TODAY'S AGENDA

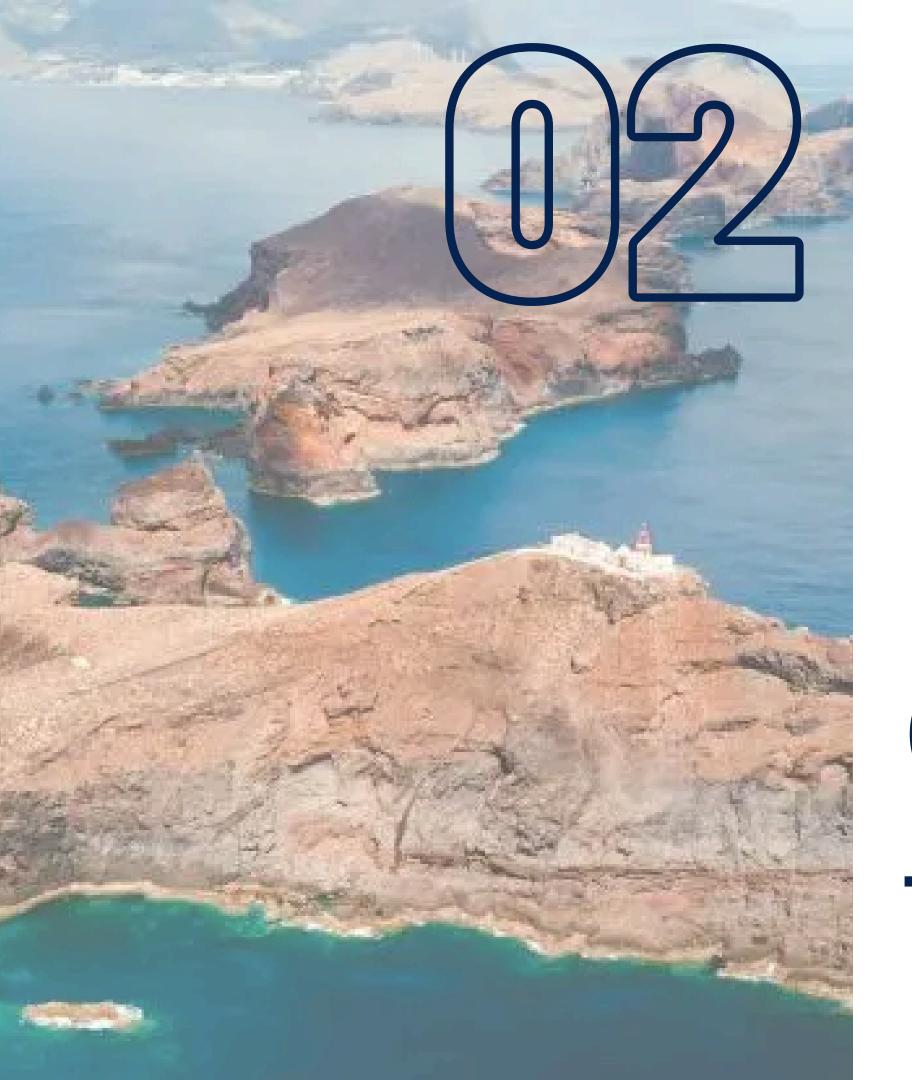|	
11:00am	Introduction and Overview
11:10am	ISA Excel Sheet
11:15am	Setting up Kumu
11:20am	Importing into Kumu
11:30am	Loop Analysis
11:45am	Comfort break
12:00pm	CLD Validation
12:15pm	Presentation creation
12:25pm	Questions
1:00pm	Close
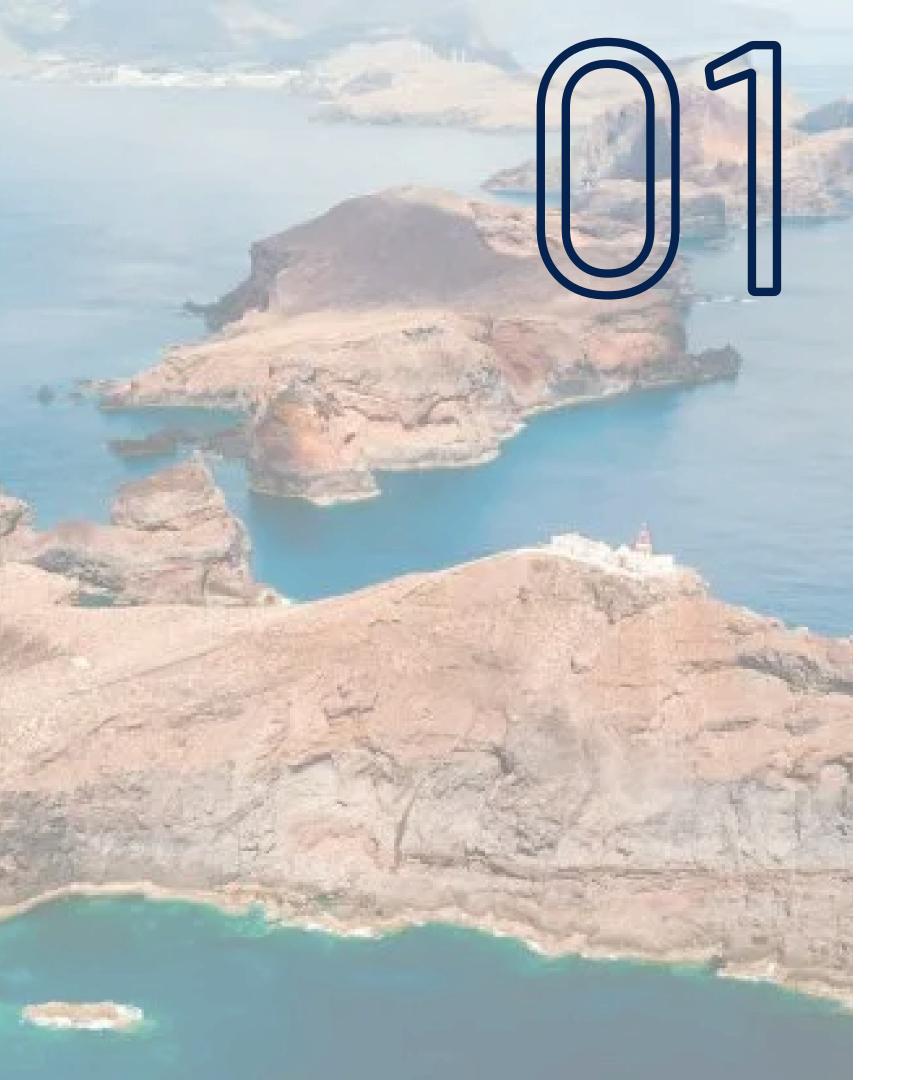
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01

Introduction

- Demonstrate the use of the Simple SES tools to facilitate the exercise in the DAs

  - Importing information into Kumu

  - Conducting a loop analysis

  - Enable you to carry out the approach

Objectives

- This session will be recorded for future reference
    - The slides and workshop will be uploaded to SharePoint

- Scheduled Q&A at the end

- Arrange another meeting for late September for Q&A and any clarifications

Information

02
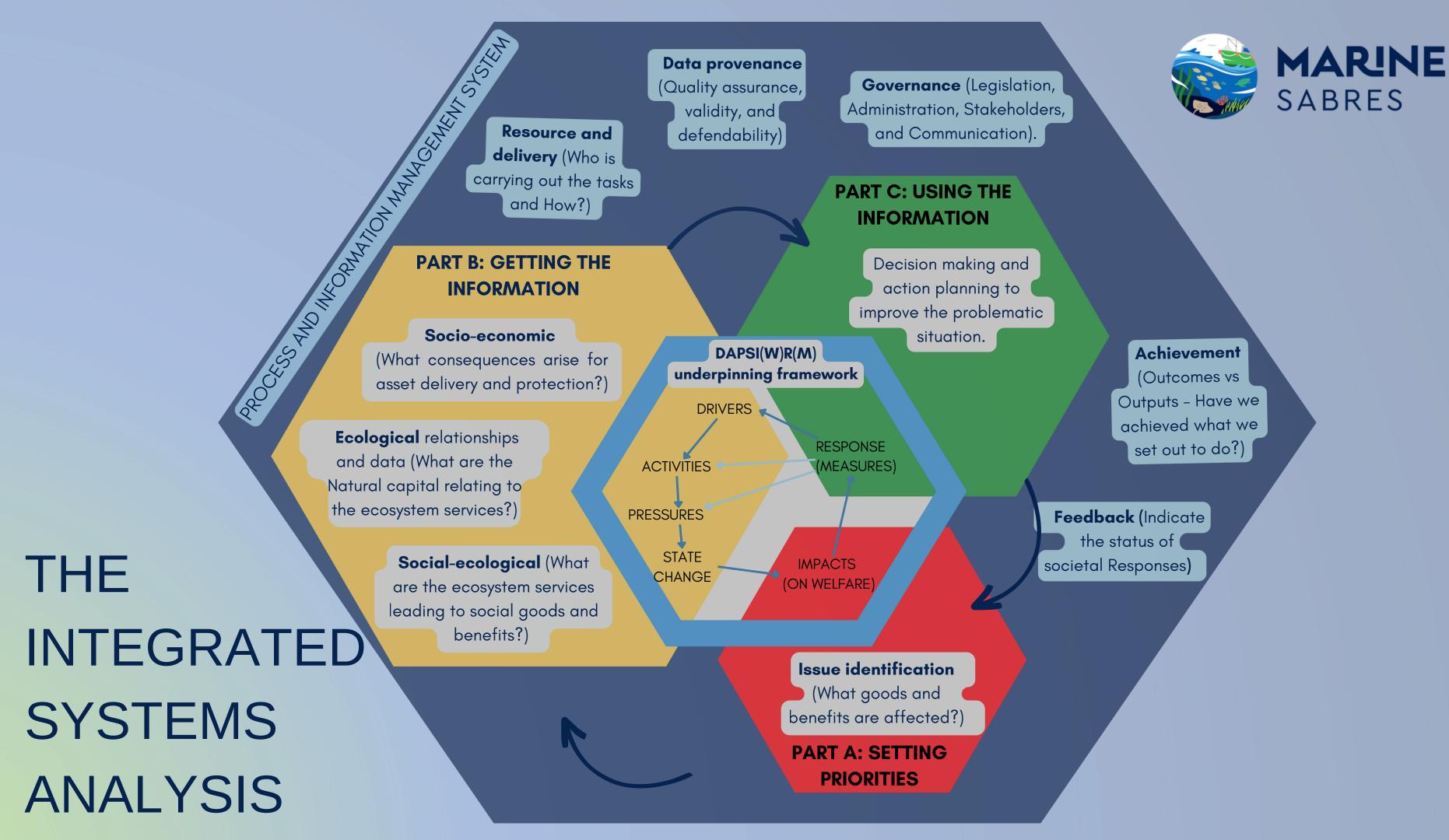
Overview of the ISA

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

The scope of focus where these elements 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.

