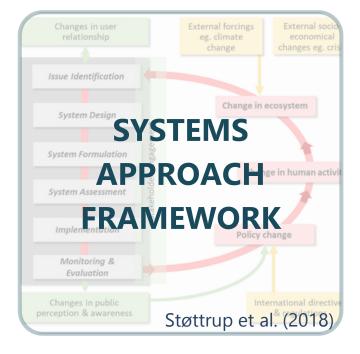


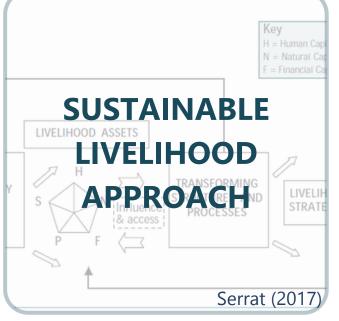


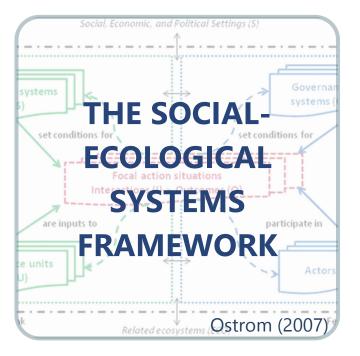




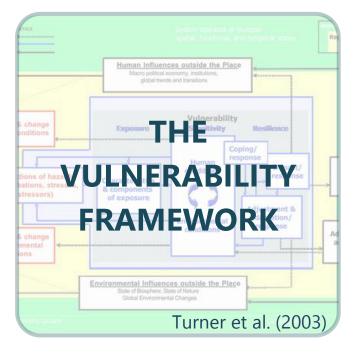








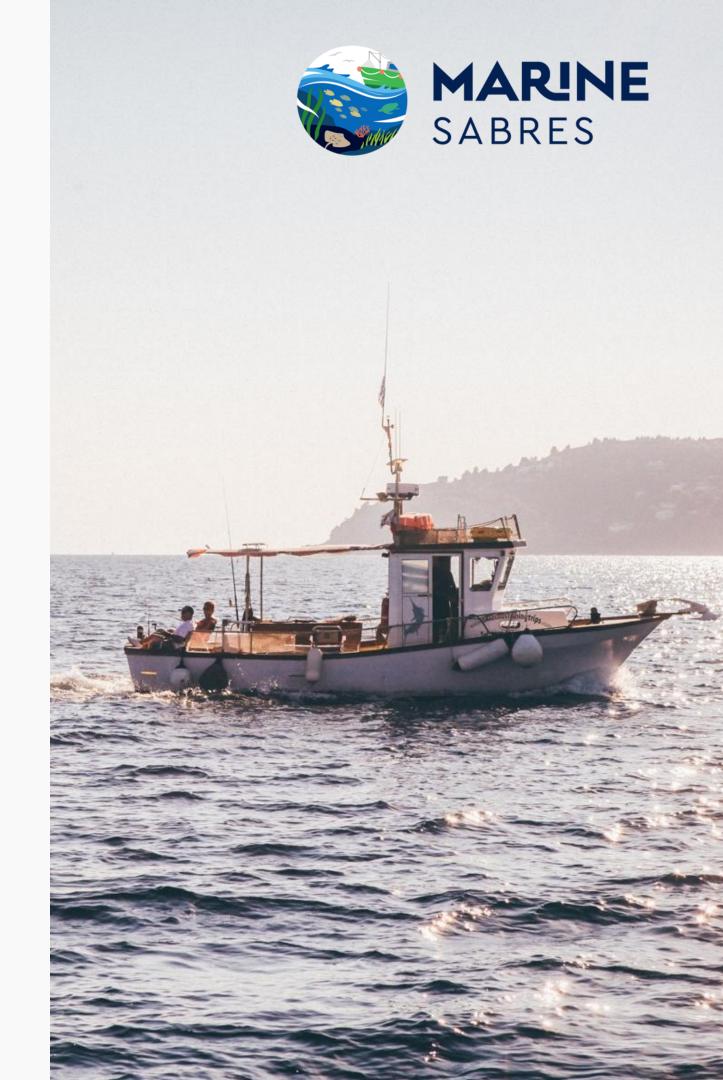






Four frameworks stood out following the analysis as applicable.

