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Aiming to reverse biodiversity decline by strengthening the conservation of coastal and marine areas, balancing human and ecosystem needs, and upscaling ecosystem-based management

WP3 - Task 3.2
Simple SES Guidance Notes

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AZTI MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

International Estuarine and Coastal Specialists

UKRI UK Research and Innovation

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TODAY'S AGENDA

11:00am	Session Introduction presented by Angel/Bruno?
11:10am	Short Overview of the Process
11:15am	Presentation the PIMS section of the methodology
11:45am	Presentation of the Data collection and structuring methodology
12:15pm	Comfort Break
12:30pm	Overview of the Kumu software
1:00pm	Questions and group discussion chaired by Mike/Bruno?
2:00pm	Session Close

01

Introduction

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Objectives of the workshop

The DAs to have a clear view of the data needed for the approach.

To Understand how the methodology should be applied using KUMU

Provide routes for questions and move forward in the completion of T4.1 and T3.2.

02

Overview of the ISA

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

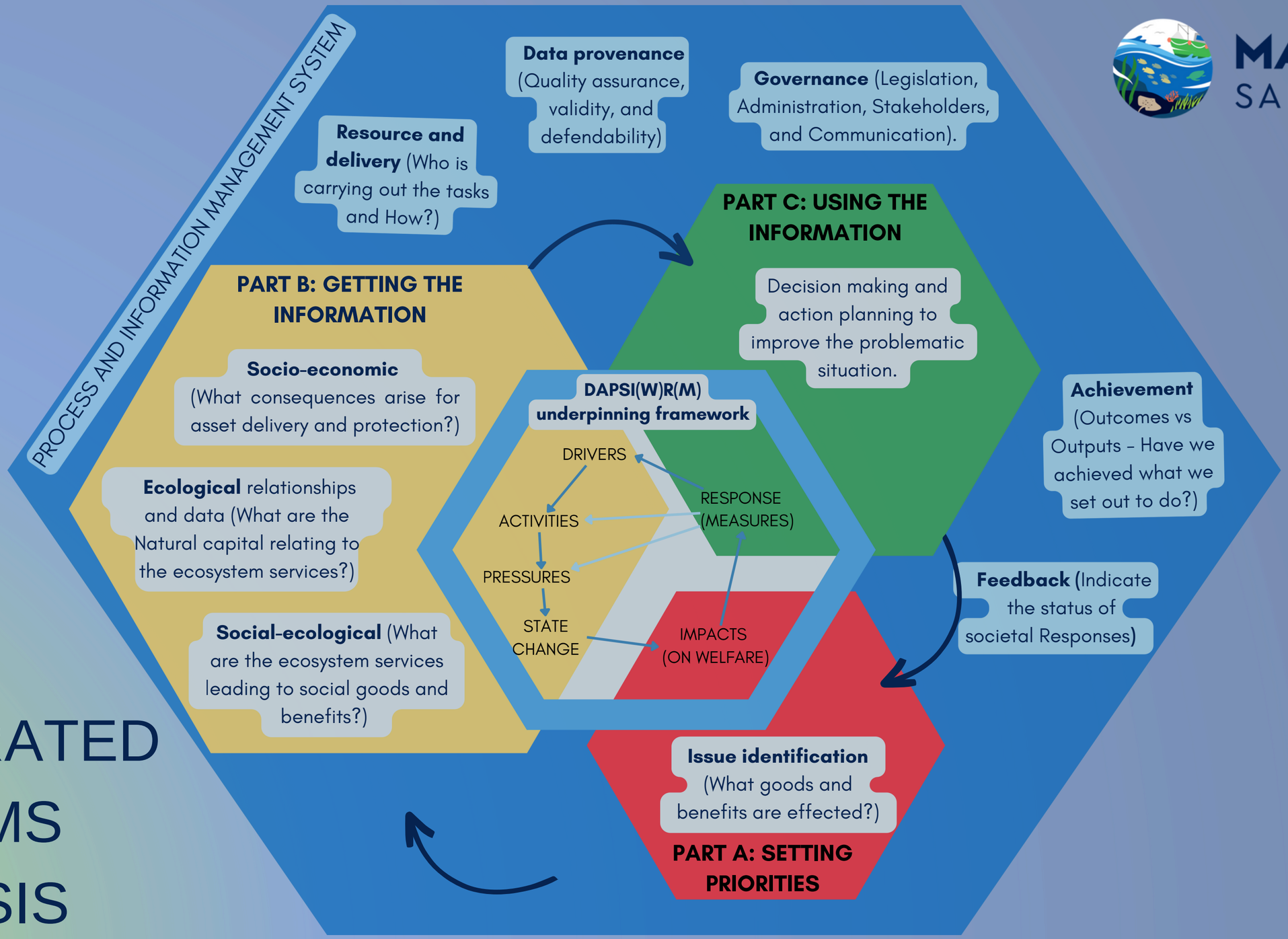
The scope of focus where these elements interact, e.g. an ecosystem or a specific area

SIMPLE SOCIAL-ECOLOGICAL SYSTEM

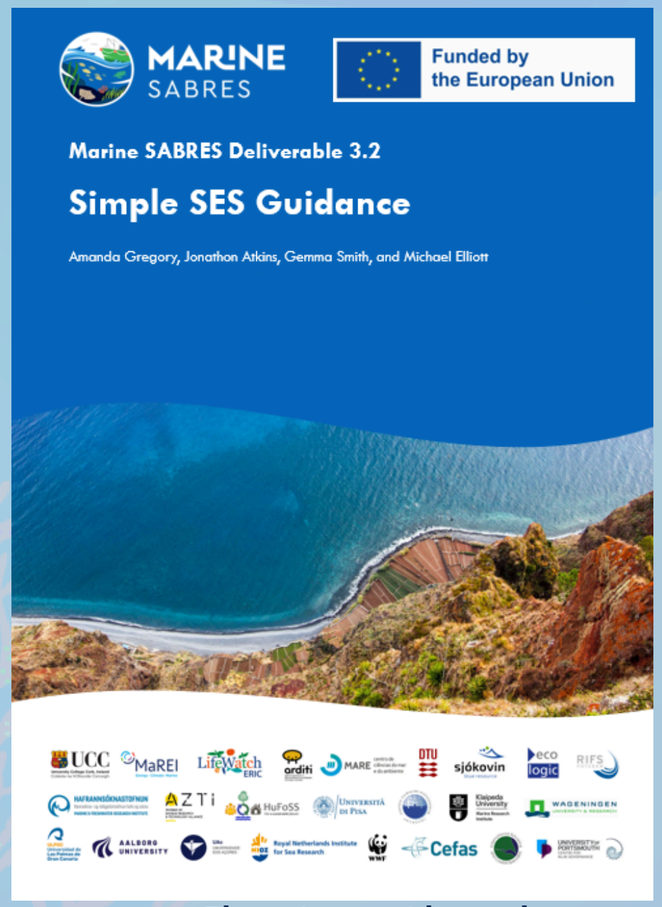
The minimum complexity necessary to make informed decisions

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

THE INTEGRATED SYSTEMS ANALYSIS



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:

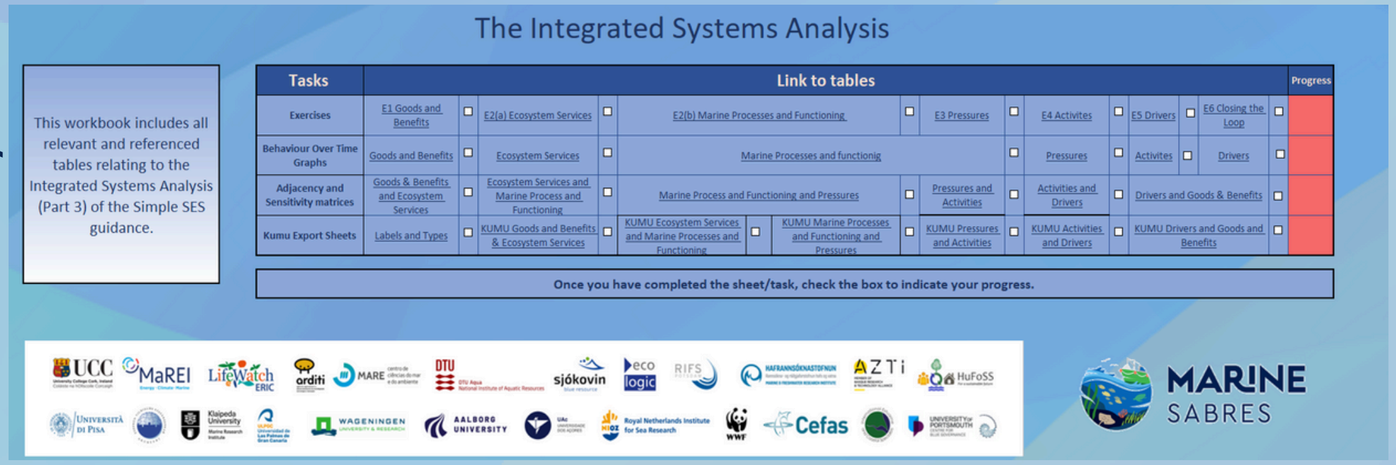
1. Add your question to the table below.
2. Check back regularly to see if your question has been answered.
3. Once your question has been answered, it will be added to the list below of FAQs.

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:

The Data Analysis Excel

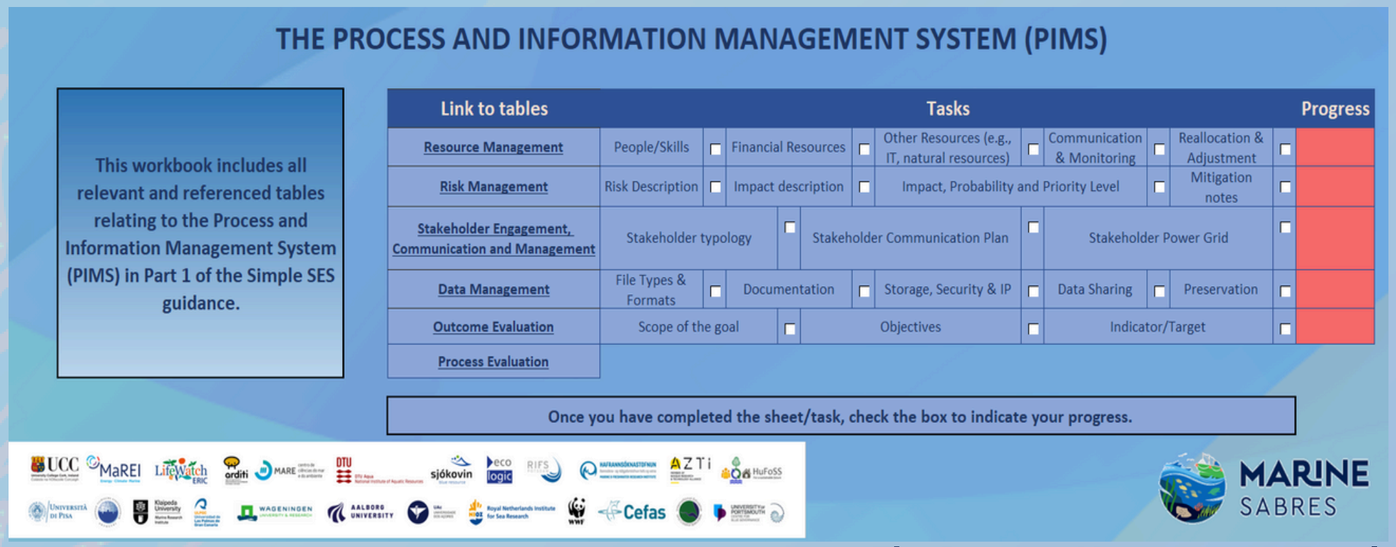


The Integrated Systems Analysis

This workbook includes all relevant and referenced tables relating to the Integrated Systems Analysis (Part 3) of the Simple SES guidance.

Tasks	Link to tables																Progress
Exercises	E1 Goods and Benefits	☐	E2(a) Ecosystem Services	☐	E2(b) Marine Processes and Functioning	☐	E3 Pressures	☐	E4 Activites	☐	E5 Drivers	☐	E6 Closing the Loop	☐			
Behaviour Over Time Graphs	Goods and Benefits	☐	Ecosystem Services	☐	Marine Processes and functionig	☐	Pressures	☐	Activites	☐	Drivers	☐					
Adjacency and Sensitivity matrices	Goods & Benefits and Ecosystem Services	☐	Ecosystem Services and Marine Process and Functioning	☐	Marine Process and Functioning and Pressures	☐	Pressures and Activities	☐	Activities and Drivers	☐	Drivers and Goods & Benefits	☐					
Kumu Export Sheets	Labels and Types	☐	KUMU Goods and Benefits & Ecosystem Services	☐	KUMU Ecosystem Services and Marine Processes and Functioning	☐	KUMU Marine Processes and Functioning and Pressures	☐	KUMU Pressures and Activities	☐	KUMU Activities and Drivers	☐	KUMU Drivers and Goods and Benefits	☐			

Once you have completed the sheet/task, check the box to indicate your progress.



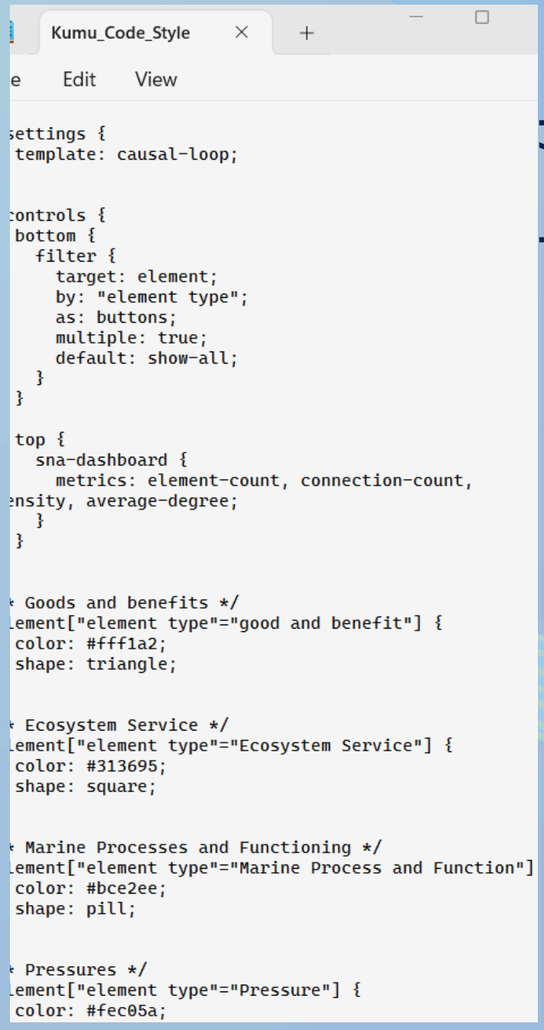
THE PROCESS AND INFORMATION MANAGEMENT SYSTEM (PIMS)

This workbook includes all relevant and referenced tables relating to the Process and Information Management System (PIMS) in Part 1 of the Simple SES guidance.