THE INTEGRATED SYSTEMS ANALYSIS

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PROCESS AND INFORMATION MANAGEMENT SYSTEM

Data provenance (Quality assurance, validity, and defendability)

Governance (Legislation, Administration, Stakeholders, and Communication).

Resource and delivery (Who is carrying out the tasks and How?)

PART C: USING THE INFORMATION

Decision making and action planning to improve the problematic situation.

PART B: GETTING THE INFORMATION

Socio-economic (What consequences arise for asset delivery and protection?)

Ecological relationships and data (What are the Natural capital relating to the ecosystem services?)

Social-ecological (What are the ecosystem services leading to social goods and benefits?)

DAPSI(W)R(M) underpinning framework

DRIVERS

ACTIVITIES

PRESSURES

STATE CHANGE

RESPONSE (MEASURES)

IMPACTS (ON WELFARE)

Achievement (Outcomes vs Outputs – Have we achieved what we set out to do?)

Feedback (Indicate the status of societal Responses)

Issue identification (What goods and benefits are affected?)

PART A: SETTING PRIORITIES

PIM SYSTEM

- The overarching Process and Information Management System (PIMS)

- Sets the foundations for merging different systems used across sectors (science, policy, socio-economic) to reach holistic management solutions.
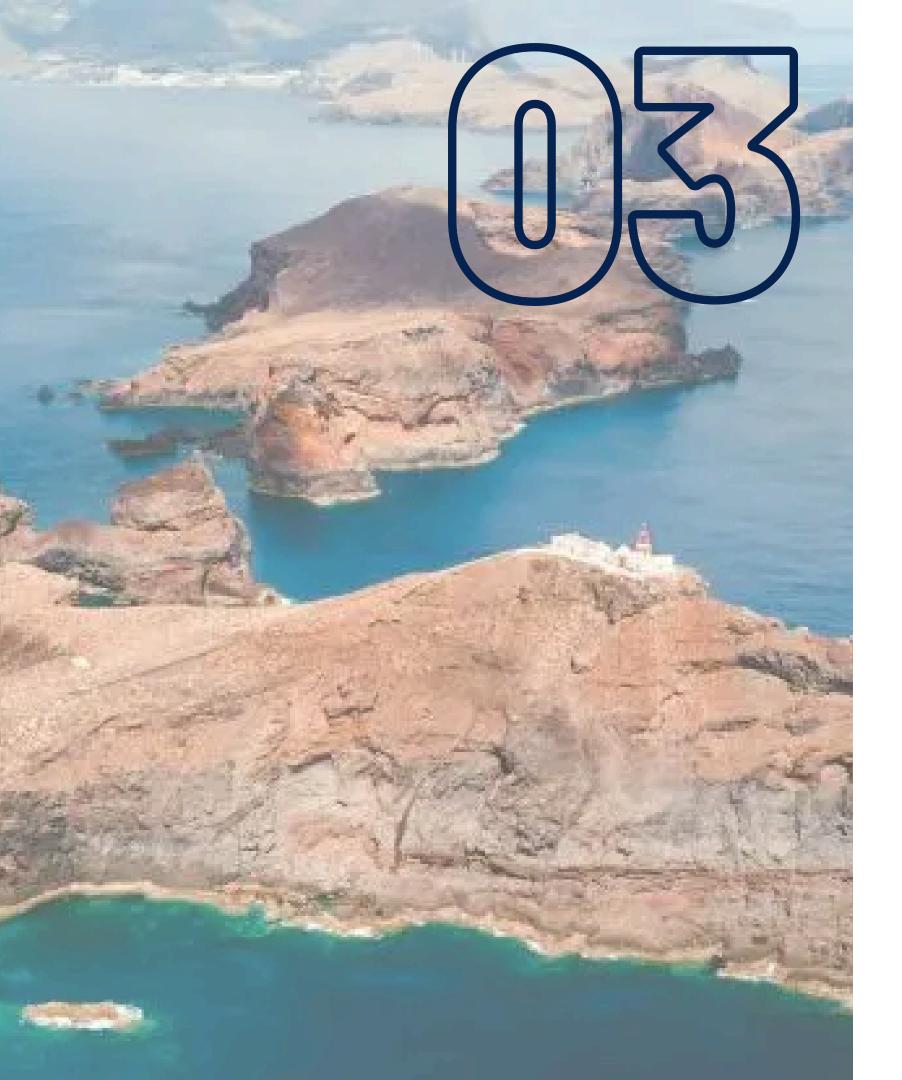
- Organises and plans for stakeholder communication.

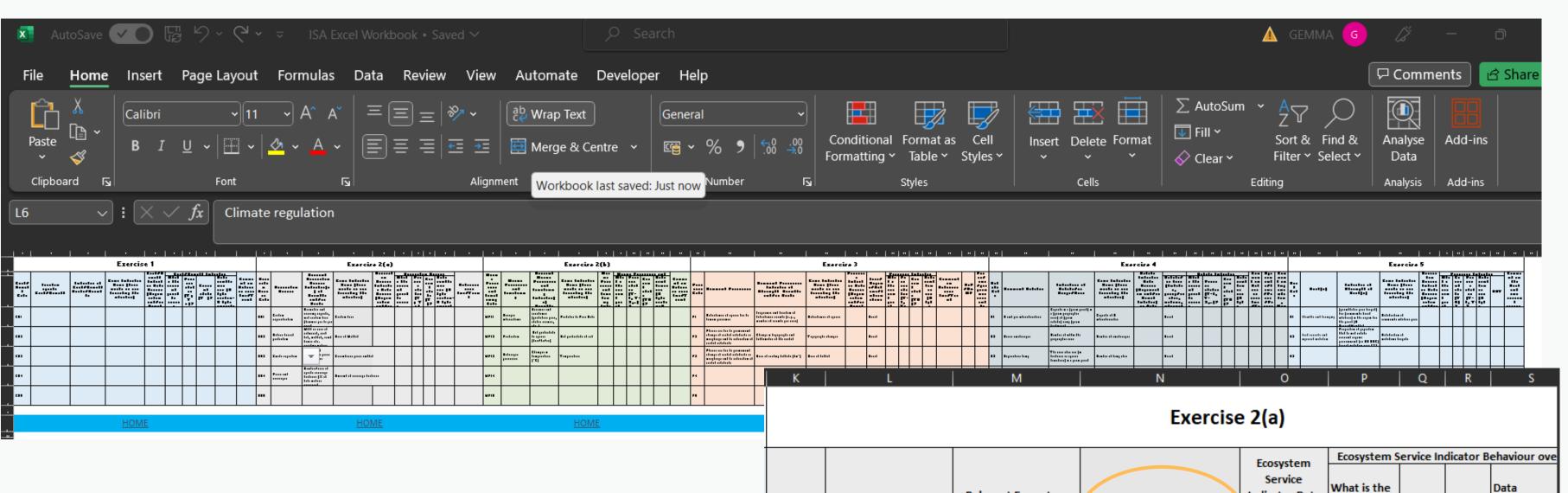- Good data provenance and management allows for a legitimate and credible SES process.