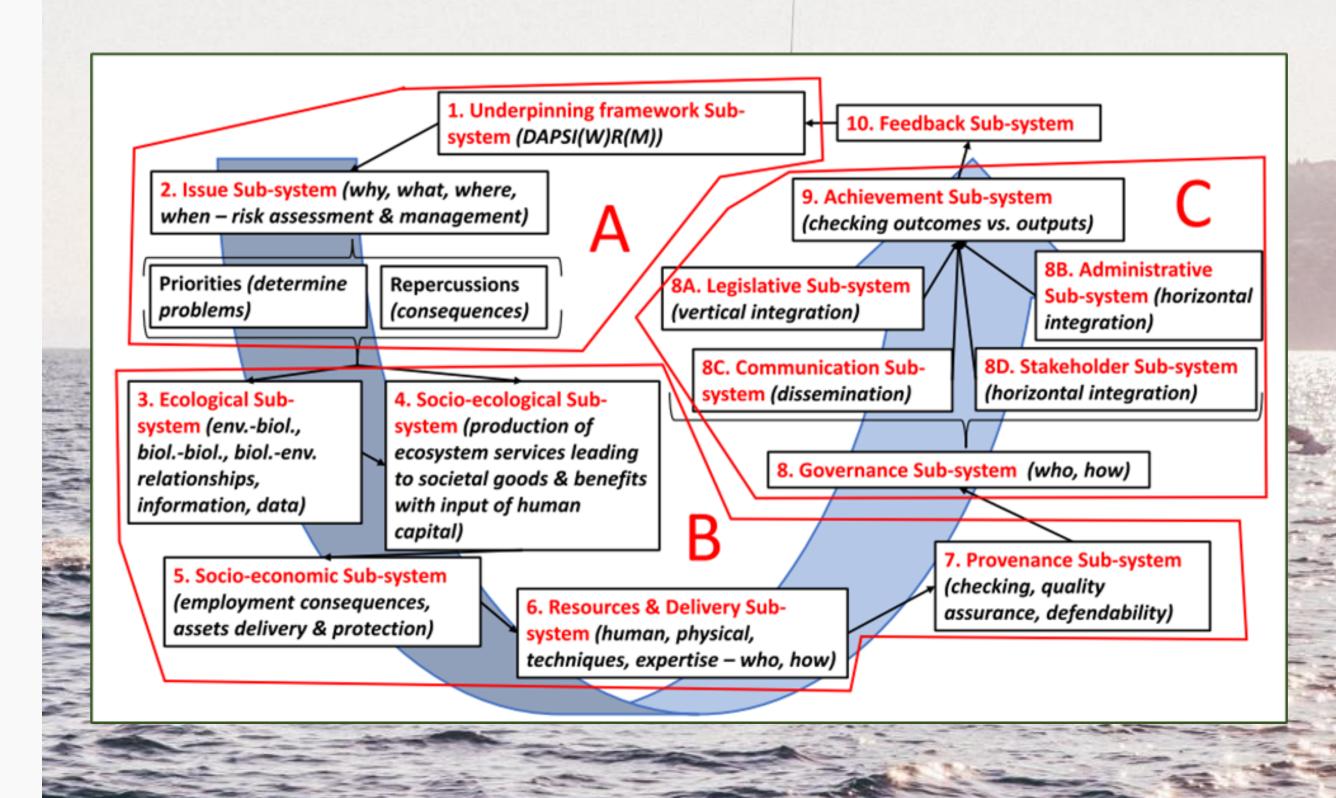
- The Ecocycle Framework
- The Integrated Systems Analysis
- Systems Approach Framework
- The Social-Ecological Systems Framework





- The ISA used as a foundation to be supplemented with strengths and opportunities of other reviewed frameworks.
- Tools from the Systems Thinking discipline to operationalise the approach.