Link to tables	Tasks									Progress
Resource Management	People/Skills	☐	Financial Resources	☐	Other Resources (e.g., IT, natural resources)	☐	Communication & Monitoring	☐	Reallocation & Adjustment	☐
Risk Management	Risk Description	☐	Impact description	☐	Impact, Probability and Priority Level			☐	Mitigation notes	☐
Stakeholder Engagement, Communication and Management	Stakeholder typology	☐	Stakeholder Communication Plan	☐	Stakeholder Power Grid					☐
Data Management	File Types & Formats	☐	Documentation	☐	Storage, Security & IP	☐	Data Sharing	☐	Preservation	☐
Outcome Evaluation	Scope of the goal	☐	Objectives	☐	Indicator/Target					☐
Process Evaluation										

Once you have completed the sheet/task, check the box to indicate your progress.

The Process Management Excel



Kumu_Code_Style

e Edit View

```
settings {
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controls {
 bottom {
   filter {
     target: element;
     by: "element type";
     as: buttons;
     multiple: true;
     default: show-all;
   }
 }

 top {
   sna-dashboard {
     metrics: element-count, connection-count,
ensity, average-degree;
   }
 }


* Goods and benefits */
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 color: #fff1a2;
 shape: triangle;


* Ecosystem Service */
lement["element type"="Ecosystem Service"] {
 color: #313695;
 shape: square;


* Marine Processes and Functioning */
lement["element type"="Marine Process and Function"]
 color: #bce2ee;
 shape: pill;


* Pressures */
lement["element type"="Pressure"] {
 color: #fec05a;
```

The copy and paste kumu code

03

The Process and Information Management System

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PIM System

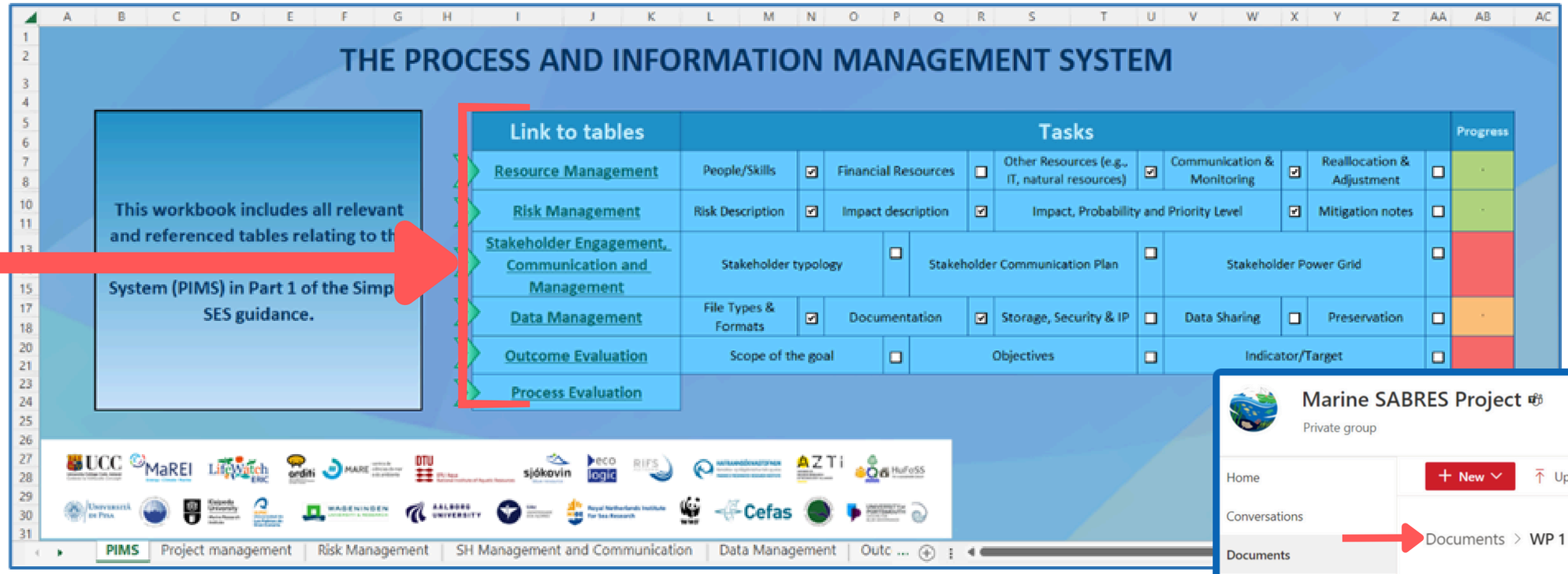
The overarching process and information management system (PIMS)

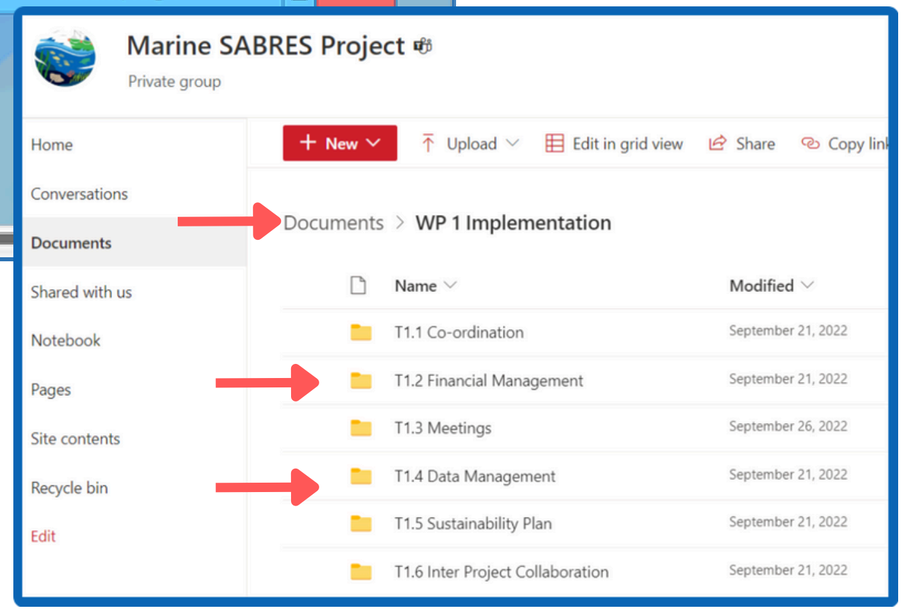
Sets the foundations for merging different systems used across sectors (science, policy, socio-economic) to reach holistic management solutions.

Organises and plans for stakeholder communication.

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

PIMS Information



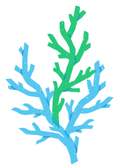


Majority of the PIMS information relating to the overall Marine SABRES Project can be found in the SharePoint folder WP1.

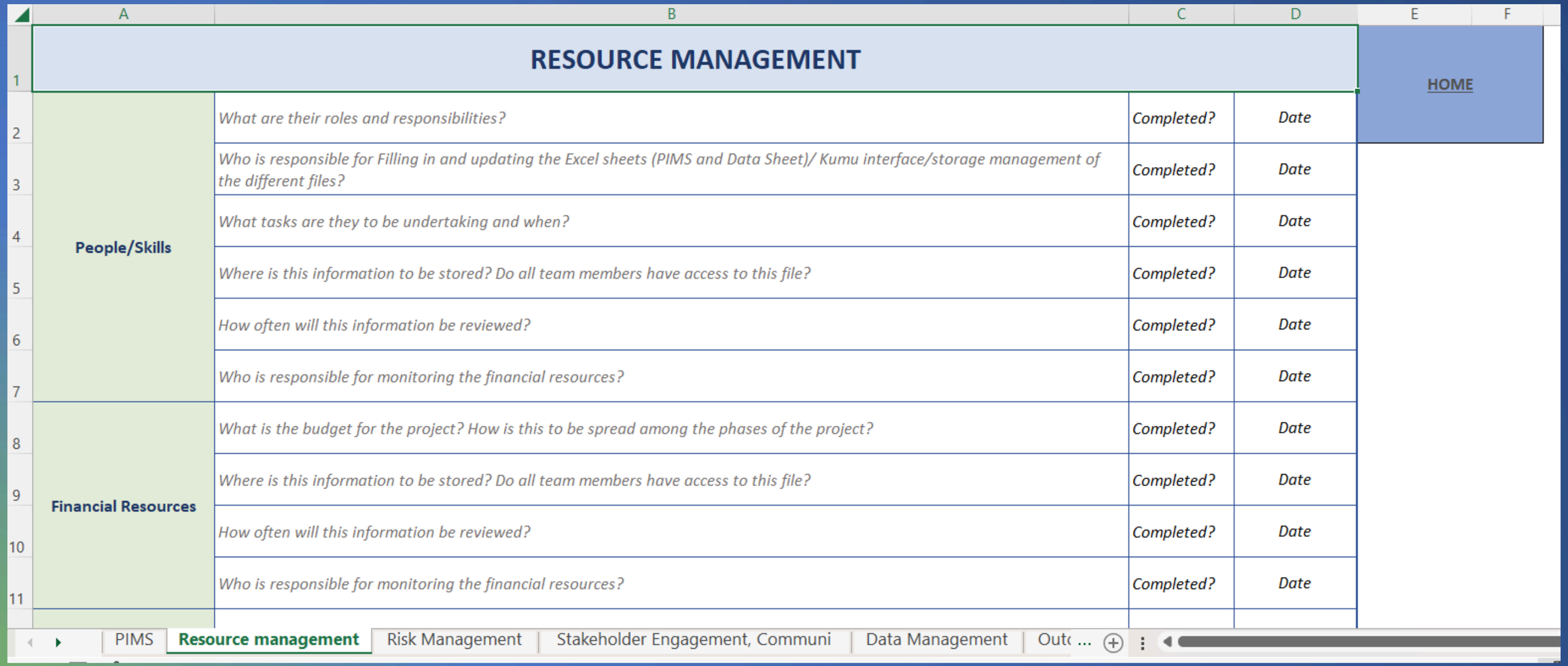
PIMS E0 E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13

Resource Management

Resource management is the efficient and effective development of resources when they are needed.



Such resources may include financial resources, inventory, human skills, production resources, information technology (IT) and natural resources.



RESOURCE MANAGEMENT

HOME

People/Skills	*What are their roles and responsibilities?*	*Completed?*	*Date*
	Who is responsible for Filling in and updating the Excel sheets (PIMS and Data Sheet)/ Kumu interface/storage management of the different files?	*Completed?*	*Date*
	What tasks are they to be undertaking and when?	*Completed?*	*Date*
	Where is this information to be stored? Do all team members have access to this file?	*Completed?*	*Date*
	How often will this information be reviewed?	*Completed?*	*Date*
	Who is responsible for monitoring the financial resources?	*Completed?*	*Date*
Financial Resources	*What is the budget for the project? How is this to be spread among the phases of the project?*	*Completed?*	*Date*
	Where is this information to be stored? Do all team members have access to this file?	*Completed?*	*Date*
	How often will this information be reviewed?	*Completed?*	*Date*
	Who is responsible for monitoring the financial resources?	*Completed?*	*Date*

PIMS | Resource management | Risk Management | Stakeholder Engagement, Communi | Data Management | Outc ...

RESOURCE MANAGEMENT

	Who is responsible for monitoring the financial resources?	*Completed?*	*Date*
Other Resources (e.g., IT, natural resources)	*What other resources are essential to the undertaking of the project (for example, online data storage and computer software)?*	*Completed?*	*Date*
	Where is this information to be stored? Do all team members have access to this file?	*Completed?*	*Date*
	How often will this information be reviewed?	*Completed?*	*Date*
	Who is responsible for monitoring the financial resources?	*Completed?*	*Date*
Communication & Monitoring	*Where is this information to be stored? Do all team members have access to this file?*	*Completed?*	*Date*
	How often will this information be reviewed?	*Completed?*	*Date*
	Who is responsible for monitoring overall resources, including reallocation and adjustment?	*Completed?*	*Date*
Reallocation & Adjustment	*Are any resources necessary to be reallocated?*	*Completed?*	*Date*
	Document here which resources are to be reallocated/adjusted.	*Completed?*	*Date*
	When are these to be reviewed?	*Completed?*	*Date*

PIMS | Resource management | Risk Management | Stakeholder Engagement, Communi | Data Management | Outc ...

Risk Management

- Assess any factors that could prevent the ability to meet deadlines

	A	B	C	D	E	F	G	H
1	**RISK MANAGEMENT**							
2	**Risk Description**	**Impact description**	**Impact Level**	**Probability level**	**Priority level**	**Mitigation notes**	**Person Responsible**	**Date**
3	*What risks could have a negative impact upon the team's ability to meet completion deadlines?*	*What impact would this have on the project?*	*1-5 score (1 being low impact and 5 being high impact)*	*1-5 score (1 being low probability and 5 being high probability)*	*1-5 score (1 being low priority and 5 being high priority)*	*Notes on how this will be addressed.*	*Team member completing Risk assessment*	

Risk Management

Annex 1 - Description....pdf

LIST OF CRITICAL RISKS

Critical risks & risk management strategy

Grant Preparation (Critical Risks screen) — Enter the info.

Risk number	Description	Work Package No(s)	Proposed Mitigation Measures
1	Failure to establish the needed information flow and linkages between WPs (likelihood low, severity medium)	WP7, WP5, WP6, WP3, WP1, WP2, WP4	The organisation of activities and the management structure of SABRES is designed to foster collaboration and synergies among WPs and partners. Many of the partners have successfully collaborated previously, and actively wrote the proposal together. In every SC meeting, WP interactions and interdependencies to best exploit possible synergies and ensure information flow will be reviewed. In addition, WP3 will develop a transdisciplinary Simple SES for the integrative assessment of marine ecosystems, that will further support WP conceptual linkages. Both WP4 and WP2 link to both DAs to provide fail-safes.
2	Quality of deliverable is low (likelihood low, severity high)	WP7, WP5, WP6, WP3, WP1, WP2, WP4	The budget has been prepared to allow proper achievement of all deliverables. Risk is low given the excellent and complementary expertise of all partners involved in the consortium. In addition, a system of two internal reviewers per deliverable will be established to check quality of deliverables; reviewers will review an early annotated outline and the draft version of deliverables before submission.
3	Failure to submit deliverables according to project timeline (likelihood low, severity high)	WP7, WP5, WP6, WP3, WP1, WP2, WP4	The organisation of activities and the management structure is designed to deliver in time. The WP leaders, task leaders and the coordination team will continuously monitor progress to mitigate inefficient/ineffective research activities. The coordination team will establish a system of deliverable and milestone reminders for fixed points in time.
4	Data loss and corruption due to cyberattacks (likelihood low, severity high)	WP1	Different actions will be undertaken to reduce the risk of cyberattacks and prevent the loss of data following the ISO 27032 standard that provides guidance on addressing a wide range of cyber security risks, including user endpoint security, network security and critical infrastructure protection (e.g., LifeBlock).
5	Limited engagement of project partners to ensure long-term sustainability of project products (likelihood low, severity high)	WP1	International organisation and European research infrastructures involved in the project directly as partners or with established collaboration with project partners have in their mission the long-term maintenance and operation of services produced for the stakeholder communities both by themselves and by other organisation and rojects. The engagement of these partners and partner related institutions will be ensured early in the

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Location on SharePoint:

Documents > DOCUMENTS FOR REFERENCE > 101058956_Grant Agreement

Name	Modified	Modified By
Annex 1 - Description of the action (part A)....	October 20, 2022	Emma Verling

PIMS E0 E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13

Stakeholder Engagement, Communication, and Management

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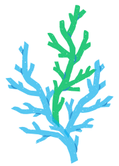
We use "boundary decisions" to simplify the complex marine system, deciding what is important and needs to be included.