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ISA excel sheets

The ISA Excel 'Master Data Sheet'
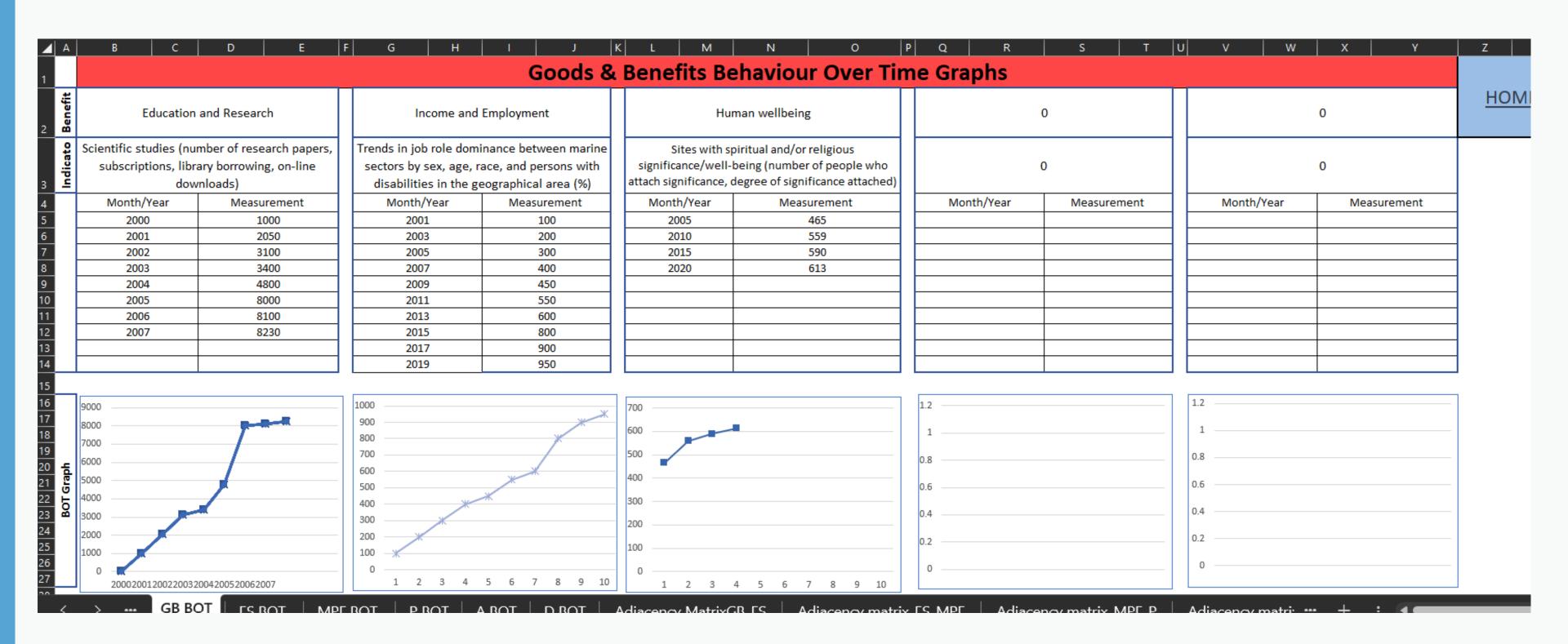
We have added a Kumu name column to reduce the complexity of the Causal Loop Diagram

Behaviour Over Time (BOT) graphs

Adjacency Matrices

Goods & Benefits and Ecosystem Services

	Goods and benefits							Goods and benefits				
	Scientific studies (number of research papers, subscriptions, library borrowing, on-line downloads)	Trends in job role dominance between marine sectors by sex, age, race, and persons with disabilities in the geographical area (%)	Sites with spiritual and/or religious significance/well-being (number of people who attach significance, degree of significance attached)	0	0			Scientific studies (number of research papers, subscriptions, library borrowing, on-line downloads)	Trends in job role dominance between marine sectors by sex, age, race, and persons with disabilities in the geographical area (%)	Sites with spiritual and/or religious significance/well-being (number of people who attach significance, degree of significance attached)	0	0
Assimilative and recycling capacity, net carbon burial (tonnes per ha per year)	+	+	+	Select	Select		Assimilative and recycling capacity, net carbon burial (tonnes per ha per year)	Medium Positive	Medium Positive	Medium Positive	Select	Select
Width or area of saltmarsh, reed bed, mudflat, sand dunes etc. providing natural hazard protection (m, % cover, ha)	-	-	+	Select	Select		Width or area of saltmarsh, reed bed, mudflat, sand dunes etc. providing natural hazard protection (m, % cover, ha)	Weak Negative	Weak Negative	Medium Positive	Select	Select
Quantity of greenhouse gases fixed and/or emitted	-	-	+	Select	Select		Quantity of greenhouse gases fixed and/or emitted	Weak Negative	Weak Negative	Medium Positive	Select	Select
Number/area of specific seascape features (% of total natural seascape)	-	+	+	Select	Select		Number/area of specific seascape features (% of total natural seascape)	Weak Negative	Medium Positive	Medium Positive	Select	Select
0	Select	Select	Select	Select	Select		0	Select	Select	Select	Select	Select

Adjacency Matrix — Ecosystem Services | Sensitivity Matrix — Ecosystem Services

Adjacency MatrixGB_ES | Adjacency matrix_ES_MPF | Adjacency matrix_MPF_P | Adjacency matrix_P_A | Adjacency matrix_A_D | Adjacency matrix_D_GB
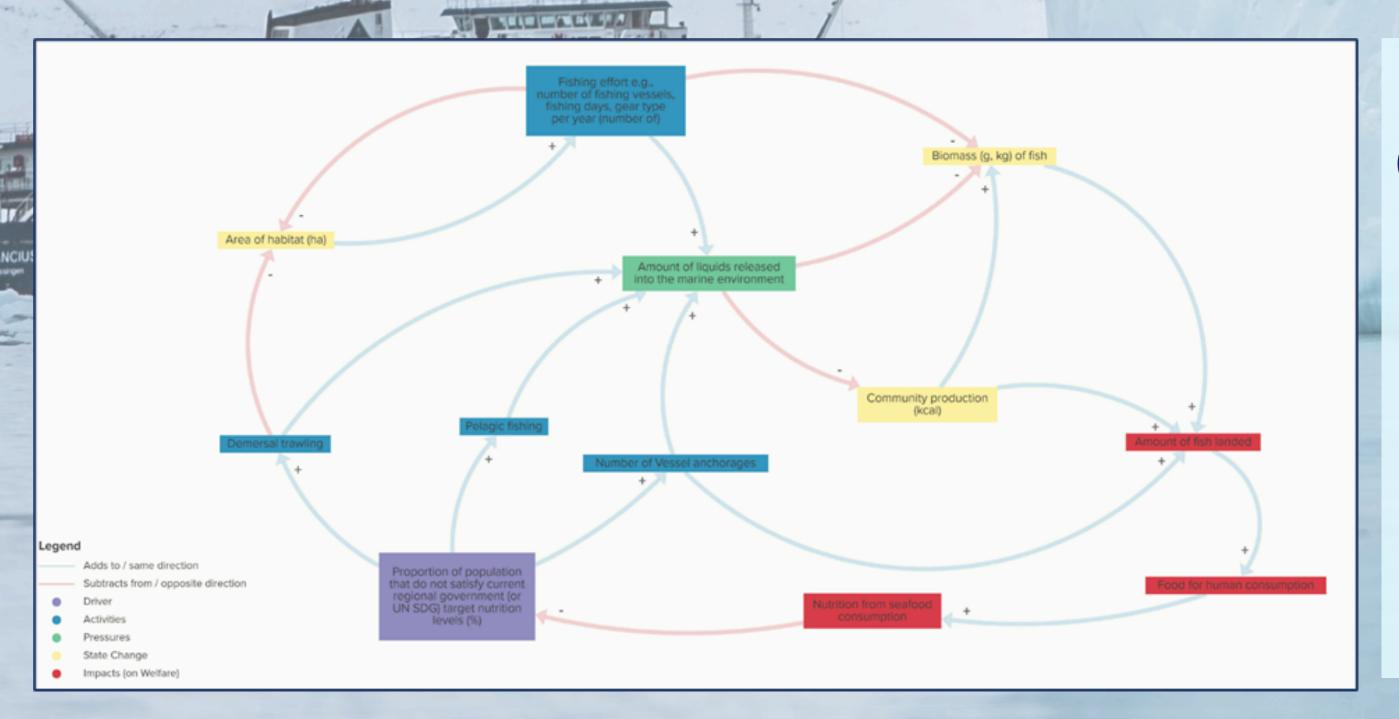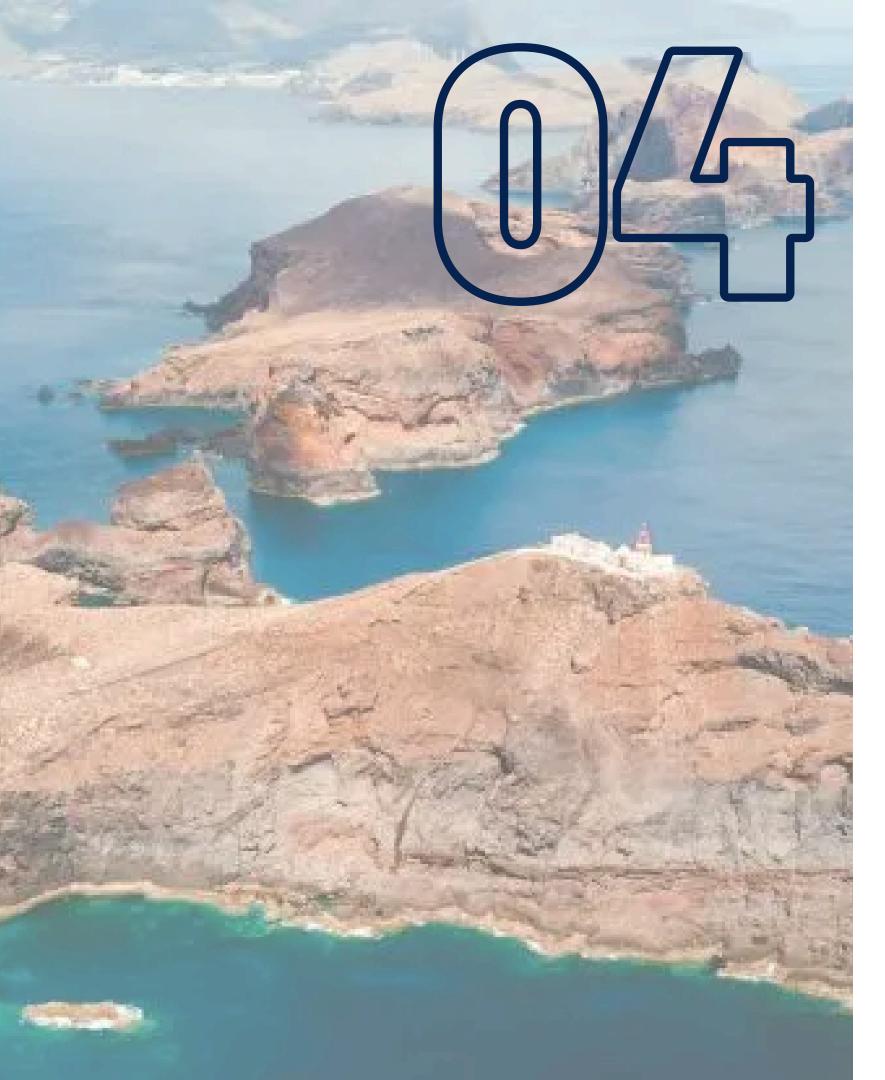
Causal Loop Diagrams

Causal Loop Diagrams (CLDS) are 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.