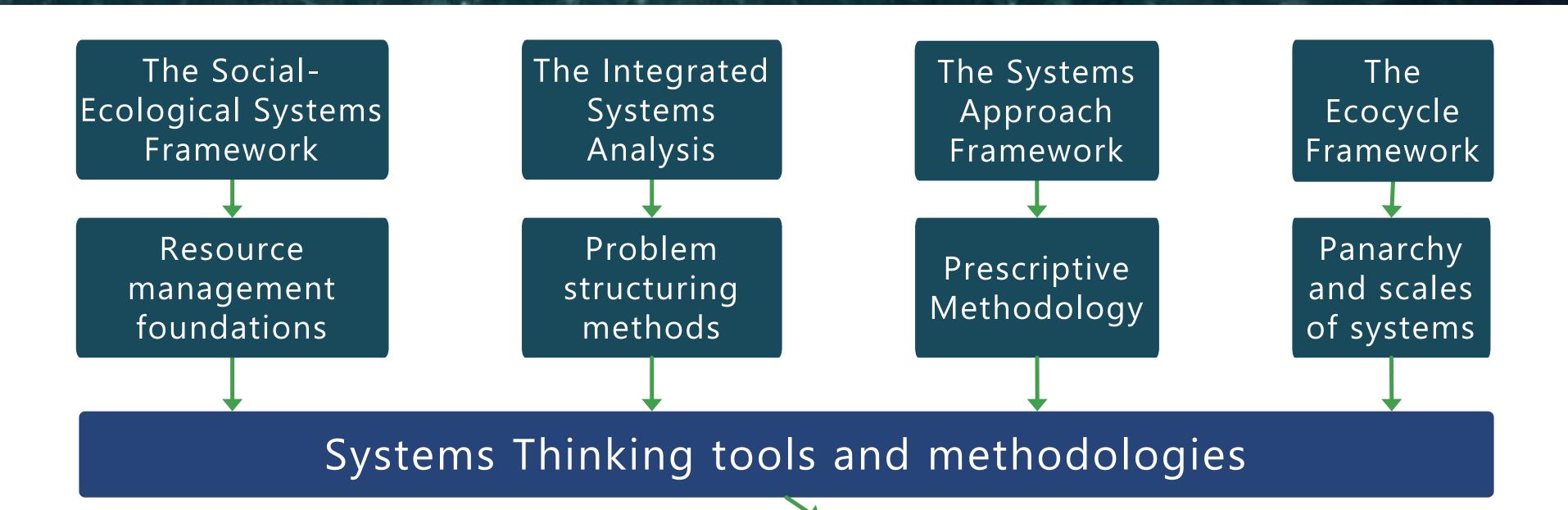








# Operationalisation of the Approach



The Simple SES approach



# Systems Thinking tools

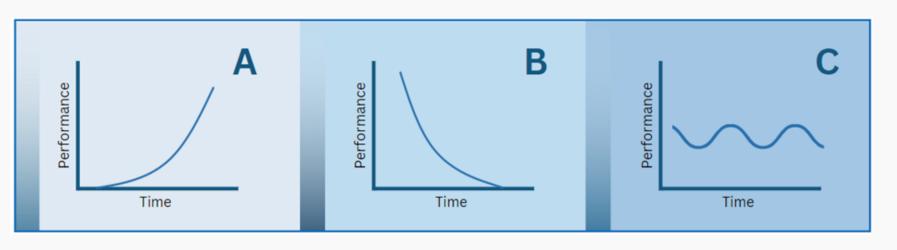


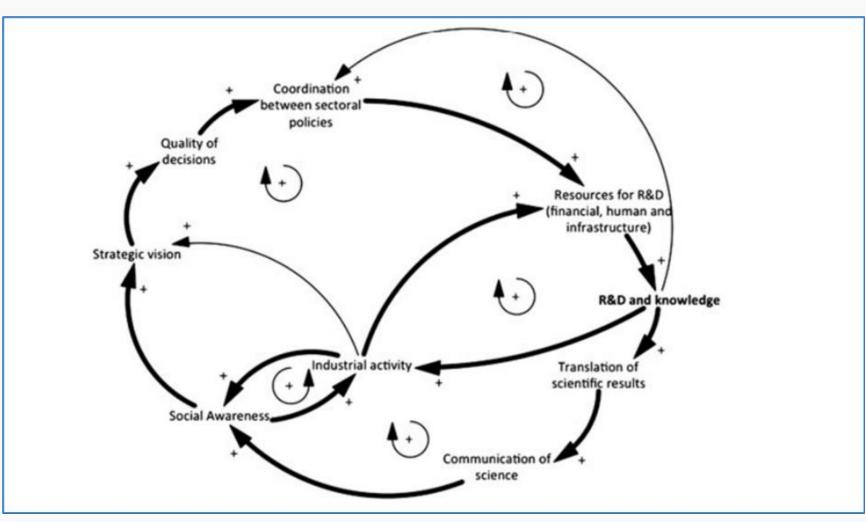
## **Behaviour Over Time Graphs**

The BOTs can be used to connect past observed behaviour with future behaviour in a way that offers insight into underlying causal structures.

## **Causal Loop Diagrams**

A qualitative systems-based tool that shows the relationships between a set of elements