These decisions help us to focus on the right things without spending too much time and resources.



Everyone inside the boundary plays an important part in shaping and improving our plans and response measures.

Type of Stakeholder	Stakeholder
Extractors (fishers, resource removers)	*List stakeholders here.*
Inputters (dischargers, polluters)	*List stakeholders here.*
Beneficiaries (those acquiring the benefits)	*List stakeholders here.*
Affectees (society, those paying the costs)	*List stakeholders here.*
Regulators (government, legislators, decision-makers)	*List stakeholders here.*
Influencers (expert groups, politicians, NGOs)	*List stakeholders here.*

Interest		
	SUBJECTS	**PLAYERS**
	List stakeholders here who are interested in the project, but have little influence over the outcomes (e.g. local individuals).	*List stakeholders here who are interested in the project and have a high influence over the outcomes (e.g. large industry in the area, local environmental groups).*
	CROWD	**CONTEXT SETTERS**
	List stakeholders here who currently exhibit neither interest nor power to influence the issue of concern (e.g. general public of the country).	*List stakeholders here who may have a high degree of power over the future of the issue, particularly in terms of influencing the future context within which responses will need to operate (e.g. local governing bodies; marine planning authorities).*
	Power	

Communication type	Stakeholders
Smaller communication methods; Sound bites, headlines, Tweets and one-page briefing notes.	*List stakeholders here.*
More in-depth and larger communication methods; Theses, reviews, scientific papers, and consultant reports.	*List stakeholders here.*

Data Management

A data management plan (DMP) is a written document outlining the plans for managing research data both during and after the project.

The Marine SABRES project has an overall DMP which we recommend to be referenced in ensuring the DA application is in line with this Marine SABRES approach to GDPR and data provenance.

Category	Key Points	Data management actions
File Types & Formats	What types of files will be created as part of the project? Will data be transformed and/or transferred as part of the process of analysis? Outlining all the types, sources, and estimated size of data being collected and analysed will help you identify potential issues relating to storage, sharing, and preservation.	*List the characteristics of the data to be collected (e.g. quantitative, text, audio, video, code, etc.)*
		Include the file formats/software and if they are open or proprietary. List relevant physical formats like lab notebooks here.
		Outline the file types you'll be creating or transforming during collection and analysis.
		What is the anticipated size of data? Will require additional resources?
Documentation	It is important to document how files are being managed as you may want to or be expected to share your data, and someone may want to verify, replicate, or reuse your data. Describe the documentation and quality assurance strategies for each type of data during collection and analysis. Consider using a file naming convention and using built-in documentation capabilities, like taking notes in code scripts.	*Outline what documentation you will create here.*
		Describe workflows for systematic capture of study information.
		How will you add, update, and maintain the data and documentation? Who will be responsible for this management?
		How will you track multiple files or versions?
		How will non-digital documentation be handled?
		Establish if there is a relevant disciplinary standard for documentation and metadata you could use.*
		Consider what documentation will be needed for shared/preserved data.
		Consider creating a README document for shared/preserved data you'll use during collection and analysis. Where will this be stored?

Storage, Security & IP	Storage location, data safety, and access control. In almost all cases, research data should be kept in secure storage (what does this mean in terms of this project?). Avoid using local hard drives, portable storage devices, laptops, and tablets for storage to reduce the risk of accidental loss.	*Describe where you will store your data at every stage of collection and analysis (be specific about the journey your data will take).*
		Determine how you will keep your data safe to prevent accidental loss and unauthorised access
		Decide if you will transfer data from a collection tool to do your analysis, e.g. voice recorder, field measurements, or online survey *How and when will you do this? Every week? After data collection ends?*
		Describe how and when you will transfer data if necessary, including deleting data from collection tools/storage.
		Identify any ethical, legal or commercial issues with your data, e.g. identifiable data, copyright materials, patents, etc. How will you protect the data? (This could include transforming, de-
		Identify who will have access to the data. How will collaborators have access to the data?
		Identify any special storage or computing requirements you may have.
		Describe how you will securely store and maintain any non-digital data.

Storage, Security & IP	Storage locati almost all case secure storage project?). Avoi storage device reduce the risk			*Describe where you will store your data at every stage of collection and analysis (be specific*
		Data Sharing	Data sharing for verification and reuse is an increasingly important marker of research integrity. Your plan should identify what data will or will not be shared from the project and, for data that can't be shared, you should include a justification for why not. For shareable data, you should outline where, when, and how others can access it. Often data is released following publication or at the close of a project. Be aware: some funders and publishers require data to be shared within specific timelines (what is the expectation on this project?).	*Make sure your consent forms don't prohibit sharing/retention and, even better, ensure that they mention that de-identified data will be shared in an open repository* *If the data cannot be shared, explain why (e.g. don't own the data, national security, copyrighted)*
				Outline what parts of your data can and cannot be shared
				Describe and justify any restrictions or terms of access (restricted, NDA, etc.) *When will the data be released?*
				Is there non-digital data that needs to be made available? How will people request access (e.g. a publicly discoverable metadata record)?
				Will you transform the data? (e.g. de-identify or convert to an open format)
				Identify how you will share your data, such as depositing in a repository *Consider applying a Creative Commons license to your shared data or code* *Check out the FAIR principles of data sharing (https://www.go-fair.org/fair-principles/)*
				Best practice is to deposit the data into a suitable data repository. Repositories provide the best visibility, tracking, and safe keeping for your data (what is recommended for this project?).
				Identify a suitable repository. Consider a discipline specific repository that is most appropriate for your data. Check out PLOS' list of recommended
			Remember, sharing data isn't all or nothing. You can still engage in a culture of openness and transparency while appropriately protecting your data:	*Releasing some data publicly and restricting access to other parts*
				Transforming the data to share it more openly
				Restricting access to bona fide researchers or on a case-by-case basis
				Outlining terms of access and/or applying for a copyright licence
				Only allowing access for verification of findings and subject to a non-disclosure agreement
				Creating a public metadata record outlining what data is held and why it cannot be shared

Evaluation

Participants in a multi-stakeholder setting usually define their own evaluation criteria in relation to specified goals and objectives. In terms of the ISA process, we have to think of evaluation as involving two considerations:

Process Evaluation

Outcome Evaluation

PIMS E0 E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13

Outcome

	A	B	C	D	E
1	**OUTCOME EVALUATION**				
2	**Site**	**The scope of the objectives**			
3					
4					
5					
6	**DA Sites**	**The broad scope of the goal**	**Objectives**		**Indicator/Target**
7	The Tuscan Archipelago	Tourism and conservation of seagrass beds: We will restore seagrass beds by finding alternative mooring solutions. The recovery of seagrass beds from physical disturbance will be assessed by replicated diving surveys to assess the recovery rate in terms of biodiversity, protection from invasive species and carbon sequestration. Measures to promote more sustainable mooring and boat use across private users and commercial charter companies will be developed.	*Is this objective Specific, Measurable, Achievable, Realistic and Time-bound?*	*What is the scale of this objective (local, national, regional)?*	*The desired final state and the date at which it should be assessed, with appropriate intermediate assessments to check progress if appropriate, should be specified.*
8			*Is this objective Specific, Measurable, Achievable, Realistic and Time-bound?*	*What is the scale of this objective (local, national, regional)?*	*The desired final state and the date at which it should be assessed, with appropriate intermediate assessments to check progress if appropriate, should be specified.*
9			*Is this objective Specific, Measurable, Achievable, Realistic and Time-bound?*	*What is the scale of this objective (local, national, regional)?*	*The desired final state and the date at which it should be assessed, with appropriate intermediate assessments to check progress if appropriate, should be specified.*
10			*Is this objective Specific, Measurable, Achievable, Realistic and Time-bound?*	*What is the scale of this objective (local, national, regional)?*	*The desired final state and the date at which it should be assessed, with appropriate intermediate assessments to check progress if appropriate, should be specified.*
11			*Is this objective Specific, Measurable, Achievable, Realistic and Time-bound?*	*What is the scale of this objective (local, national, regional)?*	*The desired final state and the date at which it should be assessed, with appropriate intermediate assessments to check progress if appropriate, should be specified.*
12			*Is this objective Specific, Measurable, Achievable, Realistic and Time-bound?*	*What is the scale of this objective (local, national, regional)?*	*The desired final state and the date at which it should be assessed, with appropriate intermediate assessments to check progress if appropriate, should be specified.*
13			*Is this objective Specific, Measurable, Achievable, Realistic and Time-bound?*	*What is the scale of this objective (local, national, regional)?*	*The desired final state and the date at which it should be assessed, with appropriate intermediate assessments to check progress if appropriate, should be specified.*
14			*Is this objective Specific, Measurable, Achievable, Realistic and Time-bound?*	*What is the scale of this objective (local, national, regional)?*	*The desired final state and the date at which it should be assessed, with appropriate intermediate assessments to check progress if appropriate, should be specified.*

Process

Focussing on the group option analysis session, to what extent do you agree or disagree with the following statements:						
		Strongly Disagree	Disagree	Agree	Strongly Agree	Neither Agree nor Disagree
Communication	a. There was a good exchange of ideas and viewpoints between participants					
	b. All participants contributed to the discussion					
	c. A shared language was being used					
	d. Some participants dominated discussions which prevented some other participants from contributing					
	e. Participants understood and were focussed on the options analysis task					
Consensus	a. Participants' opinions converged as they discussed options for their respective positions					
	b. Participants became aware that there were more options than they originally thought					
	c. Participants did not reach agreement on the analysis of the options					
	d. The approach to analysing options helped participants communicate their ideas to others					
Commitment	a. There was a strong belief and recognition of the value of the options analysis exercise					
	b. Participants' level of engagement with the analysis exercise was low					
	c. There was a strong desire to achieve an analysis of the options which was both correct and complete through the exercise					

Governance

What rules are in place that influence activities and management within the area?

Deliverable 3.2 - Governance Audit Guidelines

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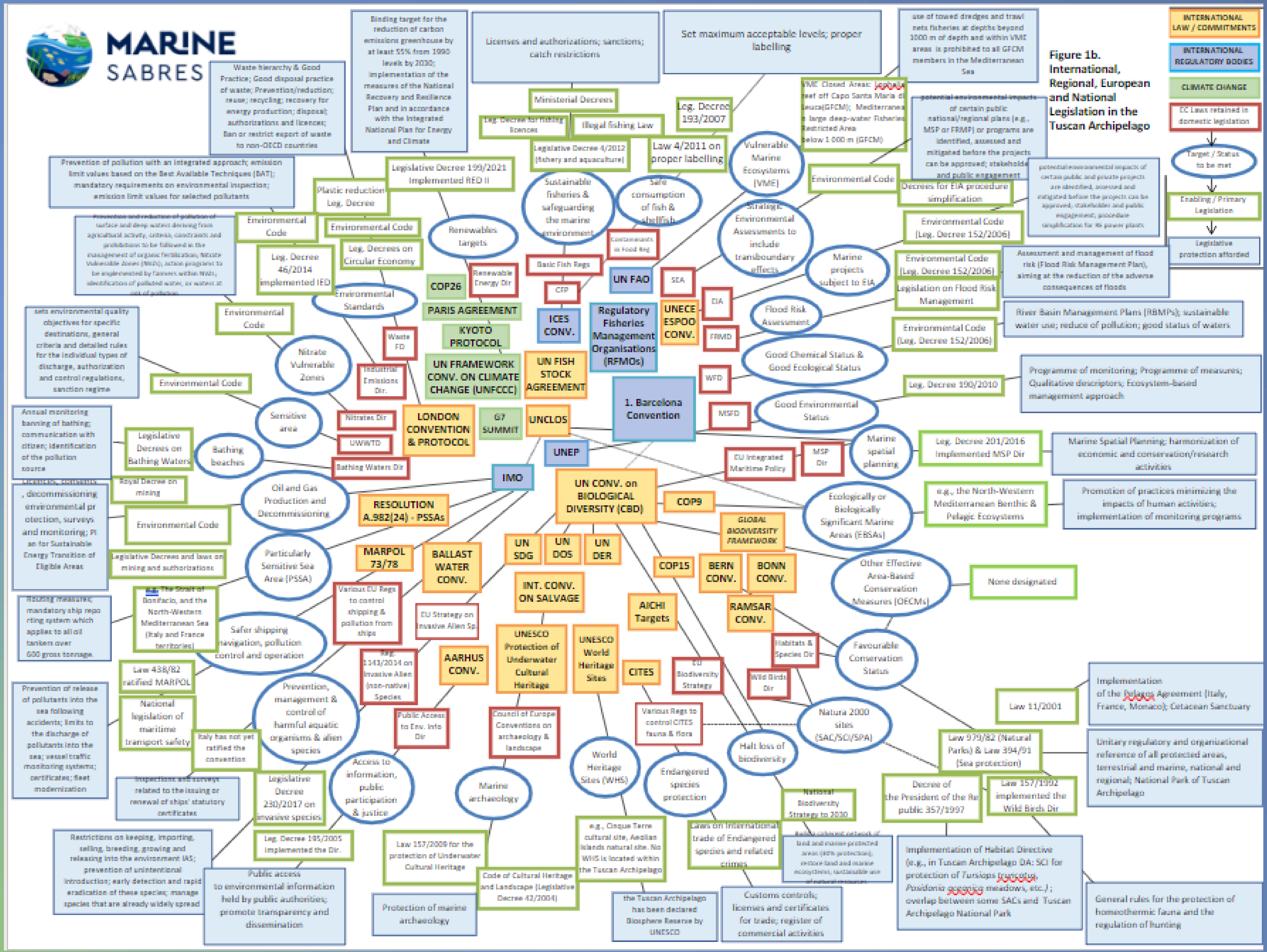
Table 2. Working document for collating national legislative information (moving clockwise around Figure 1b).