04

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Kumu
Demonstration

Live Demonstration

Exporting Excel sheets

Formatting Kumu

Importing .csv

Organising in kumu

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https://kumu.io/

Amount of data

- This approach can provide insight with as little as one element for each exercise.

- The number of elements can also differ per exercise, which will not require three elements for each section.

- e.g. 3 Goods and Benefits, 4 Ecosystem services, 3 Marine Processes and Functioning, 4 Pressures, 2 Activities, and 1 Driver.
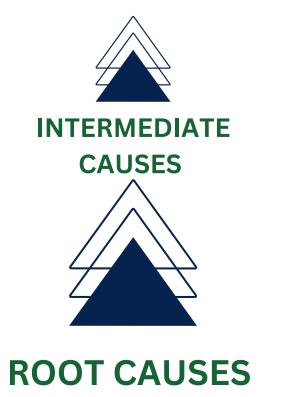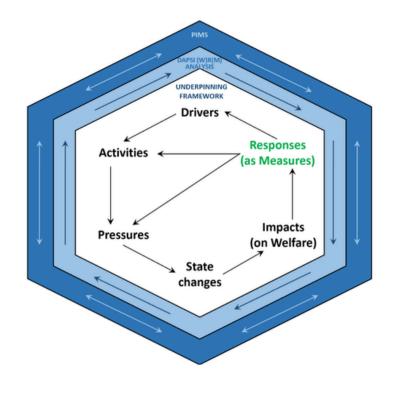
Exercises 7-13: Analysis
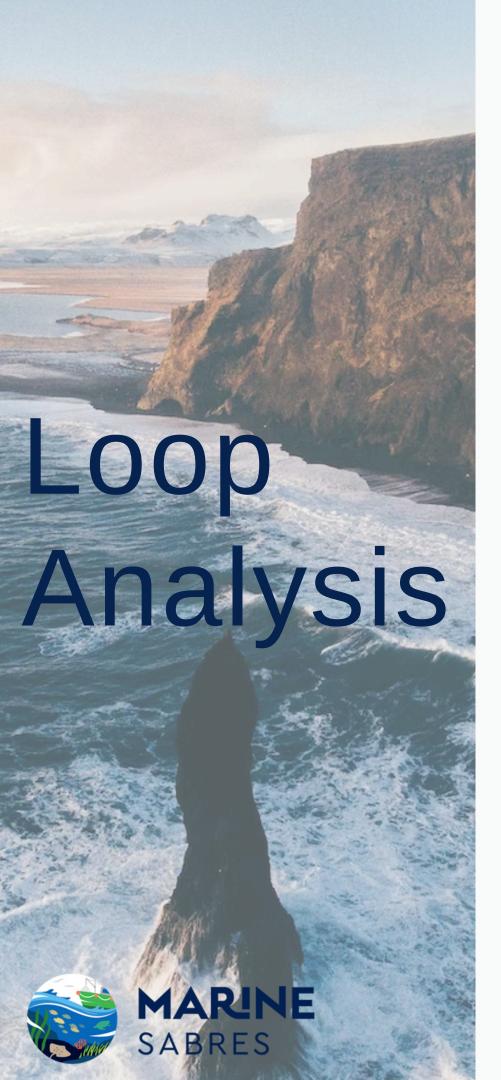
Creation and analysis of a CLD can lead to identifying leverage points for change.

Focusing on those elements which significantly influence the system's behaviour, we can better capture a meaningful explanation and determine how best to influence the system in relation to our management goals.

PROBLEM SYMPTOMS

INTERMEDIATE CAUSES

ROOT CAUSES

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Loop Analysis
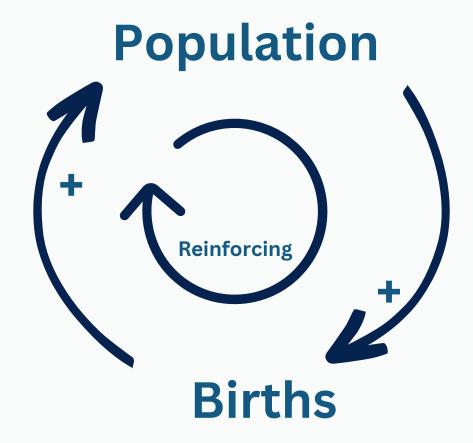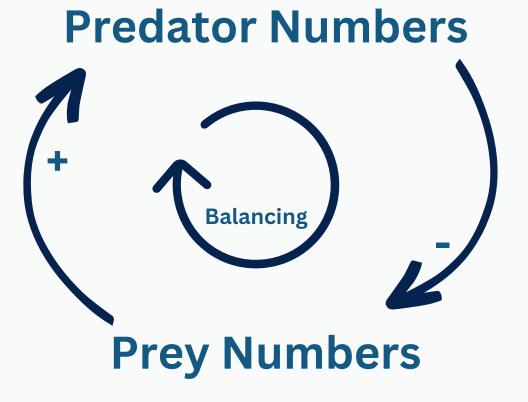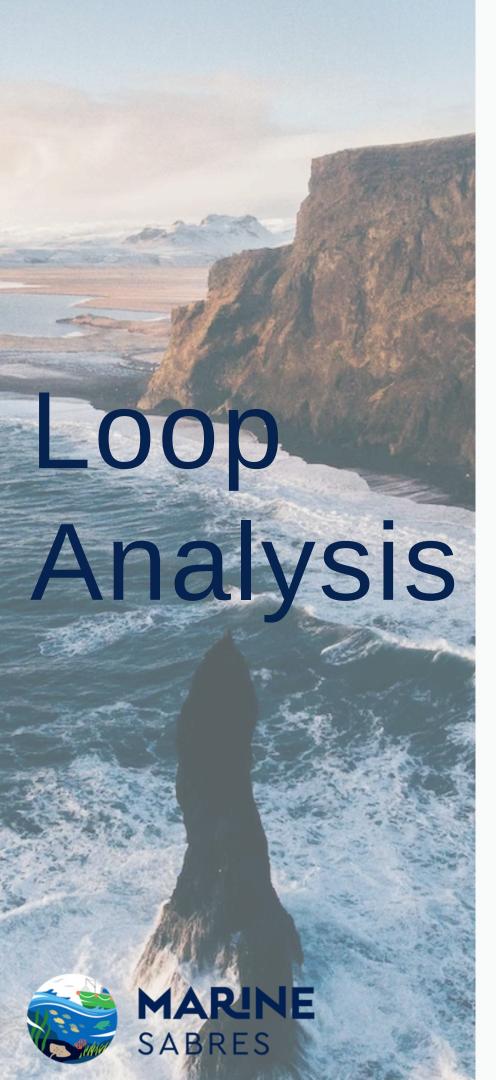
Step 1: Understand the Types of Feedback Loops

Reinforcing Loop: This is a loop where a change in a variable leads to an effect that further increases or decreases the change in the original variable.

Balancing Loop: This is a loop that works to maintain stability or equilibrium in a system. They respond to change in a way that counteracts that change.