that are variables (factors liable to change e.g. indicators) operating in a system.







# Overview of the Simple SES



### PIM System

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



#### DAPSI(W)R(M)

We use a problem structuring cause-consequence - response framework to underpin the SES to define key elements.



#### **CLD and BOT**

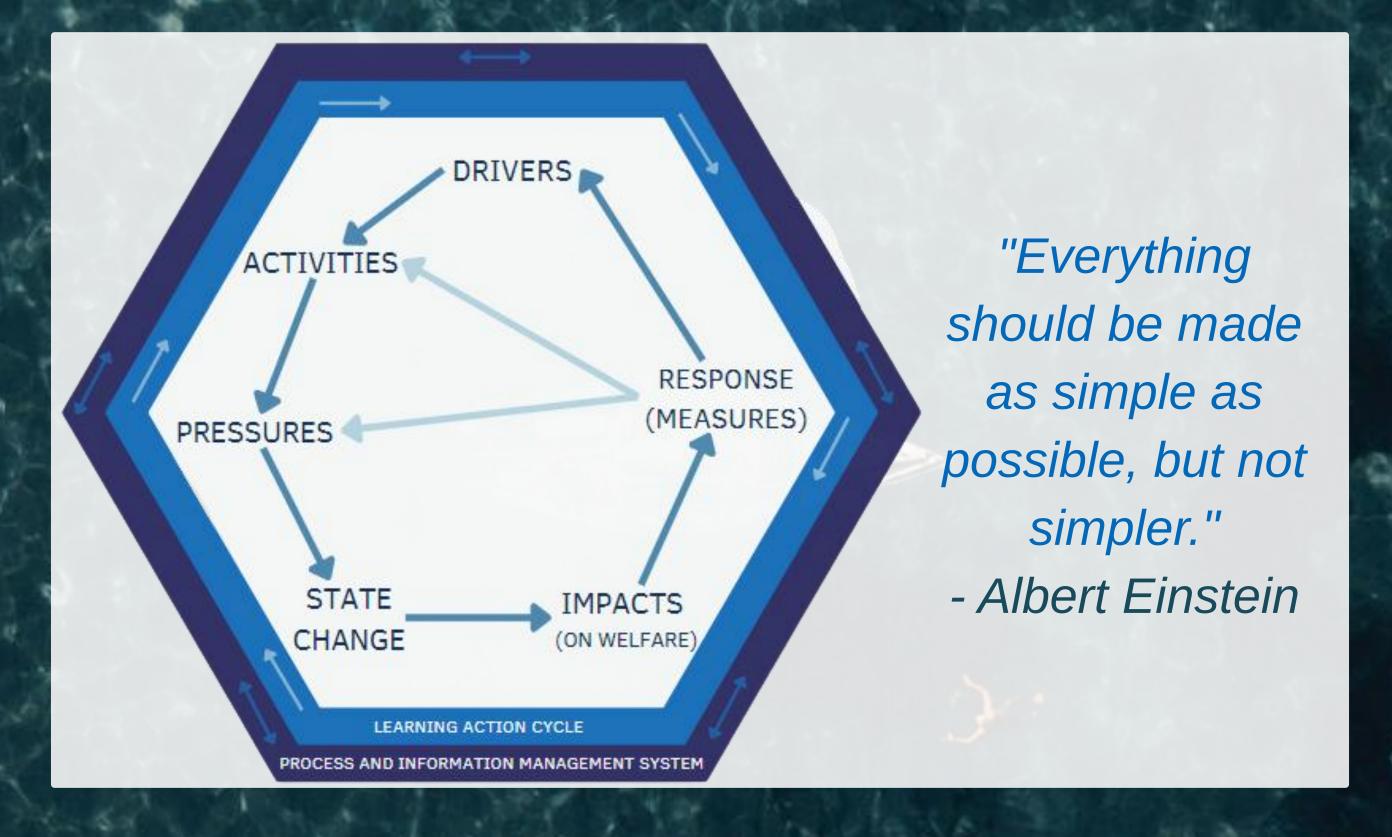
Qualitative systems tools such as Causal loop diagrams and Behaviour Over Time graphs complement the data driven approach.