BOX on Figure 1b	LEGISLATION	COMPLETE THIS COLUMN TO STATE YOUR NATIONAL IMPLEMENTATION & THE PROTECTION IT AFFORDS	Added to Figure 1b ✓
Regional Sea Convention			
Box 1	Insert your Regional Sea Convention in the central area (highlighted in yellow) e.g. OSPAR, HELCOM, Barcelona or Bucharest.	e.g. UK - OSPAR	
EU Marine Strategy Framework Directive (MSFD)			
Boxes 2a and 2b.	Under which piece of national legislation is the MSFD implemented? (If just one main act or regulation, then delete the second box).	e.g. UK – Marine Strategy Regulations; Environment Act	
Box 2c.	Do you have any nationally implemented legislation which also helps to achieve GES?		
Box 2d	State what specific protection this legislation gives your Demonstration Area.		
EU Marine Spatial Planning Directive (MSPD)			
Box 3	Which piece(s) of national primary/enabling legislation implements the MSPD in your country?		
Box 3a	State what components or sub-area this act/regulation specifically protects in the MarineSABRES Demonstration Area.		
CBD COP9 - Ecologically or Biologically Significant Marine Areas (EBSAs)			
Box 4	Do you use this term and if so, do you have any designated EBSAs? If so, name the area.		
Box 4a	What specific protection does this concept/designation give to the Demonstration Area?		



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Administration

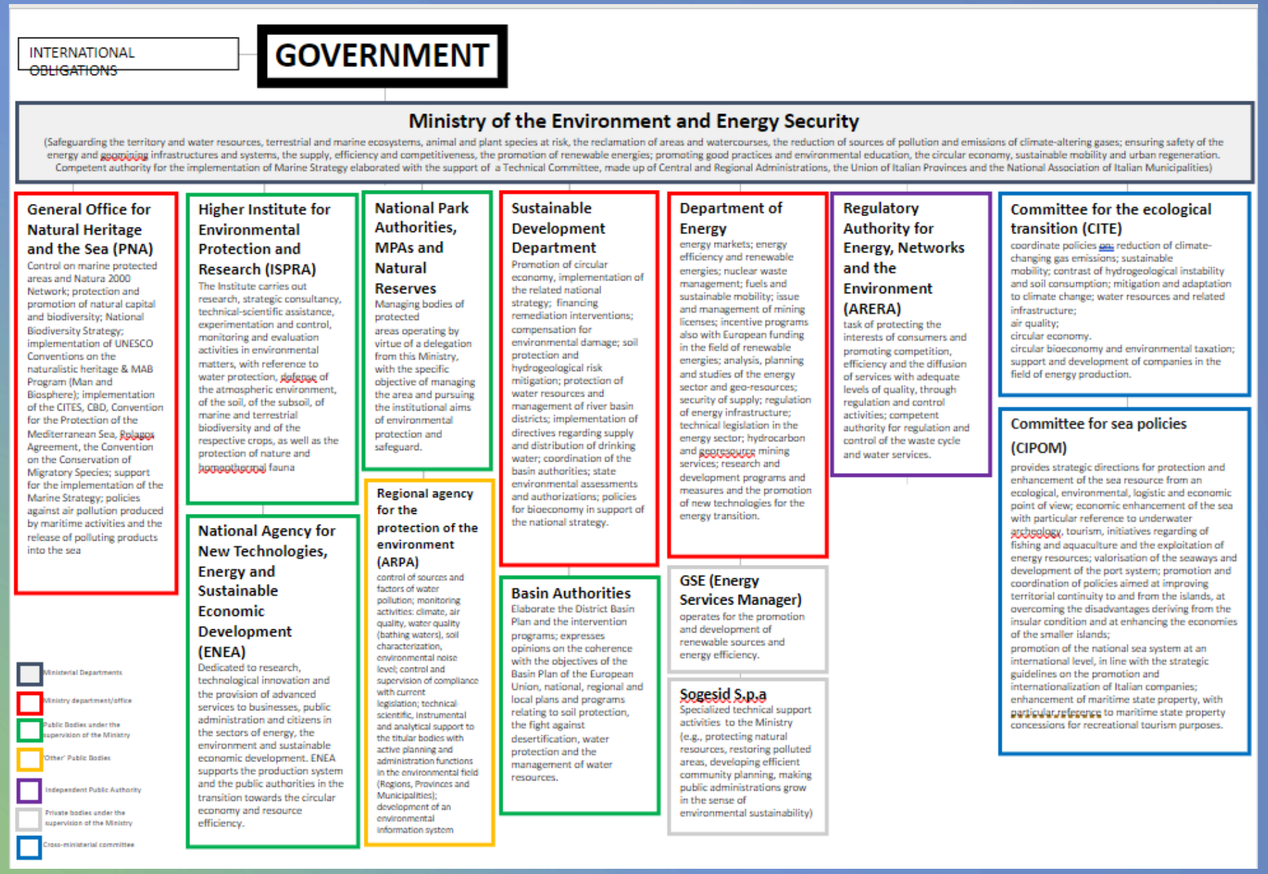
Who play a role in management of the area?

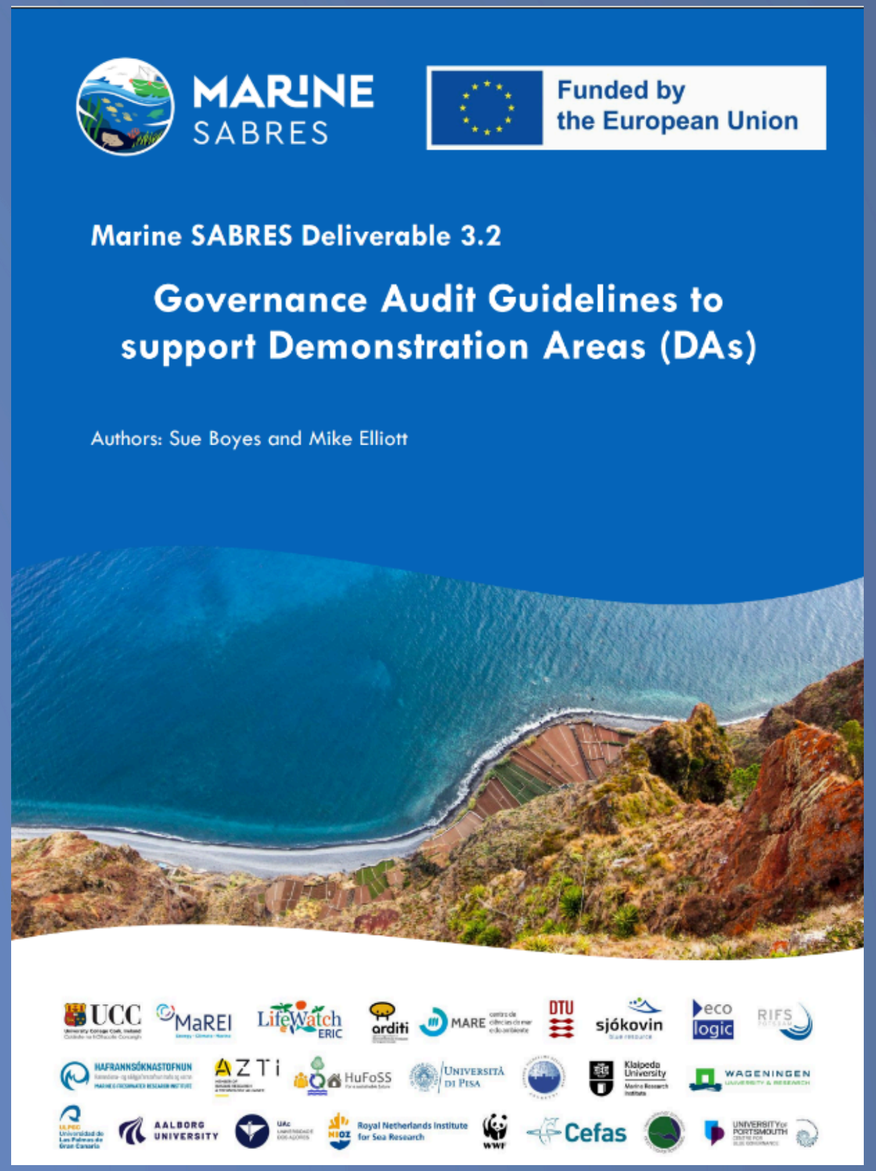
Deliverable 3.2 - Governance Audit Guidelines

Table 3. Working document for collating statutory organisation/administrative information.

Statutory Organisation	**Hierarchy** If an agency/body – under which department do they operate	**Overview** Describe the vision of the organisation	**Responsibilities** Description of their specific role in relation to:		
			Maritime Spatial Planning (MSP)	**Marine Protected Areas (MPAs)**	**Marine Strategy Framework Directive (MSFD)**
e.g. Marine Management Organisation (MMO), England	Statutory. Executive Non-Departmental Public Body working under the Department of Environment, Food and Rural Affairs (Defra) in England and Wales	Protecting and enhancing the marine environment and supporting UK economic growth by enabling sustainable marine activities and development.	Marine planning (planning and licensing functions for English waters and developing marine plans covering the English marine area); Marine regulation & licensing (consenting process, harbour orders (HO), Sec 36 of Electricity Act (>1MW to 100MW) (also with responsibilities for Sec 36 and certain HOs in Welsh inshore waters)); Fisheries (regulate fishing outside territorial waters and outside MPAs, dispensations, monitoring & enforcement, quotas, statistics & vessels licenses).	Protecting the environment (marine pollution, nature conservation (MCZs) & wildlife licences).	Assists Defra to deliver the UK Marine Policy Statement by taking measures to improve the state of the UK's marine environment and achieve GES under the MSFD.

Administration





PIMS Summary

Planned effectively to ensure a good foundation of the SES process to collect data.

Assessed relevant risks and logistical considerations to the process and planned for mitigations and contingencies.

Planned and considered how and who to communicate with to gather a view of the social-ecological system.

Understood and considered what rules are in place (Policy) and who plays a role in management (Administration)

Ready to start the data collection and integrated systems analysis process.

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04

Data collection and structuring

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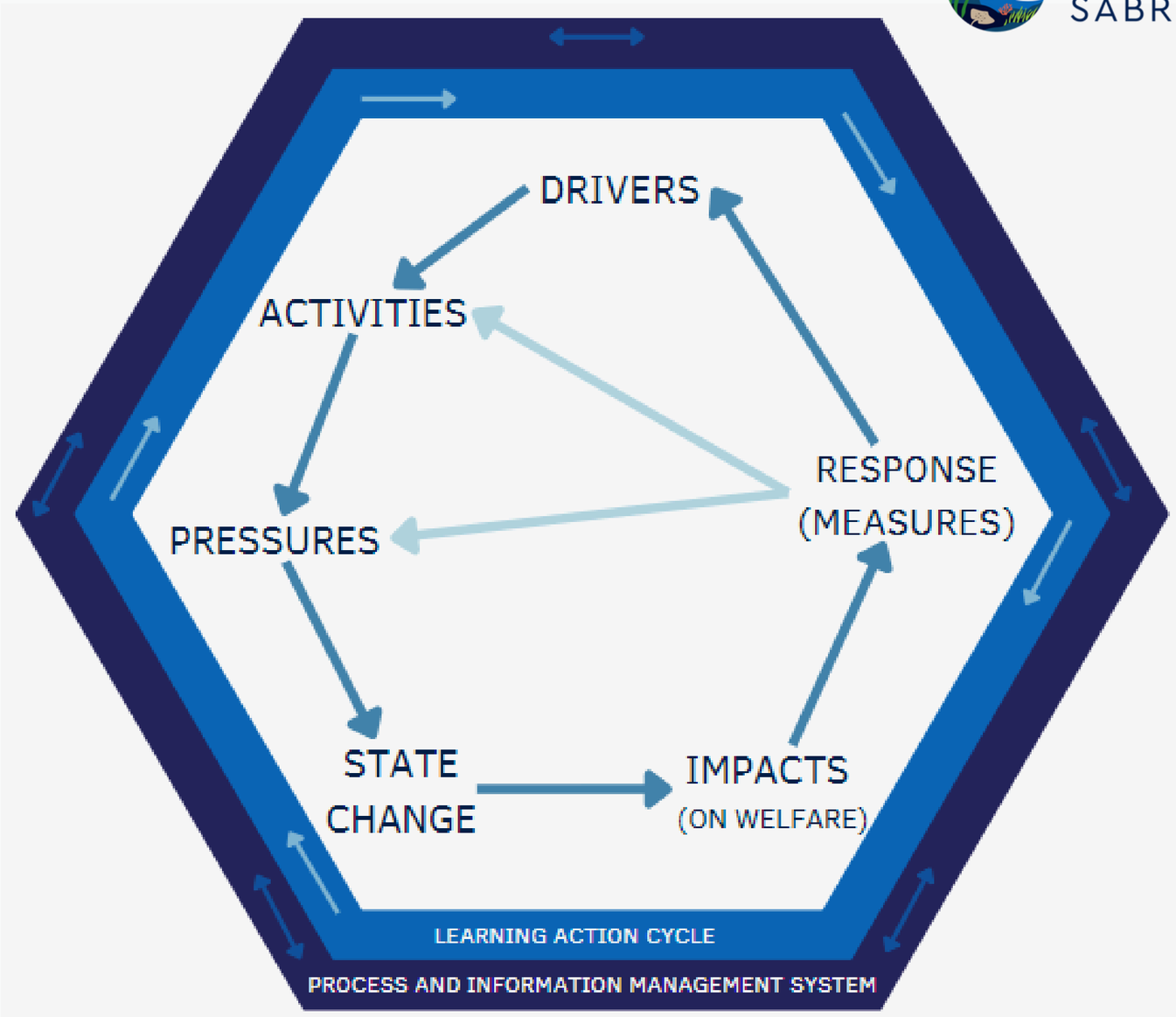
The DAPSI(W)R(M) and Modelling process

- Part 3 of the Guidance document
- The underpinning framework and systems discipline techniques of modelling.
- DAPSI(W)R(M) and Causal Loop Diagrams

The DAPSI(W)R(M) Framework



Data necessary for the approach: Indicators

Indicators are a tool “to monitor and assess the state of the marine environment and to manage human activities having an impact upon it”

When selected appropriately, indicators can show changes in the outcomes of the complex system

Drivers

The human needs which warrant the activities.

Activities

Individual anthropogenic activities to satisfy human needs.

Pressures

Reflect the mechanisms of change and can result in changes to the natural system

State change

Ecosystem services:
The direct contribution of assets to human wellbeing and quality of life.

Marine Process and Functioning:
The underlying processes and functions that result in the ecosystem services.

Impacts (on Welfare)

The products, qualities and benefits society gets from the ecosystem services.

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The direct contribution of assets to human wellbeing and quality of life.

Marine Process and Functioning:
The underlying processes and functions that result in the ecosystem services.

Pressures

Reflect the mechanisms of change and can result in changes to the natural system

Activities

Individual anthropogenic activities to satisfy human needs.