Population

+

Reinforcing

+

Births

Predator Numbers

+

Balancing

-

Prey Numbers

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Loop Analysis

Step 2: Identify the Feedback Loops in Your CLD

They typically form circular paths where the variables and their interactions cycle back to the starting variable.
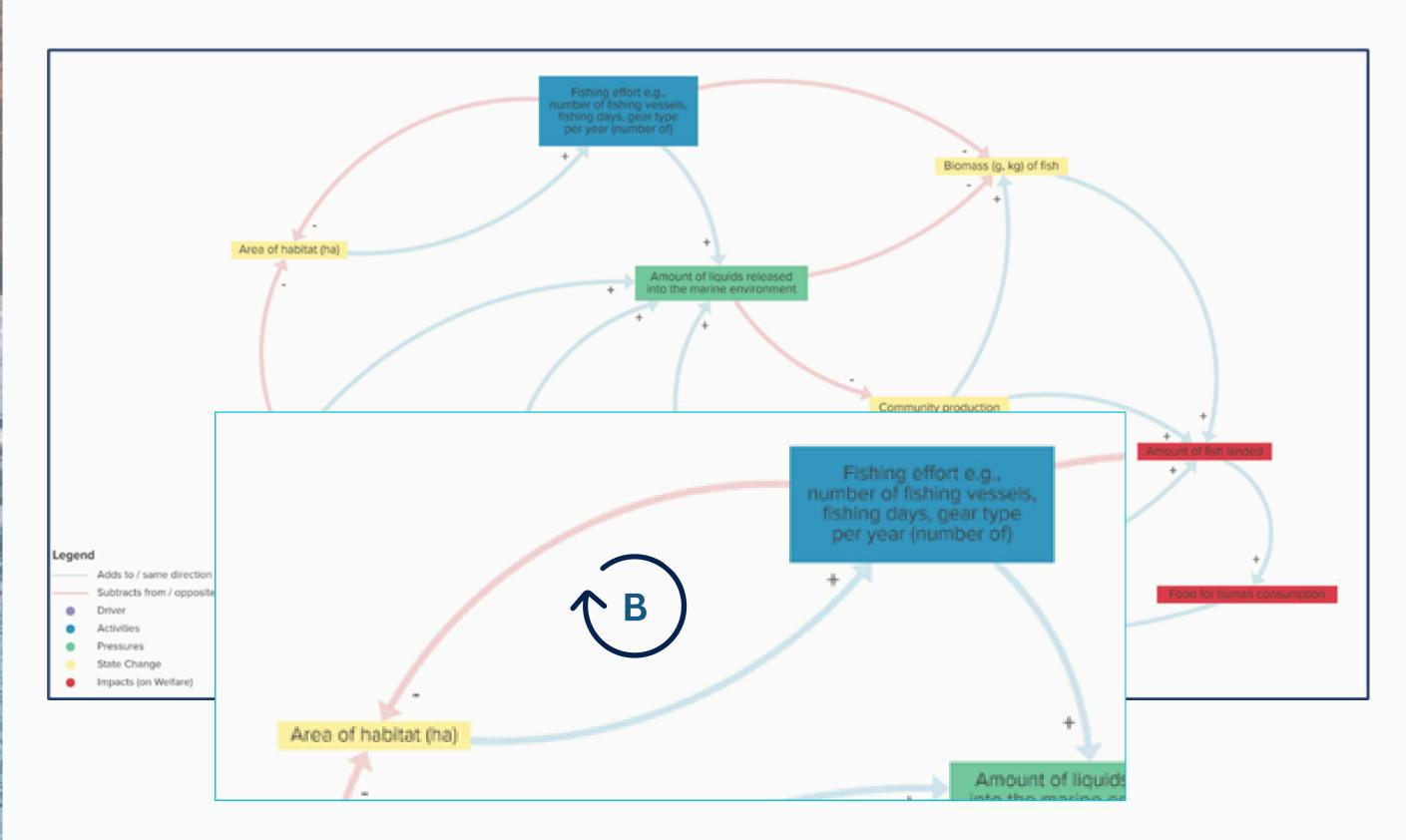
Automatic loop analysis feature within Kumu.
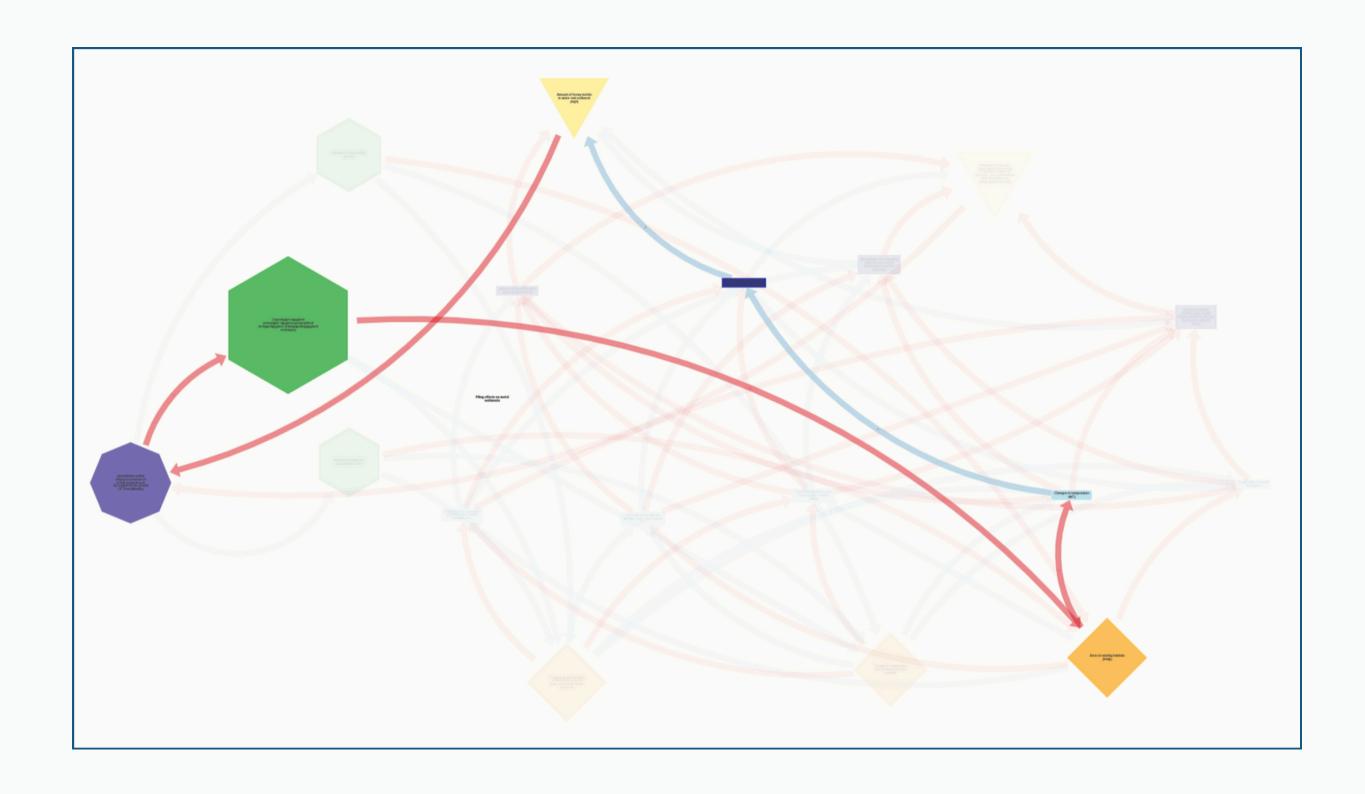
Label these loops for easy reference and to highlight this on your CLD.

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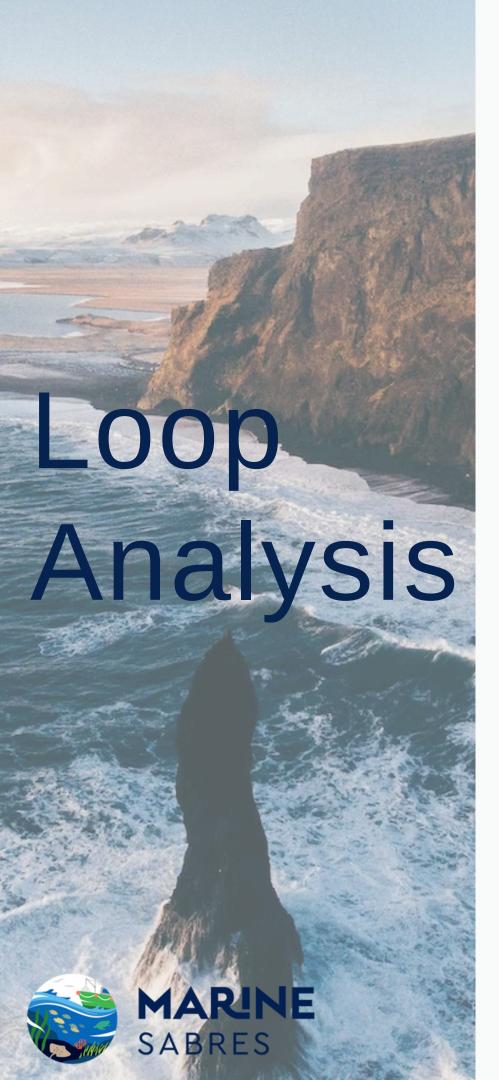
Step 2: Identify the Feedback Loops in Your CLD

Step 2: Identify the Feedback Loops in Your CLD

Loop
Analysis

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Step 3: Determine Primary Loops
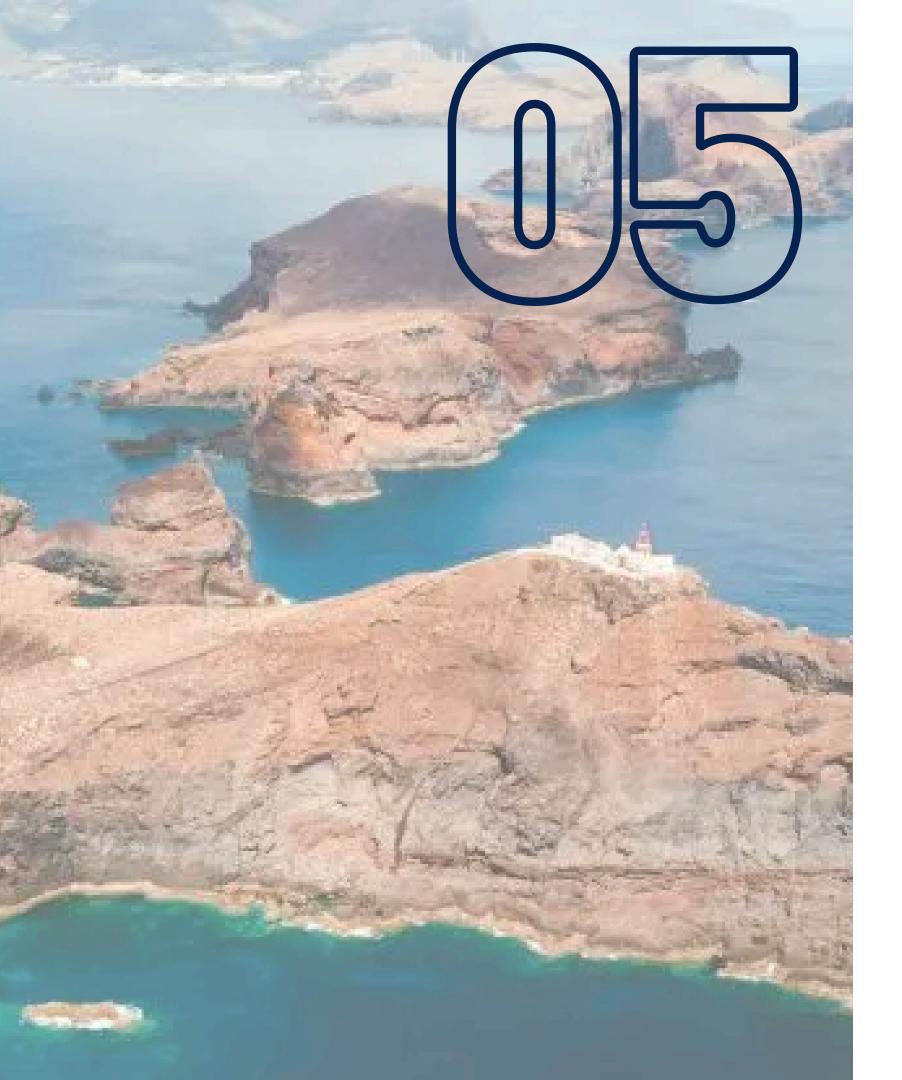
Not all feedback loops in a system will have the same level of influence. Some will dictate the behaviour of your system more than others.