### Learning and action

In operationalisation, we look to promote a continuous and meaningful learning and action cycle throughout the process.







# The value of a Simple SES





Understand complex systems and identify the main drivers of biodiversity loss in areas with different levels of complexity.



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



Promote sustainable development in coastal and marine sectors



Systems Approaches for Biodiversity Resilience and Ecosystem Sustainability

Overarching Aim:

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





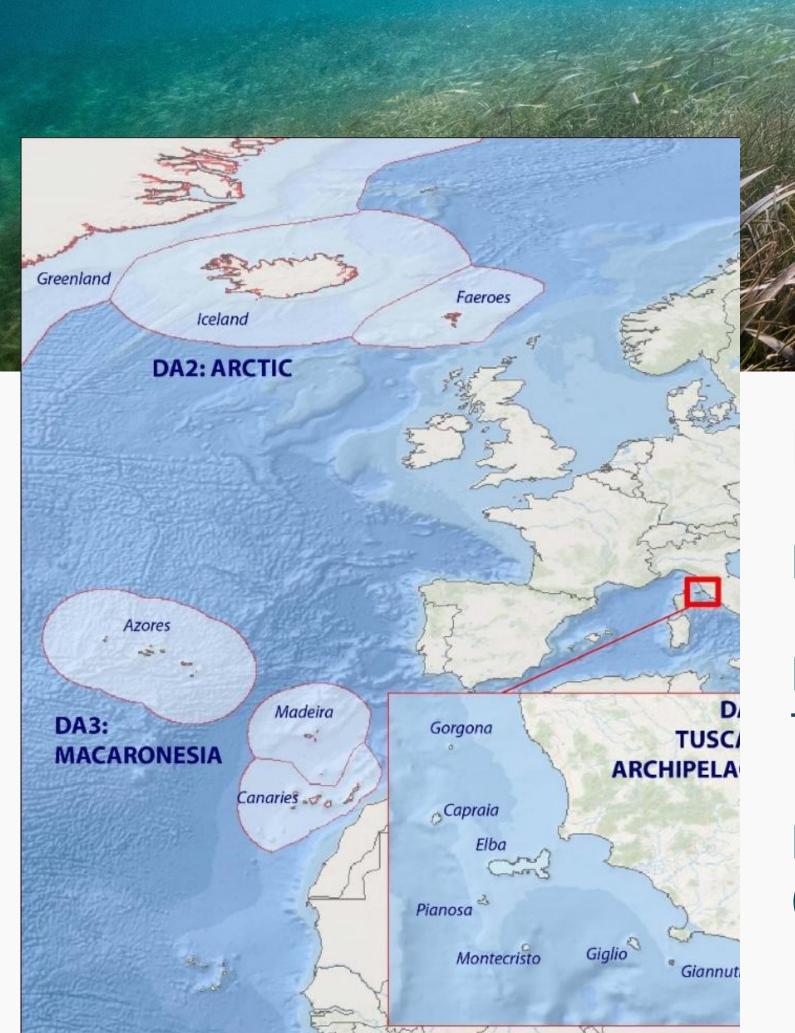
Marine SABRES Deliverable 3.2 Simple SES Guidance