Activities are the means of retrieving goods and benefits from the marine ecosystem (Elliott et al., 2017). The distinction of the Activities from the Drivers in the marine environment refers to the actions taken to meet basic human needs (the Drivers). At the same time, Pressures are the consequences or impacts that arise from these activities, as they affect the natural system (Elliott et al., 2017).

Drivers

The human needs which warrant the activities.

DAPSI(W)R(M) Illustrative Indicator Names

Drivers

- Cleaner water
- Cultural wellbeing
- Equality Diversity and Inclusion
- Food security and improved nutrition
- Healthier climate
- Improved human health benefits and wellbeing
- Identity and belonging
- Safer places
- Other

Activities

- Shellfish aquaculture_Bottom culture
- Finfish aquaculture
- Seaweed Shellfish aquaculture, Suspended rope net culture and Trestle culture
- Coastal flood and erosion risk management schemes
- Piling_Port and Harbours Coastal flood and erosion risk management schemes
- Offshore coastal defence structures
- Managed realignment
- Leisure e.g. swimming, rock pooling
- Cultural and heritage sites e.g. wrecks, sculptures, foundations etc.
- Marine and Coastal Research and teaching

Pressures

- Input of genetically modified species and translocation of native species
- Loss of or change to natural biological communities due to cultivation of animal or plant species
- Disturbance of species due to human presence
- Extraction mortality or injury to wild species
- Physical disturbance to seabed temporary or reversible
- Physical loss due to permanent change of seabed substrate or morphology and to extraction of seabed substrate
- Changes to hydrological conditions

State change

Marine Processes and functioning

- Sea space
- Sea water
- Substratum
- Production
- Decomposition
- Food web dynamics
- Ecological interactions
- Hydrological processes
- Geological processes

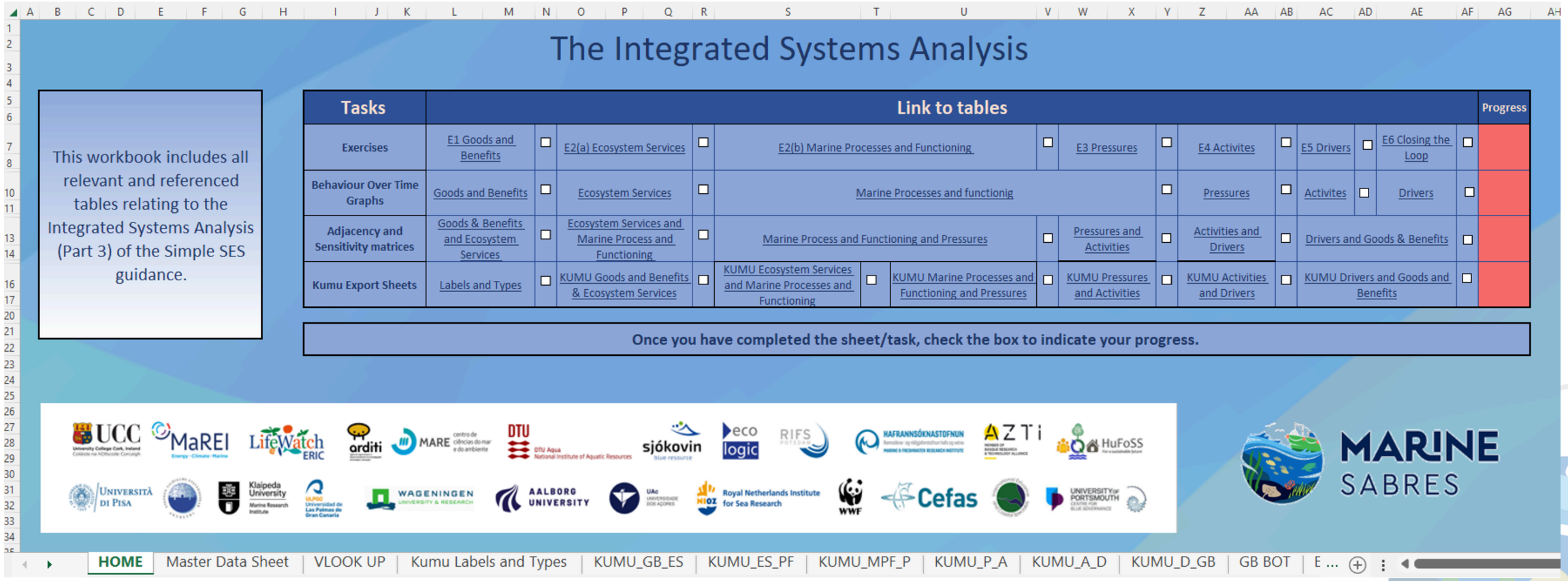
Ecosystem Services

- Biological control
- Natural hazard regulation
- Waste breakdown and detoxification
- Carbon sequestration
- Coastal and marine biota
- Climate regulation
- Natural hazard protection
- Clean water and sediments
- Places and seascapes
- Other

Impacts (on Welfare)

- Aesthetic benefits
- Clean water and sediments
- Education and Research
- Equality Inclusion and Diversity
- Fertilisers and biofuels
- Food for human consumption
- Food not for human consumption
- Healthy climate
- Housing
- Human health benefits
- Human wellbeing

Analysis Information Sheet



The Integrated Systems Analysis

This workbook includes all relevant and referenced tables relating to the Integrated Systems Analysis (Part 3) of the Simple SES guidance.

Tasks	Link to tables																				Progress
Exercises	E1 Goods and Benefits	☐	E2(a) Ecosystem Services	☐	E2(b) Marine Processes and Functioning				☐	E3 Pressures	☐	E4 Activites	☐	E5 Drivers	☐	E6 Closing the Loop	☐				
Behaviour Over Time Graphs	Goods and Benefits	☐	Ecosystem Services	☐	Marine Processes and functionig				☐	Pressures	☐	Activites	☐	Drivers	☐						
Adjacency and Sensitivity matrices	Goods & Benefits and Ecosystem Services	☐	Ecosystem Services and Marine Process and Functioning	☐	Marine Process and Functioning and Pressures				☐	Pressures and Activities	☐	Activities and Drivers	☐	Drivers and Goods & Benefits			☐				
Kumu Export Sheets	Labels and Types	☐	KUMU Goods and Benefits & Ecosystem Services	☐	KUMU Ecosystem Services and Marine Processes and Functioning	☐	KUMU Marine Processes and Functioning and Pressures		☐	KUMU Pressures and Activities	☐	KUMU Activities and Drivers	☐	KUMU Drivers and Goods and Benefits			☐				

Once you have completed the sheet/task, check the box to indicate your progress.

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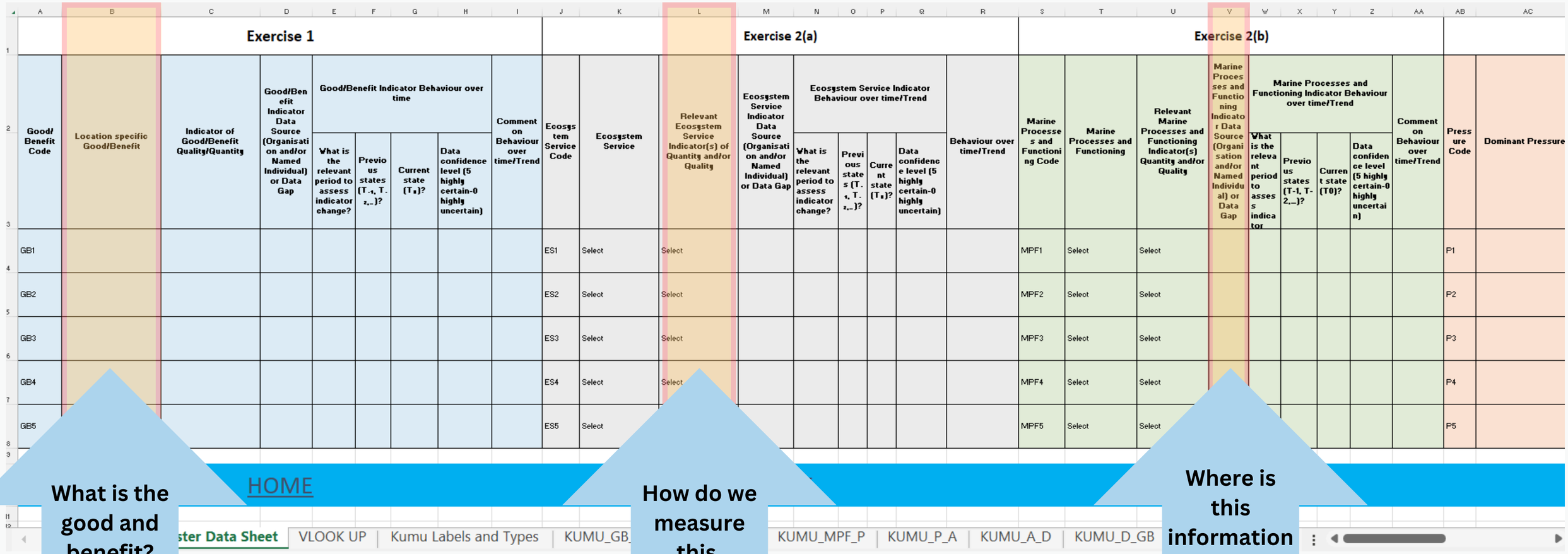
HOME | Master Data Sheet | VLOOK UP | Kumu Labels and Types | KUMU_GB_ES | KUMU_ES_PF | KUMU_MPF_P | KUMU_P_A | KUMU_A_D | KUMU_D_GB | GB BOT | E ...

The ISA Excel 'Master Data Sheet'



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
1		Exercise 1										Exercise 2(a)							Exercise 2(b)										
2	Good/ Benefit Code	Location specific Good/Benefit	Indicator of Good/Benefit Quality/Quantity	Good/Benefit Indicator Data Source (Organisation and/or Named Individual) or Data Gap	Good/Benefit Indicator Behaviour over time				Comment on Behaviour over time/Trend	Ecosystem Service Code	Ecosystem Service	Relevant Ecosystem Service Indicator(s) of Quantity and/or Quality	Ecosystem Service Indicator Data Source (Organisation and/or Named Individual) or Data Gap	Ecosystem Service Indicator Behaviour over time/Trend				Behaviour over time/Trend	Marine Processes and Functioning Code	Marine Processes and Functioning	Relevant Marine Processes and Functioning Indicator(s) Quantity and/or Quality	Marine Processes and Functioning Indicator Data Source (Organisation and/or Named Individual) or Data Gap	Marine Processes and Functioning Indicator Behaviour over time/Trend				Comment on Behaviour over time/Trend	Pressure Code	Dominant Pressure
3					What is the relevant period to assess indicator change?	Previous states (T-1, T-2,...)?	Current state (T0)?	Data confidence level (5 highly certain-0 highly uncertain)						What is the relevant period to assess indicator change?	Previous states (T-1, T-2,...)?	Current state (T0)?	Data confidence level (5 highly certain-0 highly uncertain)						What is the relevant period to assess indicator	Previous states (T-1, T-2,...)?	Current state (T0)?	Data confidence level (5 highly certain-0 highly uncertain)			
4	GB1									ES1	Select	Select							MPF1	Select	Select								P1	
5	GB2									ES2	Select	Select							MPF2	Select	Select								P2	
6	GB3									ES3	Select	Select							MPF3	Select	Select								P3	
7	GB4									ES4	Select	Select							MPF4	Select	Select								P4	
8	GB5									ES5	Select								MPF5	Select	Select								P5	
9																													
10	HOME																												
11																													
12	ster Data Sheet	VLOOK UP	Kumu Labels and Types	KUMU_GB_															KUMU_MPF_P	KUMU_P_A	KUMU_A_D	KUMU_D_GB							

What is the good and benefit?

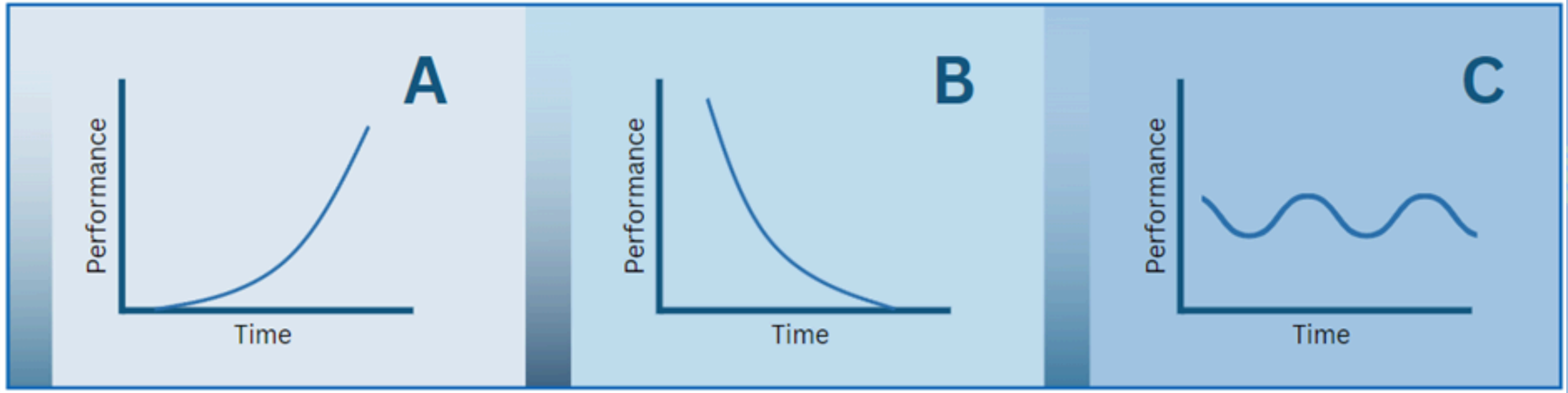
How do we measure this.

Where is this information from?

Systems thinking tool

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.