To determine the primary loops, consider which ones have a greater impact on the overall system behaviour or which ones are central to the issue or goal at hand.

BREAK

11:45 - 12:00

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CLD Validation

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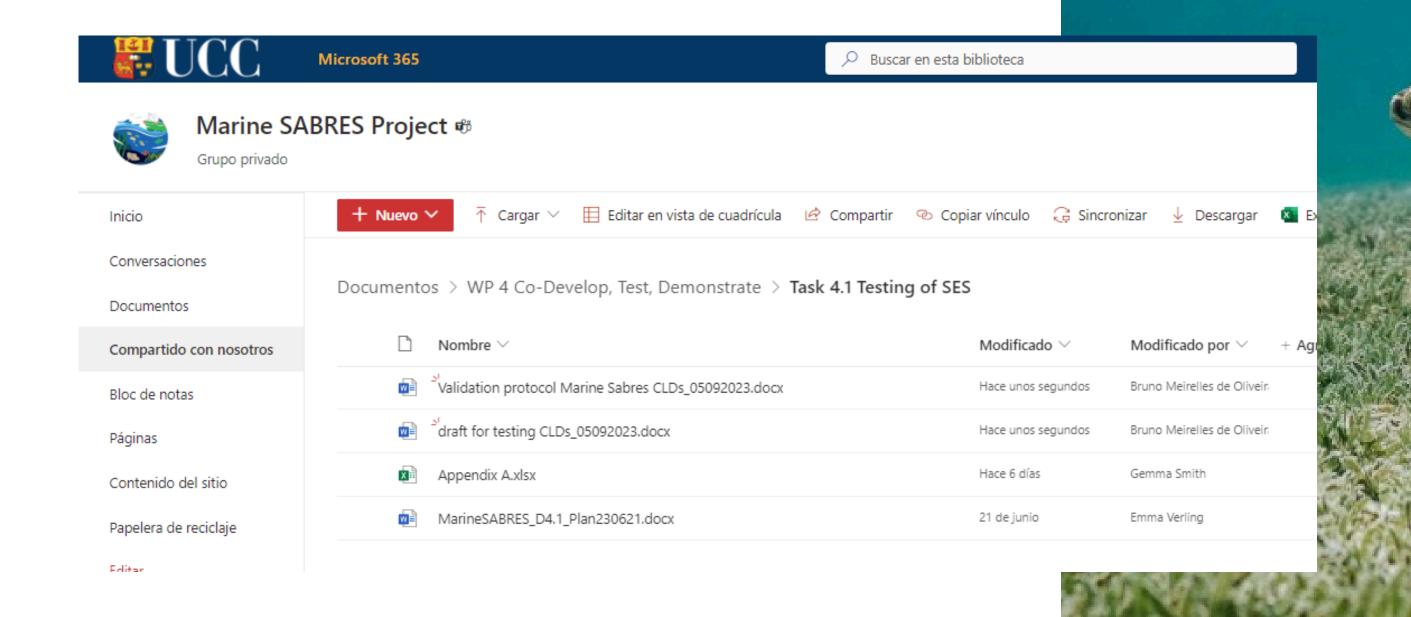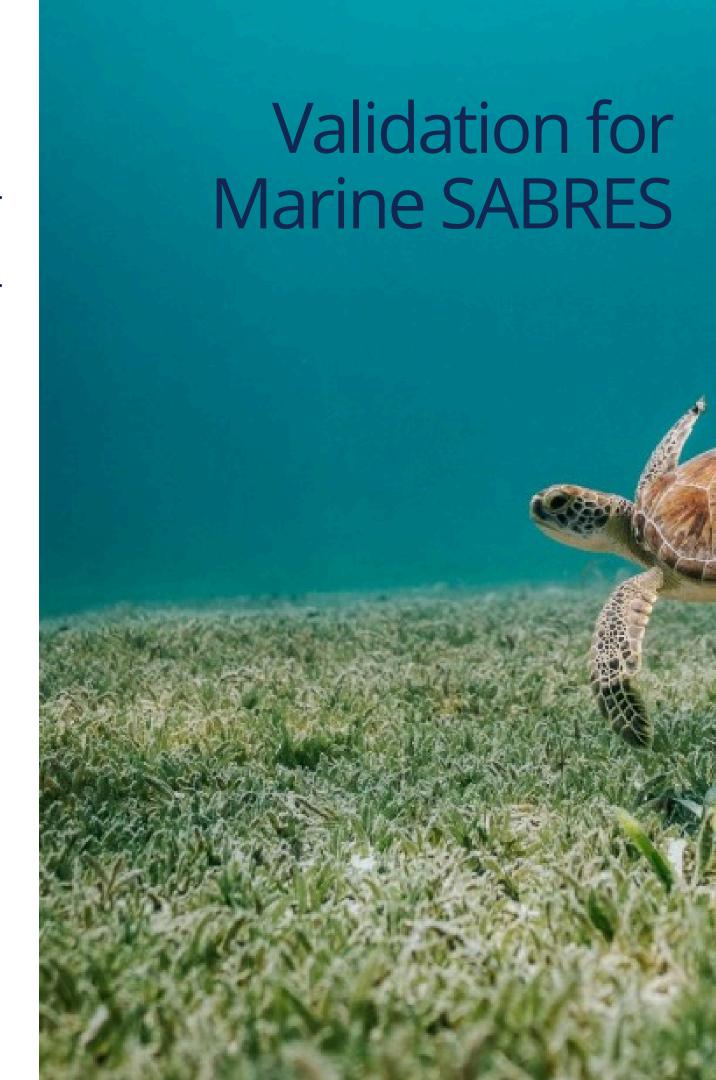
Validation / Verification: Definitions

A review and discusión of theory and indicators is provided in the Marine SABRES sharepoint

Validation for Marine SABRES

- We understand modelling very broadly, as a process of discussion and formalization (in a qualitative or quantitative model) of an understanding of a system and an issue of interest, made by a few or multiple stakeholders in a determined period.

- These tests are dedicated to increasing confidence in the whole process, not only in the model.

- The user of these guidelines must apply them every time it suits, not only to the final product. We echo the idea that modelling and validation should be done concomitantly, and thus it is highly recommended to use these guidelines at the same time as the model creation.