Simple Social-Ecological Systems Guidance

Amanda Gregory, Jonathon Atkins, Gemma Smith, and Michael Elliott



DOWNLOAD THE GUIDANCE HERE: HTTPS://WWW.MARINESABRES.EU/RESULTS



## **DEMONSTRATION AREAS**

DA 1: The Tuscan Archipelago Territories: Italy (IT)

MARINE

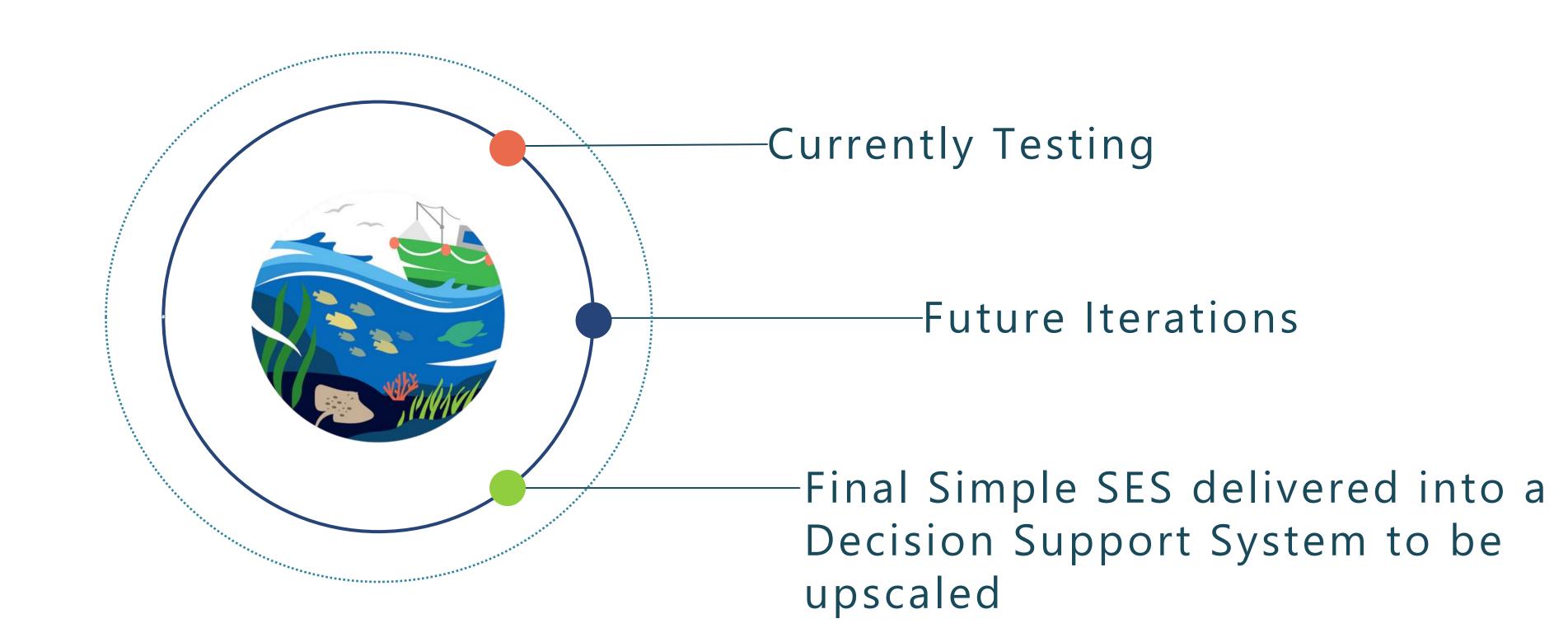
SABRES

DA 2: The Arctic North-East Atlantic Territories: Iceland (IS), Greenland (DK), Faroes (DK)

DA 3: Macaronesia Territories: Azores (PT), Madeira (PT), Canaries (ES)

# Future work









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

# Thank you!

Gemma Smith, Professor Michael Elliott, Dr Amanda Gregory, Professor Jonathan Atkins.

Contact: Gemma.Smith@iecs.ltd



@MarineSABRES



@MarineSABRES



Linkedin.com/company/MarineSABRES



















