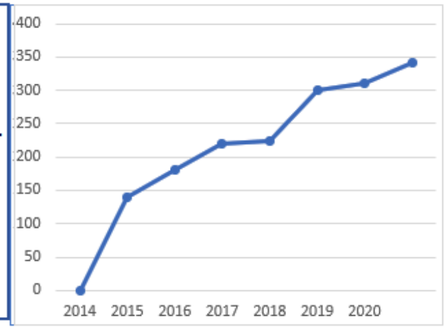


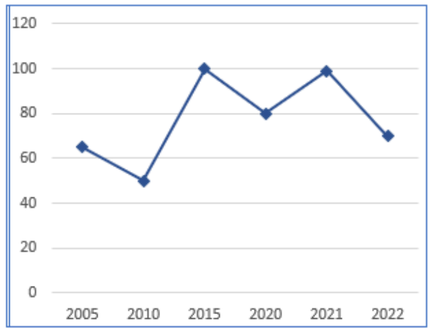
Behaviour Over Time (BOT) graphs

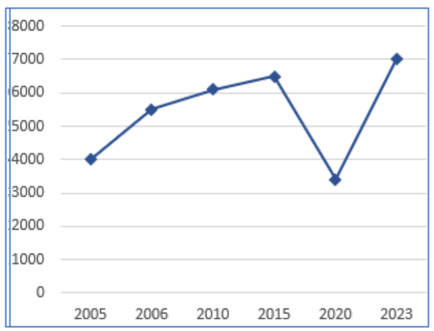
Activties Behaviour Over Time grpahs

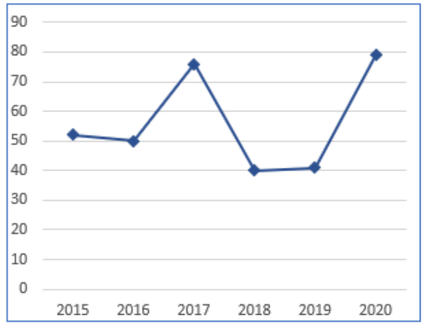
Activity	Vessel anchorages		Beach sand extraction		Cargo operations and landward transportation		Offshore wind		Port and harbours Operation	
Indicator	Number of within the geographical area		Capacity in a (given period) in a (given geographical area) of (given activity) using (given technique)		Capacity in a (given period) in a (given geographical area) of (given activity) using (given technique)		Capacity in a (given period) in a (given geographical area) of (given activity) using (given technique)		Capacity in a (given period) in a (given geographical area) of (given activity) using (given technique)	
Data	Month/Year	Measurement	Month/Year	Measurement	Month/Year	Measurement	Month/Year	Measurement	Month/Year	Measurement
	2014	140	2000	80	2004	5000	2014	22	1990	600
	2015	180	2005	65	2005	4000	2015	52	2001	800
	2016	220	2010	50	2006	5500	2016	50	2012	760
	2017	225	2015	100	2010	6100	2017	76	2015	950
	2018	300	2020	80	2015	6500	2018	40	2019	1,400
	2019	310	2021	99	2020	3400	2019	41	2021	400
	2020	342	2022	70	2023	7000	2020	79	2023	600

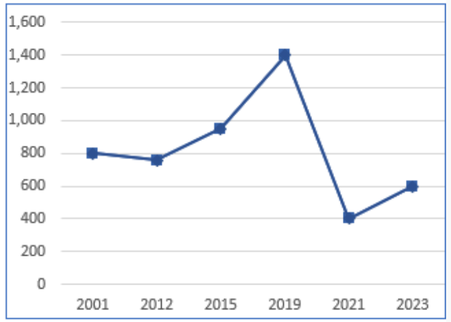
BOT Graph





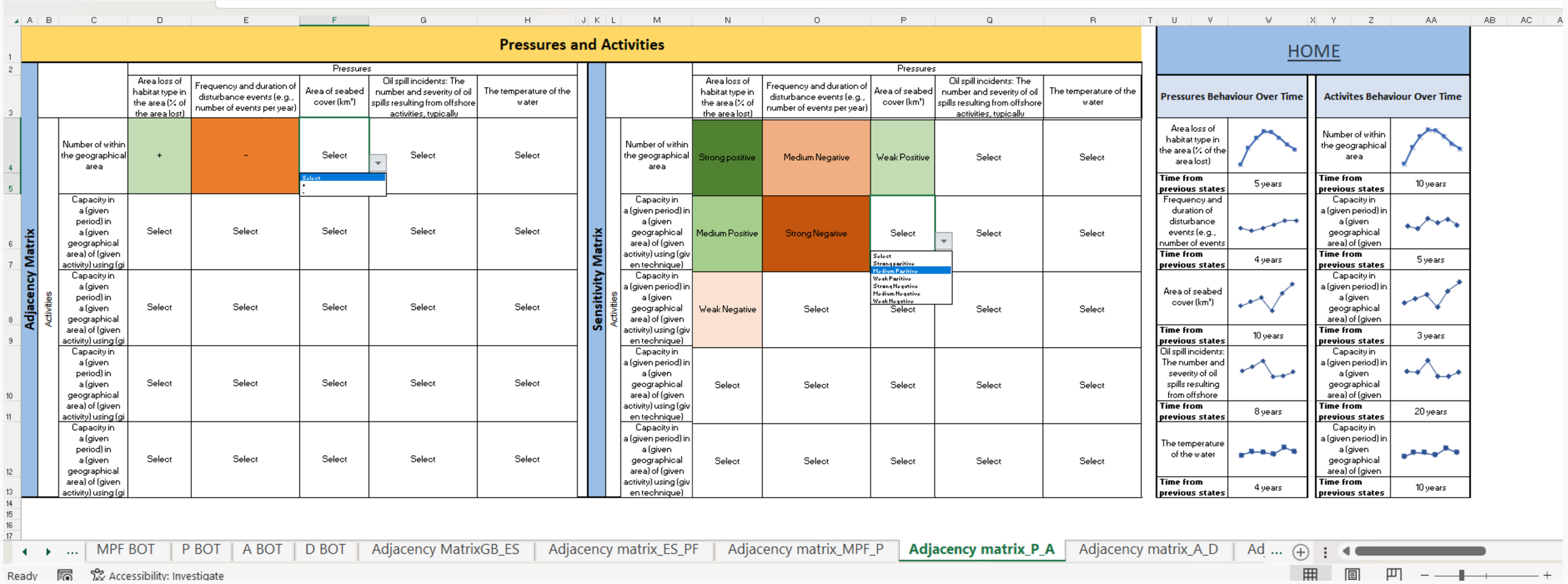






MPF BOT | P BOT | A BOT | D BOT | Adjacency MatrixGB_ES | Adjacency matrix_ES_PF | Adjacency matrix_MPF_P | Adjacency matrix_P_A | Adjacency matrix_A_D | Ad ...

Adjacency Matrices



Pressures and Activities

Adjacency Matrix

Activities	Pressures: Area loss of habitat type in the area (% of the area lost)	Frequency and duration of disturbance events (e.g., number of events per year)	Area of seabed cover (km²)	Oil spill incidents: The number and severity of oil spills resulting from offshore activities, typically	The temperature of the water
Number of within the geographical area	+	-	Select	Select	Select
Capacity in a (given period) in a (given geographical area) of (given activity) using (gi	Select	Select	Select	Select	Select
Capacity in a (given period) in a (given geographical area) of (given activity) using (gi	Select	Select	Select	Select	Select
Capacity in a (given period) in a (given geographical area) of (given activity) using (gi	Select	Select	Select	Select	Select
Capacity in a (given period) in a (given geographical area) of (given activity) using (gi	Select	Select	Select	Select	Select

Select
+
-

Sensitivity Matrix

Activities	Pressures: Area loss of habitat type in the area (% of the area lost)	Frequency and duration of disturbance events (e.g., number of events per year)	Area of seabed cover (km²)	Oil spill incidents: The number and severity of oil spills resulting from offshore activities, typically	The temperature of the water
Number of within the geographical area	Strong positive	Medium Negative	Weak Positive	Select	Select
Capacity in a (given period) in a (given geographical area) of (given activity) using (giv en technique)	Medium Positive	Strong Negative	Select	Select	Select
Capacity in a (given period) in a (given geographical area) of (given activity) using (giv en technique)	Weak Negative	Select	Select	Select	Select
Capacity in a (given period) in a (given geographical area) of (given activity) using (giv en technique)	Select	Select	Select	Select	Select
Capacity in a (given period) in a (given geographical area) of (given activity) using (giv en technique)	Select	Select	Select	Select	Select

Select
Strong positive
Medium Positive
Weak Positive
Strong Negative
Medium Negative
Weak Negative

HOME

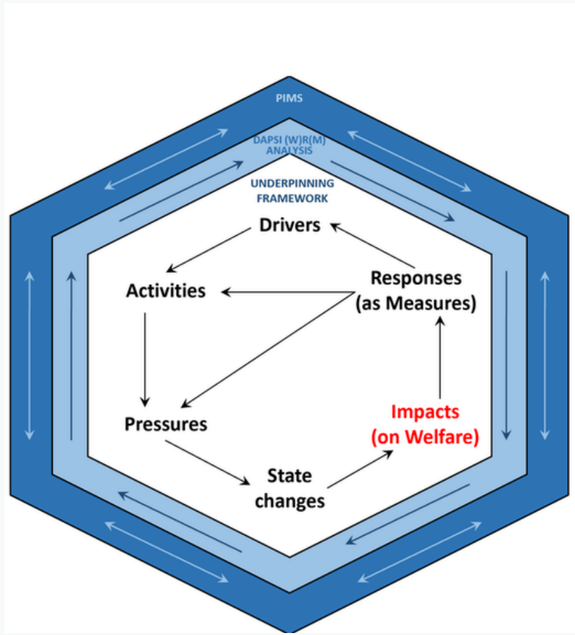
Pressures Behaviour Over Time		Activites Behaviour Over Time	
Area loss of habitat type in the area (% of the area lost)		Number of within the geographical area	
Time from previous states	5 years	**Time from previous states**	10 years
Frequency and duration of disturbance events (e.g., number of events		Capacity in a (given period) in a (given geographical area) of (given	
Time from previous states	4 years	**Time from previous states**	5 years
Area of seabed cover (km²)		Capacity in a (given period) in a (given geographical area) of (given	
Time from previous states	10 years	**Time from previous states**	3 years
Oil spill incidents: The number and severity of oil spills resulting from offshore		Capacity in a (given period) in a (given geographical area) of (given	
Time from previous states	8 years	**Time from previous states**	20 years
The temperature of the water		Capacity in a (given period) in a (given geographical area) of (given	
Time from previous states	4 years	**Time from previous states**	10 years

MPF BOT | P BOT | A BOT | D BOT | Adjacency MatrixGB_ES | Adjacency matrix_ES_PF | Adjacency matrix_MPF_P | **Adjacency matrix_P_A** | Adjacency matrix_A_D | Ad ...

Ready | Accessibility: Investigate

Part A: Setting Priorities

PIMS Considerations and initial task (Exercise 0):
Setting the scope for the impacts on welfare caused by the situation considered problematic/ focal issue of concern



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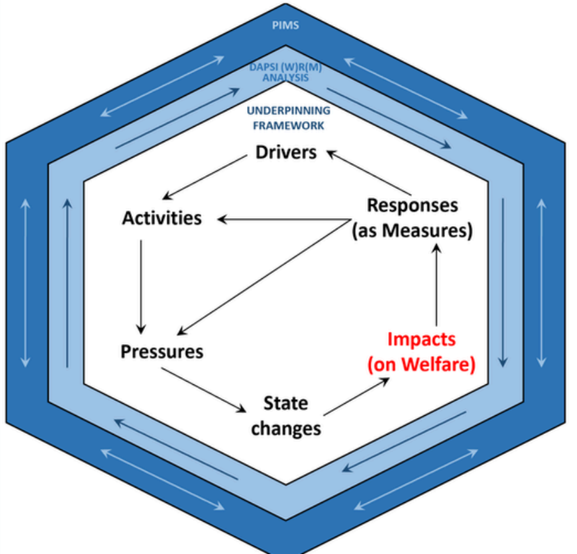
Part A: Setting Priorities

Exercise 1:

Identify goods and benefits related to the impact of concern.



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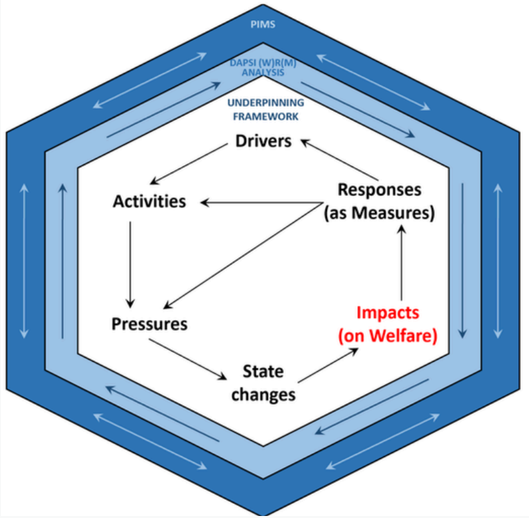
Part B: Getting the Information

Exercise 2: Specifying State Changes (on Marine Processes and Functioning and Ecosystem Services) that affect the Goods and Benefits (Impacts (on welfare))

(a)For Ecosystem services
(b) Marine Ecosystem Processes and Functioning



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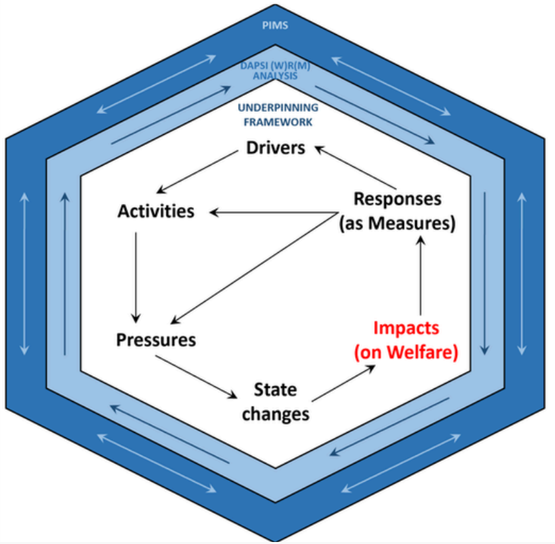
Part B: Getting the Information

Exercise 3: Specifying Pressures on State Changes



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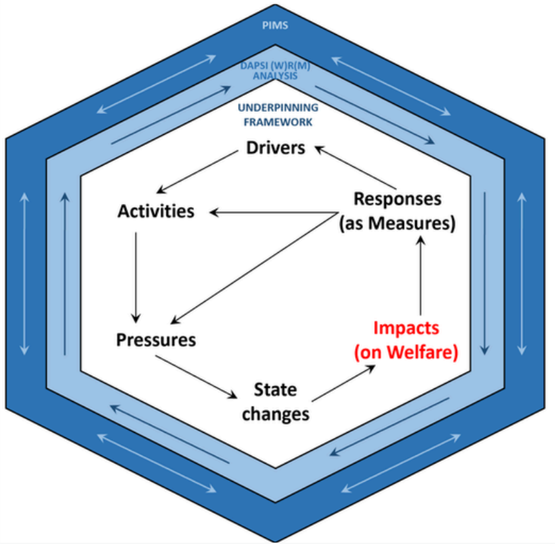
Part B: Getting the Information

Exercise 4: Specifying Activities that Affect Pressures



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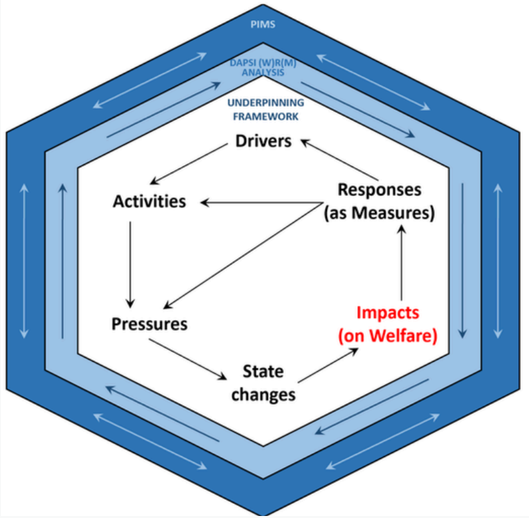
Part B: Getting the Information