- 26 indicators in 4 dimensions

1. Document the experience in the Comments column
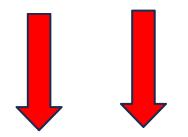
2. Grade the experience:

0
item do not
apply

1
very
dissatisfied

2
moderately
dissatisfied

3
nor
satisfied
neither
dissatisfied

4
moderately
satisfied

5
very
satisfied

Procedure

Indicators
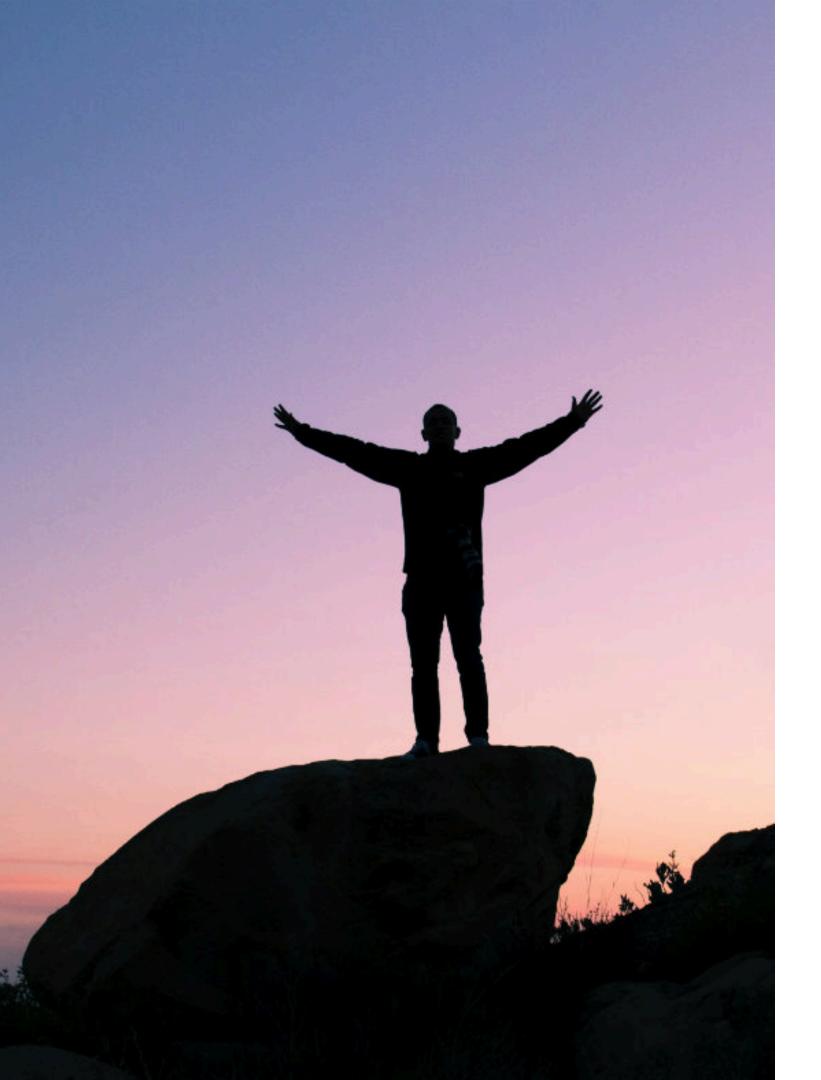
Type	N	Criteria	Description	Grade	Comments
Guidelines and processes	1	Purpose	The idea is to state clearly beforehand to which purpose the model will be built. Do you have a clear statement about the purpose of this model?		
	2	Usefulness	Embraces the idea of the adequacy of communication of the ideas represented in the model. Who will operate the model, the modelers or third parties? Is it available in an adequate and clear format for the user? Are they able to understand and use the model and the results? Is the model compatible with the users' capacities?		
	3	Presentation	Refers to the adequacy of the presentation of the model to the relevant audience, considering their level of scientific understanding, language, or others. Are the model and the materials used along the modeling process (such as data, tables, maps, pictures, etc.) appropriately formatted accordingly to the audience? Are the loops represented individually or in one big CLD? Is the diagram organized to reduce the number of crossed lines?		
	4	Perspectives in Boundary-adequacy	Refers to different perspectives of issues and policies. Does the modeling process support debate on different perspectives while discussing the system and its issues concerning: a) choice of model used; b) System Dynamics issue addressed; c) goals to be achieved; d) Policies for doing so?		
	5	Norms/values in boundary adequacy	Refers to different perspectives of values and acceptability. Do the models support debate concerning and represent the behavior of the relevant actors: a) goals (are the desired states acceptable?); b) Policies (are the actions based on discrepancies between goal and actual conditions acceptable within their culture?)		
	6	Trustworthiness or Guru status of the system dynamicist	An affinity with the modeler can enhance positively the modeling process and the Policy Insights or Recommendations (PIoR) implementation. Is it possible to report a positive relationship or atmosphere between the stakeholders and the modeling team?		
	7	Meaningfulness of the process	Relates to the experience of stakeholders. Is it easy and fun to explore the models and search for results? How much did the relevant actors participate in the model building? How much did the relevant actors participate in the discussions regarding the model?		

Indicators

Type	N	Criteria	Description	Grade	Comments
Specific model tests	8	Structure-verification	By comparing the structure of the model with the [presumed] structure of the real system the model represents (considering previous questions regarding worldview and culture). Does the model represent satisfactorily the system and its issues? Are the variables stated unambiguously? Are connections representing causation instead of correlation? Are the important delays represented?		
	9	Loop Polarity	The loop polarity test compares the loops in the model with the modeler's or client's assumption about which are the relevant feedback loops in the real system. Did stakeholders identify the relevant loops? Is the polarity of the loops properly determined? Are there loops with different polarities converging in a variable of interest? Are the goals for balancing loops explicit? Are the loops named?		
	10	Boundary adequacy (as structure)	Looks for the adequacy of the aggregation level and at the same time tries to understand if the model is capturing the relevant structures of the system. Are relevant variables explicitly represented or they are aggregated (masked) with others?		
	11	Family-member	It is relative to the degree of generalization the model might have. The recommendation is that, by adjusting a few parameters, the model can reproduce a family-level behavior, instead of a case-specific behavior. Is it possible to apply this model to a similar system with minor adequations? Would it still be meaningful and useful for the creation of policy insight or recommendations?		
	12	Extreme-conditions	Despite this being relative to the numerical model, it is brought here because the structure of the model can allow some inferences for plausible extreme combinations of state variables. Would the model presumably behave properly if variables assume extreme conditions? Is it possible to infer this from the present model?		

Indicators

Type	N	Criteria	Description	Grade	Comments
Policy insights and spillovers	13	Insight generation capacity	Whether a model does lead to any PIoR. Did the model lead to any policy insight or recommendation?		
	14	Relevance and Fertility of PIoR	Whether the policy insight or recommendation is innovative and important. Does the policy insight or recommendation represent an innovation to managing the system? Is the PIoR relevant?		
	15	Congruence of PIoR with culture	This test verifies the social implementability of any policy insight or recommendation. The point is that makes no sense to propose actions/policies that involve actions considered unacceptable or unbearable for a potential observer. Is the PIoR acceptable to all involved in the modeling process?		
	16	Boundary adequacy (as policy)	Concerns testing how the change in the boundaries of the model would affect the policy recommendations created by the simulation. In addition, the same policy can be tested for its adequacy if implemented outside the original boundaries set in the model. Would the PIoR require change if applied to a different location? How would the PIoR behave if applied to a larger system?		
	17	Learning	Do participants state that they learned about the system, other stakeholders (the community), or the policy-making process during this modeling process? Are they satisfied with that? If they want to learn more, did they receive support on how to do that?		
	18	Engagement	Did stakeholders engage in any group/action related to the issues dealt with in the modeling, during/after the modeling exercise?		

Indicators

| N		Criteria	Description	Grade	Comments
Administrative, review, and overview	19	Ease of Enrichment	Concerns about the ability of any model to be updated with new data, or used to test the effects of new policies. How easily can this model be complemented by new information or complementary issues in the system?		
	20	Time & Cost of the Intervention	Should be measured against a target and inform the level of satisfaction with the results against the target investment. Was the modeling process concluded within the expectations of time and costs? Are there recommendations to improve the efficiency of the modeling exercise for the next team or exercise?		
	21	Documentation	Refers to the adequacy of the process of making every step in the modeling process replicable by taking a formal process or writing assumptions, discussions, updates, or a change in previous steps regarding the modeling process. Is the model satisfactorily documented?		
	22	Replicability	Refers to the capacity of a third party to reproduce the model based on documentation. Are you sure that independent third parties can reproduce the model and all the results only using the written documentation?		
	23	Audit or cross-validation	Measure how adequately a model study is conducted concerning established standards, practices, guidelines, or experience. Preferably done by someone not involved in the modeling process. Consider differences in culture before applying this. Does the model and PIoR make sense? Are they contradicting any physical law or rigorous social norms that turn the model/PIoR invalid? Are they contradictory with experience beyond an acceptable level?		
	24	Higher-level Model review	A higher management level test of the model´s appropriateness to the systems definition and study objectives, adequacy of underlying assumptions, adherence to standards, modeling methodology used, model representation quality, structure, completeness, consistency, and documentation. Preferably answered by someone at a higher level than the modeler team. Does the model fulfill the expectations of the proposed modeling exercise?		
	25	Walkthroughs	Represent group exercises dedicated to testing the overall documentation for any errors. Does not test performance. Preferably answered by a small group different than the modeler team. Does the model seem correct? Does the documentation allow the reproducibility of the model? Are the main issues represented satisfactorily? Does the PIoR make sense, if applied?		
	26	System-improvement	Considers whether the behavior of a system improved after the implementation of the policies tested *in silico*. It is recommended to verify this with some indicators of the desired state of the system. Is it possible to connect some changes in the system to the modeling exercise? Are these changes congruent with the desired state modeled?		