Exercise 5: Specifying Drivers that give rise to Activities



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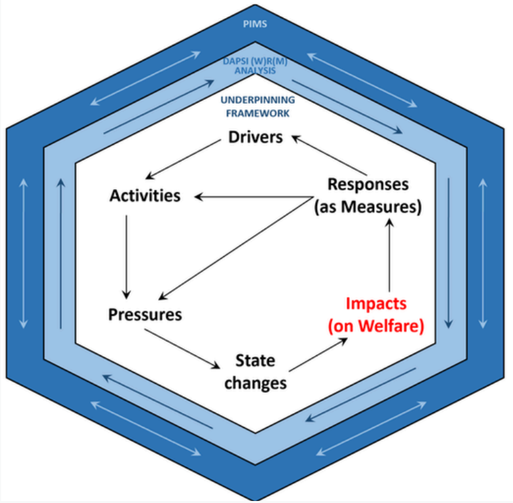
Part B: Getting the Information

Exercise 6: Closing the Loop between Drivers and Impacts on Welfare (Goods/Benefits)



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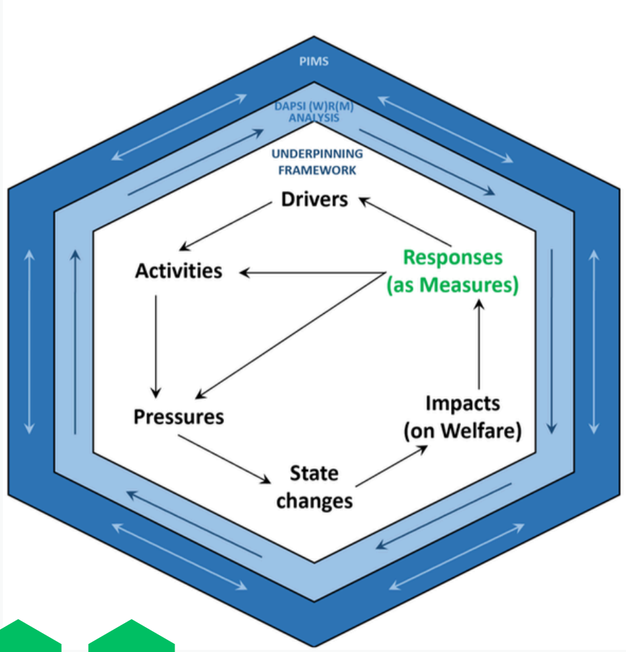
Part C: Using the Information

Exercises 7-13: Analysis

Analysis of a CLD can lead to identifying leverage points for change. By 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.



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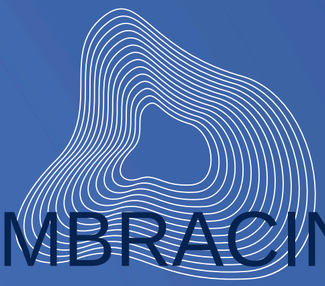
Principles of a systems analysis

BIG PICTURE THINKING



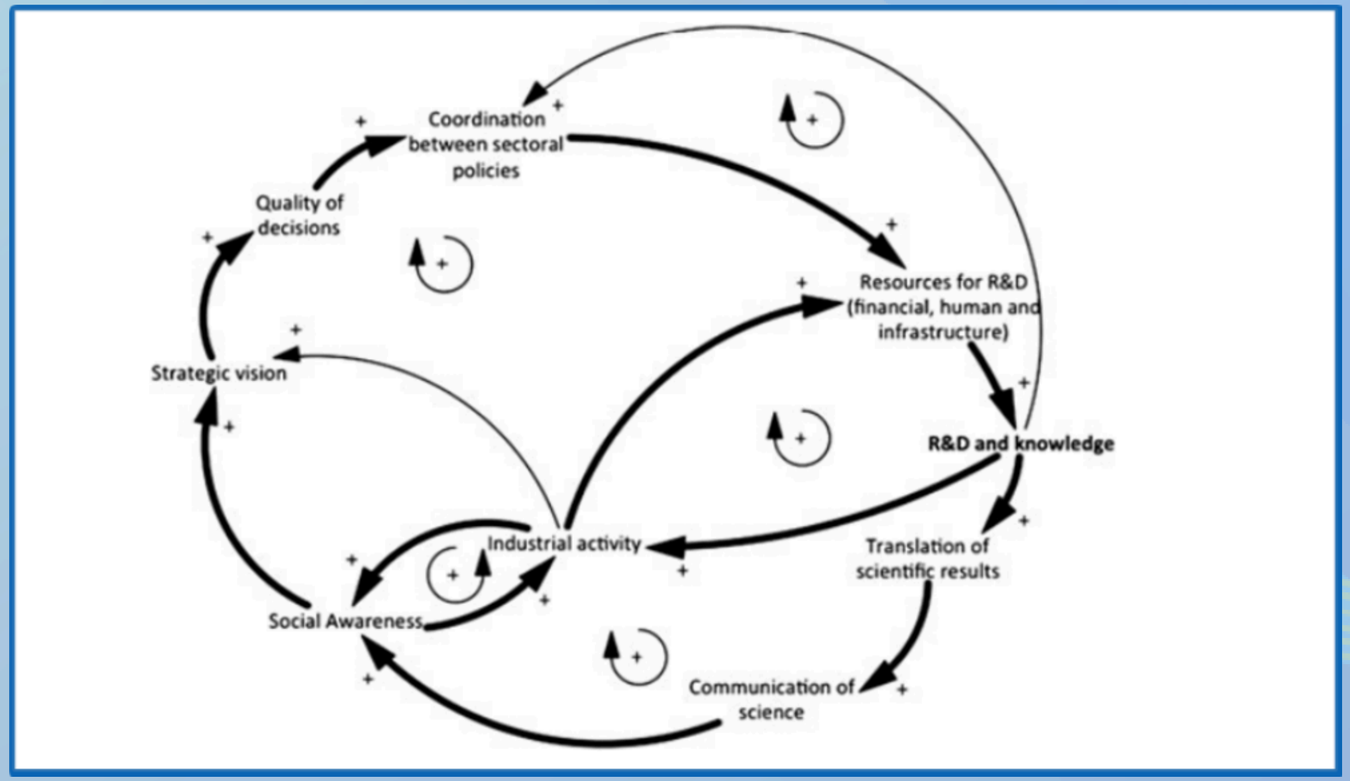
EMBRACING COMPLEXITY

SYSTEM BEHAVIOURS

Systems analysis aids in holistically using social and ecological data to understand how and why a system acts.

Systems thinking tool

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.



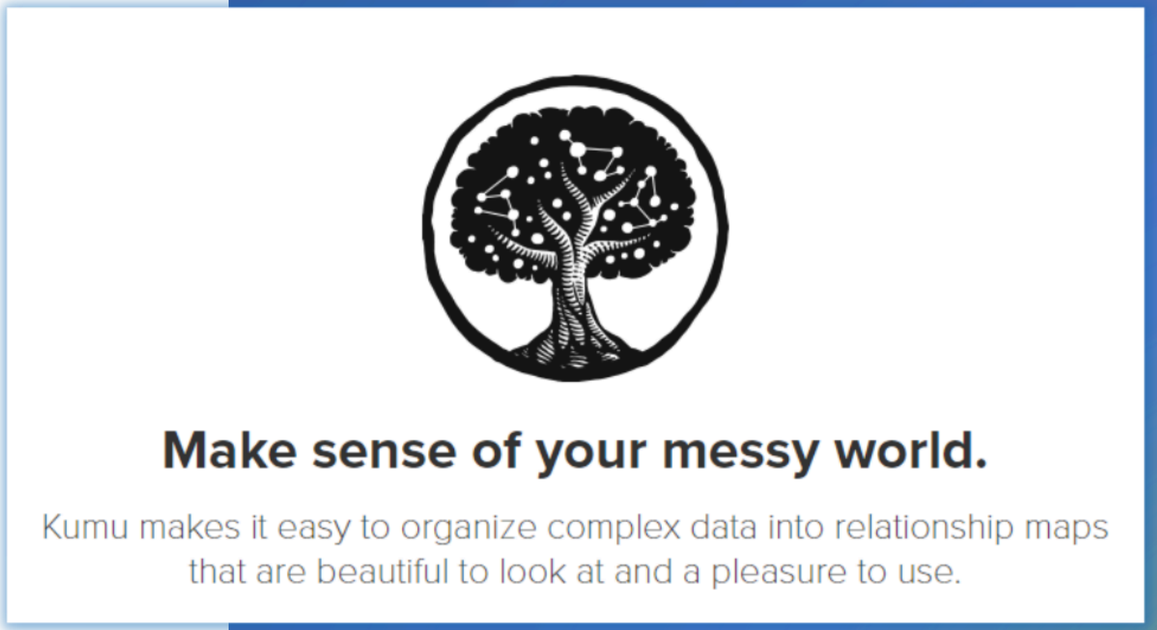
05

The Kumu software

MARINE SABRES

Exercise 7: Creating an Impact-based Causal Loop Diagram

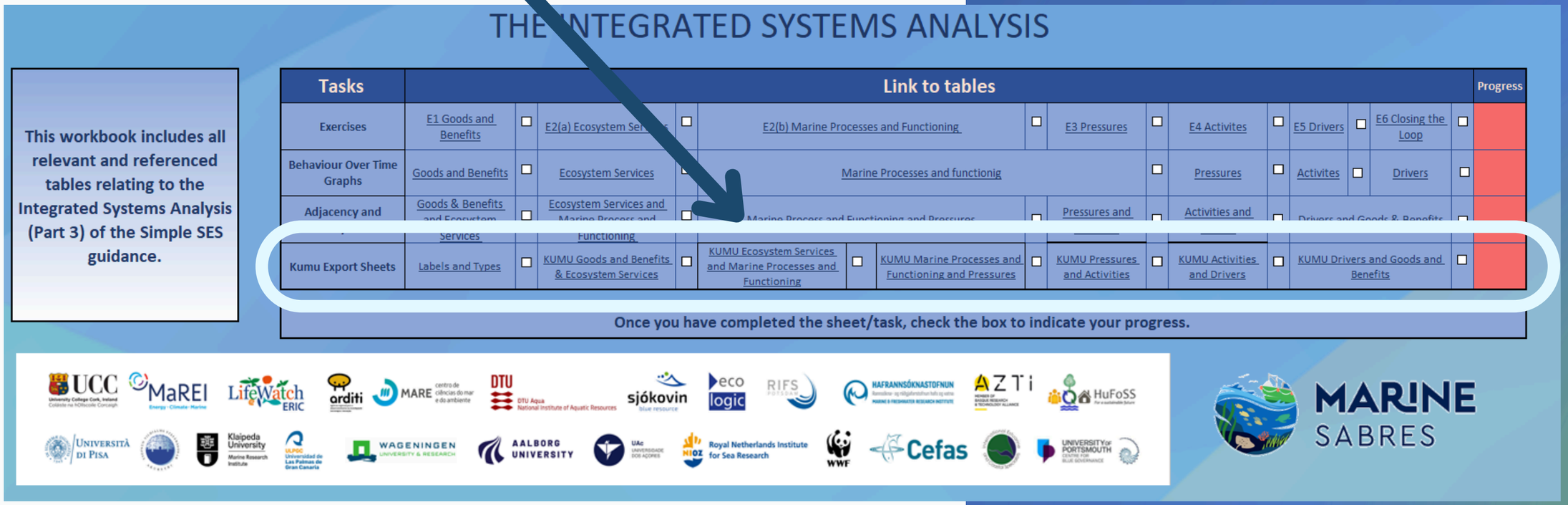
- Exporting data from the Excel workbook
- Formatting within Kumu
- Creating CLD within the Kumu interface



https://kumu.io/

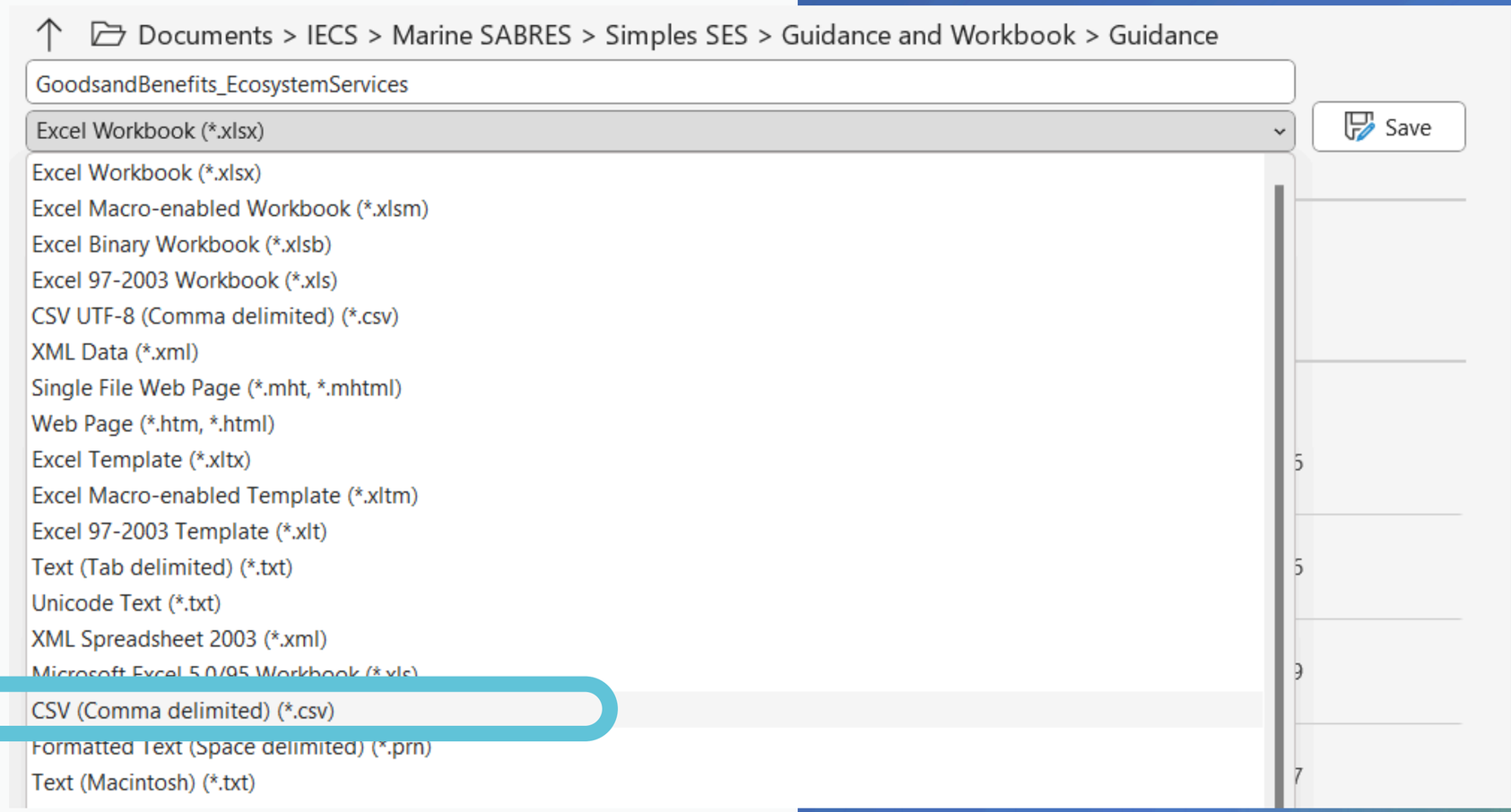
Exercise 7: Creating an Impact-based Causal Loop Diagram

Exporting data from the Excel workbook



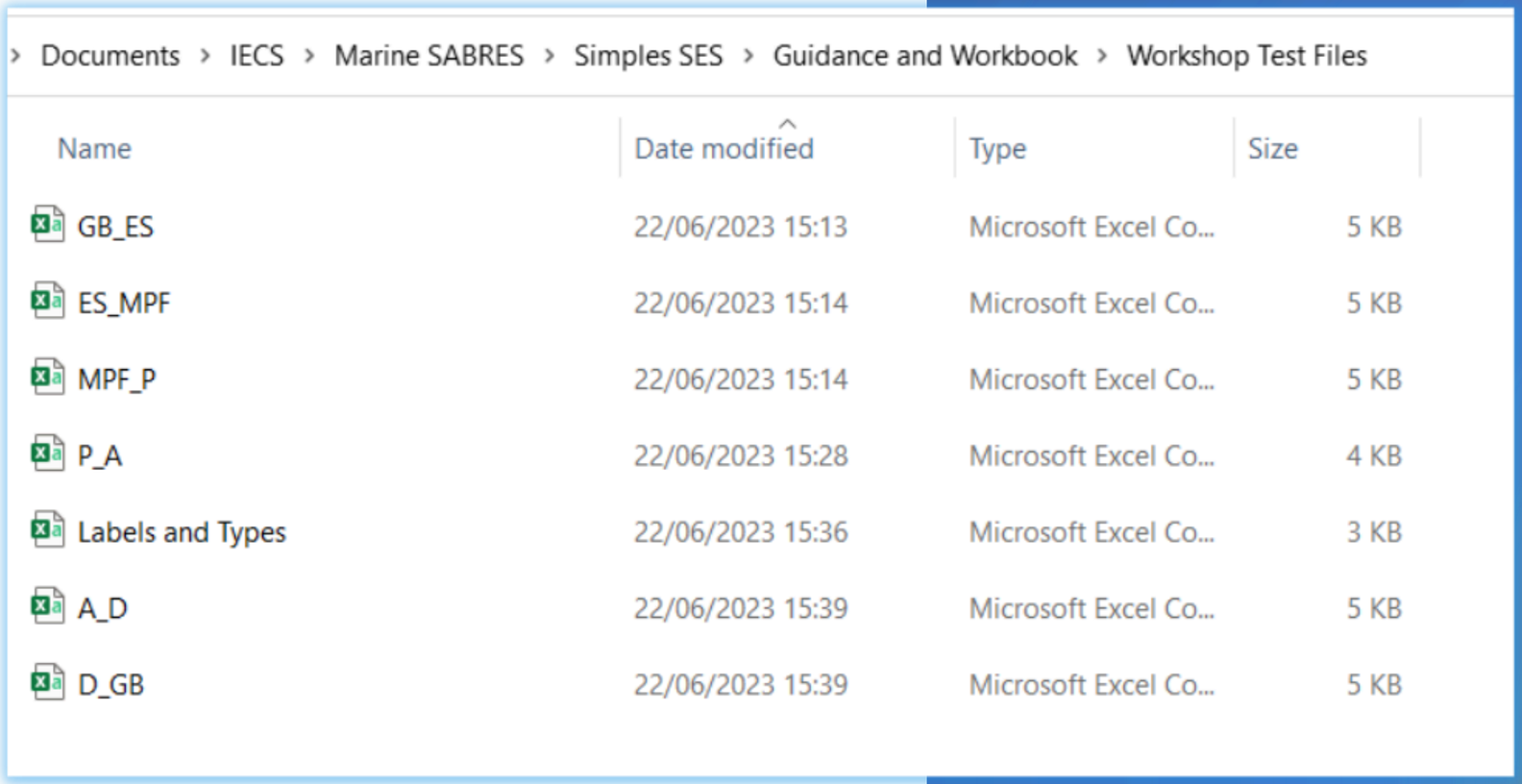
Exercise 7: Creating an Impact-based Causal Loop Diagram

Exporting data from the Excel workbook



Exercise 7: Creating an Impact-based Causal Loop Diagram

File names and storage organisation will help when importing in to Kumum



Formatting in Kumu

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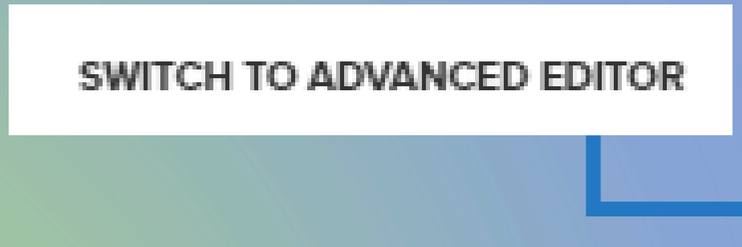
Click Settings

Click advanced editor



Kumu_Code_Style

File Edit View

```
@settings {
  template: causal-loop;
}

@controls {
  bottom {
    filter {
      target: element;
      by: "element type";
      as: buttons;
      multiple: true;
      default: show-all;
    }
  }

  top {
    sna-dashboard {
      metrics: element-count, connection-count,
density, average-degree;
    }
  }
}

/* Goods and benefits */
element["element type"="goods and benefits"] {
  color: #fff1a2;
  shape: triangle;
}

/* Ecosystem Service */
element["element type"="Ecosystem Services"] {
  color: #313695;
  shape: square;
}

/* Marine Processes and Functioning */
element["element type"="Marine processes and
functioning"] {
  color: #bce2ee;
  shape: pill;
}

/* Pressures */
element["element type"="Pressure"] {
  color: #fec85a;
  shape: diamond;
}
```

Copy Code

CURRENT VIEW

Workshop

If you're comfortable with code, we strongly recommend using the advanced editor. Check out our **ADVANCED VIEWS** guide to get started.

Automatically apply changes

```
@settings {
  template: causal-loop;
}
```

Paste Code

Exercise 7: Creating an Impact-based Causal Loop Diagram

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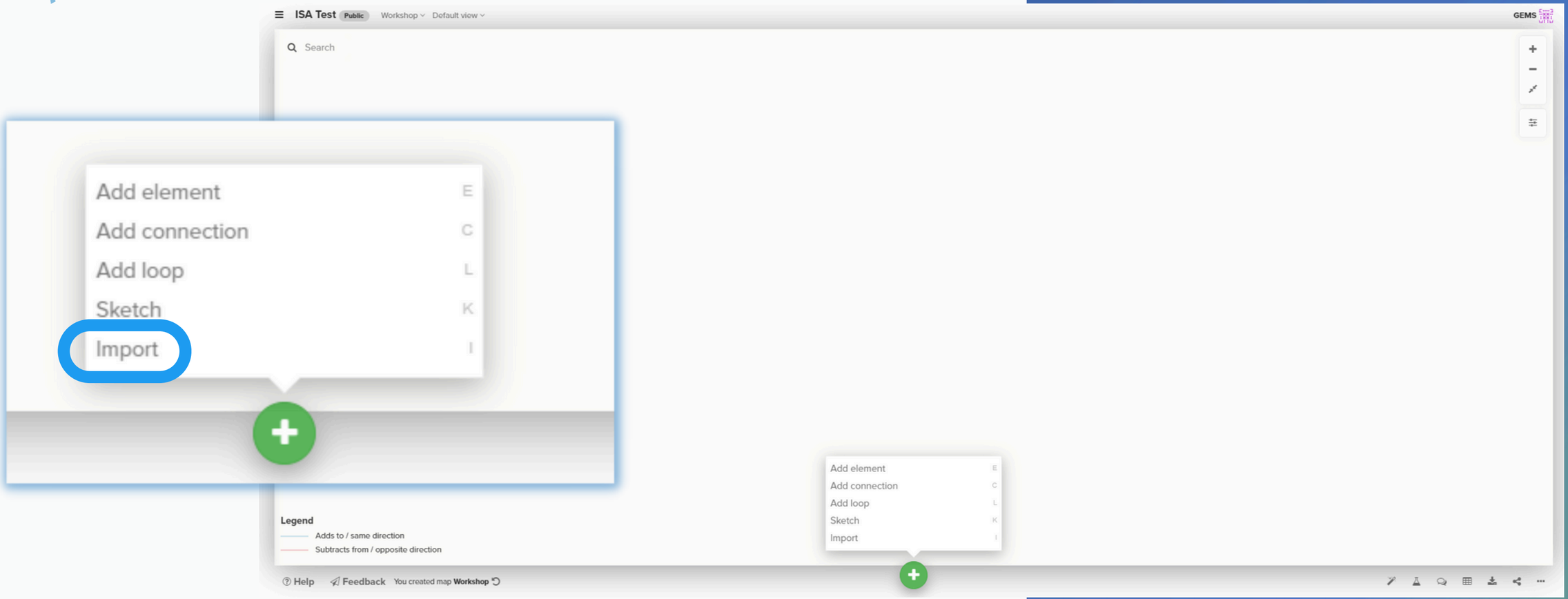
Creating CLD within the Kumu interface



Exercises 8 - 12

Using the CLD information

- Loop analysis
- Designing solutions
- Effectively communicating findings

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. For instance, population growth can be a reinforcing loop - as the population grows, more children are born, which increases the population even further.

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. An example could be a thermostat that adjusts the heating or cooling in response to changes in room temperature.

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Loop Analysis

Step 2: Identify the Feedback Loops in Your CLD

Examine your CLD and look for these reinforcing and balancing loops. They typically form circular paths where the variables and their interactions cycle back to the starting variable. Label these loops for easy reference.

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Loop Analysis

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.

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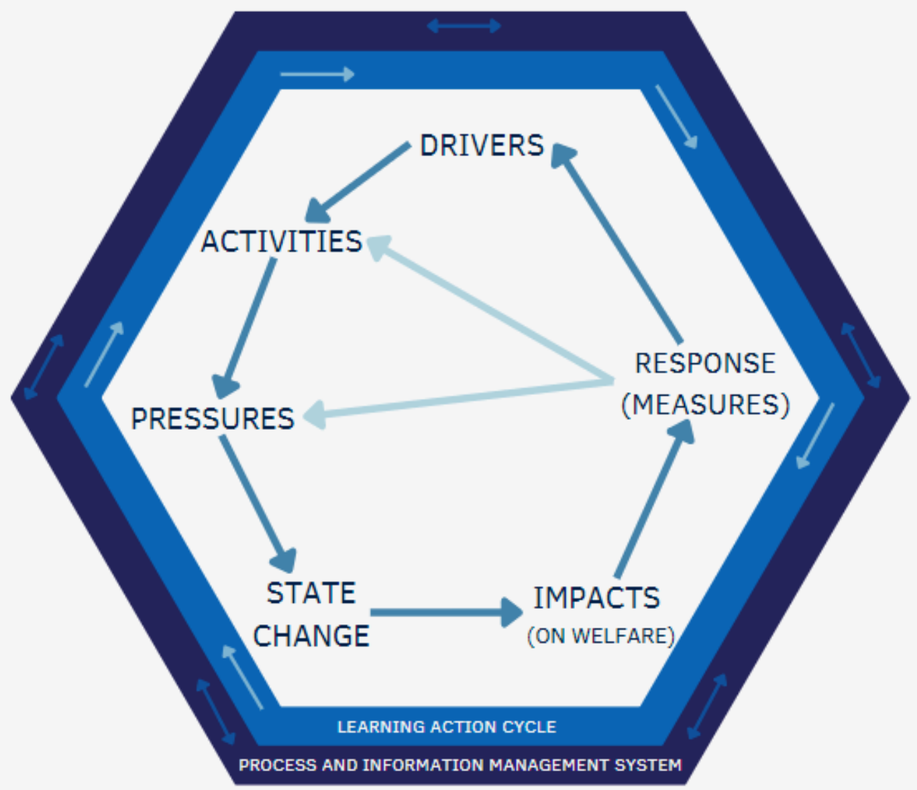
Design a Response Measure using your CLD

- Locate Leverage Points: These are places in your system where a small change can lead to a significant impact. Look at feedback loops, delays, and other variables.
- Weaken or Break Problematic Loops: Identify feedback loops causing trouble and think about how you can reduce or eliminate their influence.
- Strengthen or Create Helpful Loops: On the flip side, find beneficial feedback loops and think about ways to enhance them or create more like them.
- Adjust Delays and Parameters: Look for delays causing instability and contemplate how to lessen them. Similarly, adjust parameters that influence feedback loops.
- Challenge or Change Mental Models: Consider how existing beliefs and assumptions shape the system and think about ways to shift them for better results.

Effectively communicating insights from the CLD:

- Explain the CLD Clearly: Walk your audience through the CLD, highlighting key feedback loops and leverage points and their influence on the system's behaviour.
- Use logic chains or Stories: Make use of illustrative methods to help explain the dynamics and impacts of your proposed solutions.
- Invite Feedback: Encourage your stakeholders to give their thoughts, ask questions, and make suggestions for improving the diagram or solution. This collaborative approach can enhance and inform your management responses.

'Simple' SES



"Everything should be made as simple as possible, but not simpler."

- Albert Einstein

05

Questions and group discussion.

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Looking forward:

- DA must collate the necessary information by September 2023
- Guidance from Task 2.3 - (support from Bruno), October-December 2023
- Progressing to Task 4.1 - Baseline assessment SES models, March 2024

[Menti meter Slide]

[Menti meter Slide]

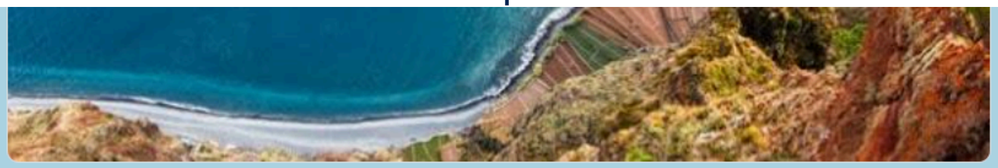
Feedback Form

4 questions included in the 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

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Thank you!

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