You did it!
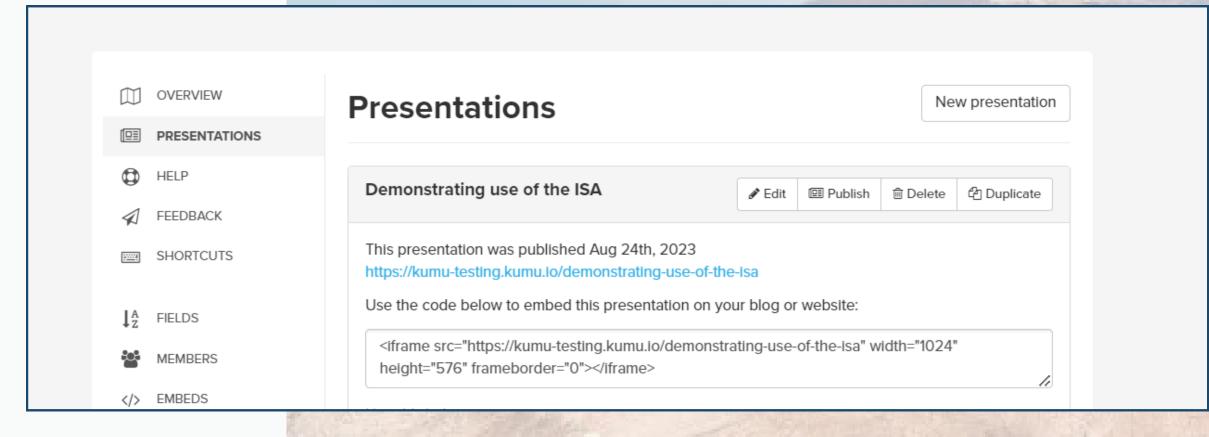
06
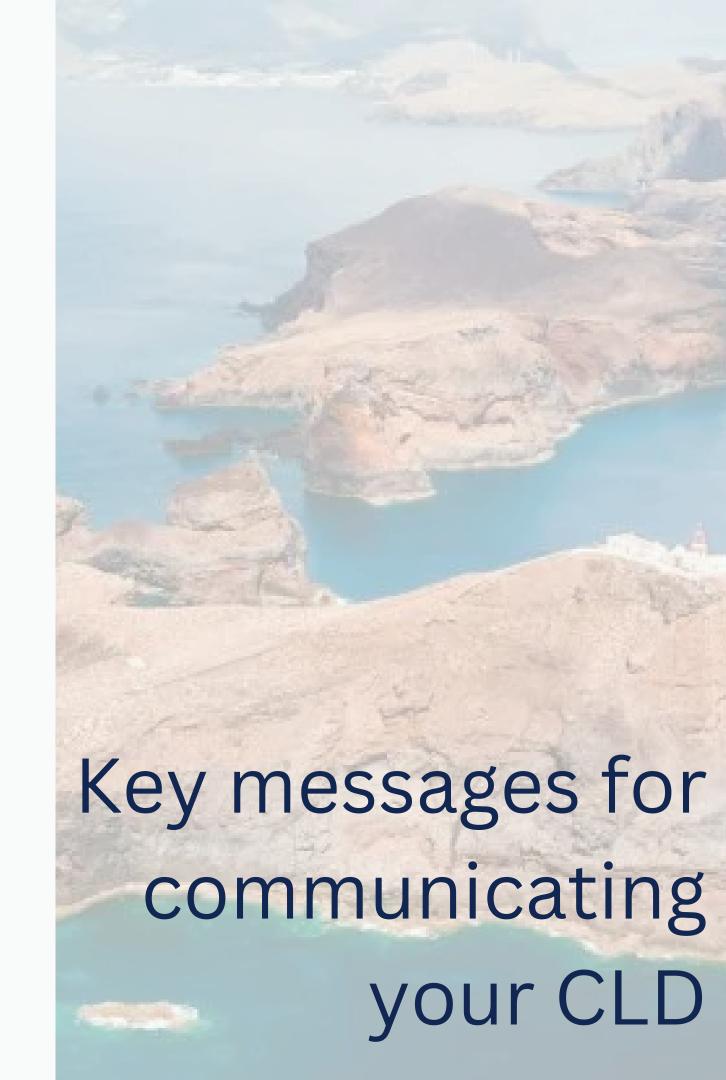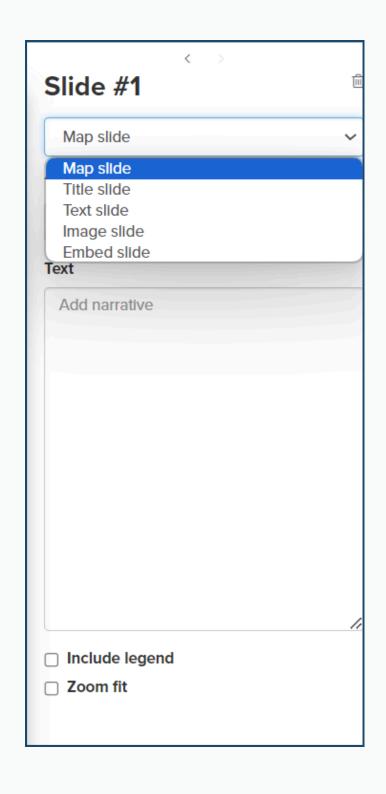
Presentation of CLD

- Highlight key feedback loops and leverage points and their influence on the system's behaviour.

- Make use of illustrative methods to help explain the dynamics and impacts of your proposed solutions.

- Encourage your stakeholders to give their thoughts, ask questions, and make suggestions for improving the diagram or solution.
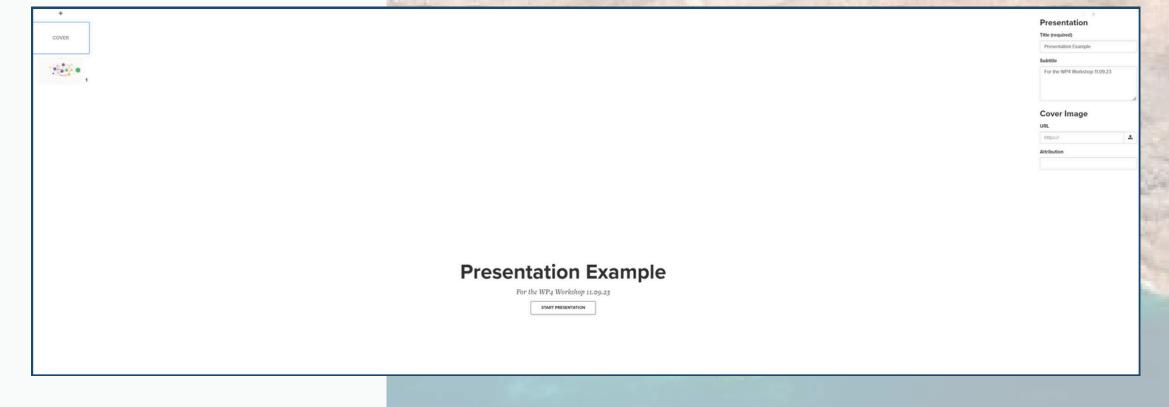
Key messages for communicating your CLD

Kumu presentation features

Available documents:

The written guidance document

FAQs

Frequently Asked Questions:

This is a dynamic document of Frequently Asked Questions (FAQs). You can ask questions, and they will be answered in due course. Please follow these steps:

1. Add your question to the table below.
2. Check back regularly to see if your question has been answered.
3. Once your question has been answered, it will be added to the list below of FAQs.

Note: Please do not edit any question or answer other than your own to maintain the integrity of the document. Also, add extra rows if necessary.

Date	Question	Answered Y/N?
EXAMPLE: 28/06/2023	**EXAMPLE:** How do I size elements in Kumu based on the number of connections?	**EXAMPLE** Y

Available documents:

Feedback Form

Example

After reading the guidance, what supporting information do you think will be helpful to aid the SES in implementation?

- ☐ A video tailored to the approach on the use of Kumu

- ☐ Supplementary information on the DAPSI(W)R(M) Framework e.g. infographics, papers

- ☐ If possible in-person workshops at the DAs or during the annual meeting

- ☐ Online Drop in sessions with WP3

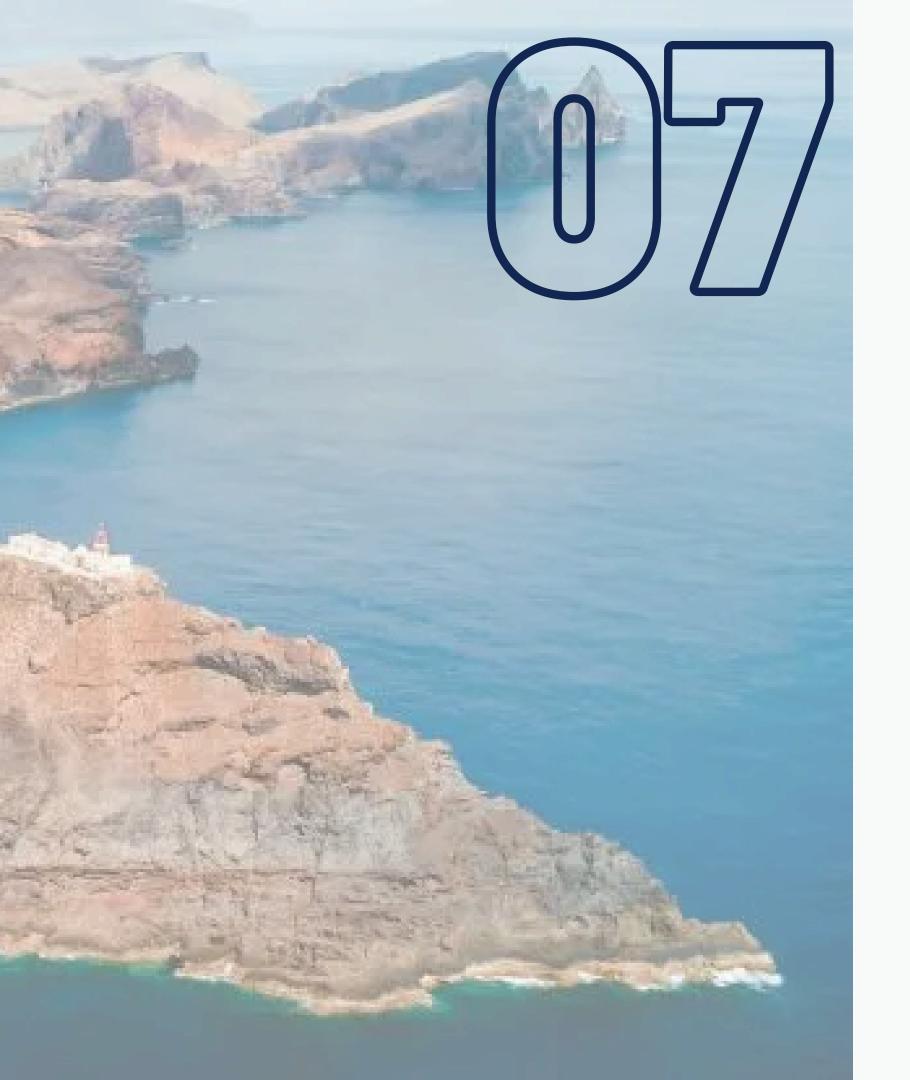- ☐ Other: _____

Simple SES

Contributing to the Marine SABRES consortium expertise WP3 over the past months have developed a user-friendly framework called the Simple Socio-Ecological System (Simple SES). This Simple SES is designed to help simplify understanding of the complex interactions between human activities and marine ecosystems through use of problem structuring methods and systems approaches to help managers make more informed decisions.

The results of this feedback form will be for the use of WP3 to address any comments, questions or suggestions to the Simple SES. This will be addressed in various ways; through revision and development of the guidance and to additions to the frequently asked questions section in the guidance for clarity.

No personal data will be collected through this form and all submissions are anonymous. If you have further comments, questions, or would like a chat please email: Gemma.Smith@iecs.ltd

Form Link: https://forms.gle/mpsJu1sYqBs5CYYT6

07

Questions
and group
discussion

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Thank you!

Gemma Smith and Michael Elliott - IECS Ltd.
Bruno Meirelles de Oliveira - AZTI

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