MARINE SABRES

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 3.1
Simple SES Development

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UK Research and Innovation

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3.1 Task description

SES Development. (Lead: IECS, Participants: CEFAS, NIOZ, UCC, WU. Start month 2 end month 13).

- Based on the stakeholder generated System Descriptions of priority components and requirements, WP3 will generate a specification to ensure that the Simple SES is robust and sufficiently flexible to incorporate the social and ecological components of each DA and includes the functionality to provide useful and usable for all end users.
- A rigorous SWOT analysis of existing SES model, literature and past project output will supplement the stakeholder system-descriptions and design briefs to contribute to the development of the Simple SES for application in the DAs.

The Approach

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- Literature review informed by a systematic methodology
- Defined key terms
- Reviewed the goals of the project and developed a characteristics desired criterion
- Reviewed the various SES frameworks
- SWOT Analysis and applied desired criteria to frameworks
- Decide on the approach best suited to the goals of the project
- Operationalise the SES.

Key definitions

Simple	**“Comprising of basic elements necessary to achieve the objectives in an easily conducted and understood manner.” (Collins, 2022)**
System	**A system is a whole, encompassing interconnected elements which are networks of interactions, which together work to create achievement of a common goal or purpose (Jackson, 2019; Elliott et al., 2020)**
Socio-Ecological System	**“A social-ecological system consists of a bio-geo-physical unit and its associated social actors and institutions. Social-ecological systems are complex and adaptive and delimited by spatial or functional boundaries surrounding particular ecosystems and their problem context.” (Glaser et al., 2012)**
Framework	**Frameworks are described as an organisational and prescriptive tool to identify and order elements and relationships between them (Ostrom, 2009 Elliott et al., 2020).**

Marine SABRES Goals

- Enable and upscale ecosystem-based management across Europe and abroad
- To reverse biodiversity decline; conserve and protect biodiversity by integrating sustainable ecosystems and a resilient blue economy
- Enable managers to make sustainable decisions
- Empower citizens to engage in marine biodiversity conservation
- Promote sustainable development in the coastal and marine sectors

Characteristics of the SES

SIMPLE
"Comprising of basic elements necessary to achieve the objectives in an easily conducted and understood manner." Referring to the 'minimum level of complexity required'.

A SALIENT SYSTEM
Relevant and useable in the management process.

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

CREDIBLE AND LEGITIMATE
Evidence-based through robust data, alongside based on data that is unbiased and gathered inclusively.

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

CONSISTENT
Relating to the simple characteristic, consistency in approaches, terminology, and reporting will aid accessibility, application, and information sharing on larger scales.

Reviewed Frameworks

- Integrated Systems Analysis (DAPSI(W)R(M)) (Elliott et al., 2020)
- Socio-Ecological System Framework (Ostrom et al., 2005)
- Socio-Ecological Action-Situation Framework (Schlüter et al., 2019)
- Systems Analysis Framework ((McFadden et al., 2010; Støttrup et al., 2017)
- Ecocycle Framework (Holling, 1987;Hurst & Zimmerman, 1994).
- Ecosystem Approach Framework (Turner & Daily, 2007)
- Sustainable Livelihoods Approach (DFID, 2001)
- Turner Vulnerability Framework (Turner et al., 2003)
- Integrated Ecosystem Assessment (Levin, 2009)

Analysis methods

Strengths	Weaknesses
management • have consideration of both	things better? • Is any bias to the social or
Opportunities	**Threats**
support the application of the	the application of the framework

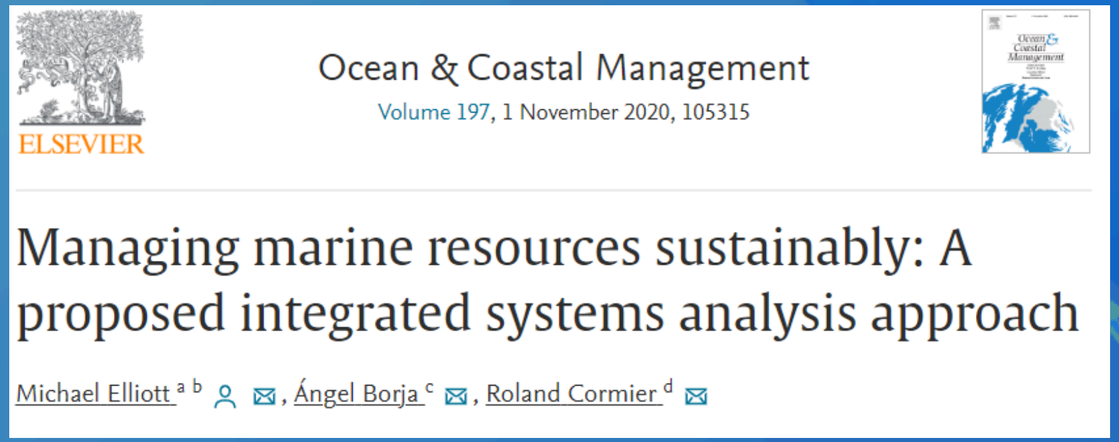
Conclusions of Review

- Recommended framework of use is the Integrated Systems Analysis Approach (Elliott et al., 2020)
- Incorporating beneficial elements of the SAF framework (Støttrup., et al. 2017) (the prescriptive methods of data collection and inclusion of stakeholders at various points)
- Combining further systems concepts regarding various scales (Panarchy) and preparing for variety as found in the Ecocyle Framework to improve the alignment of the ISA with the Marine SABRES project goals.

Simple SES Approach

- The Integrated Systems Analysis Approach

- DAPSI(W)R(M) underpinning framework



ELSEVIER

Ocean & Coastal Management

Volume 197, 1 November 2020, 105315

Managing marine resources sustainably: A proposed integrated systems analysis approach

Michael Elliott [a b], Ángel Borja [c], Roland Cormier [d]

ELSEVIER

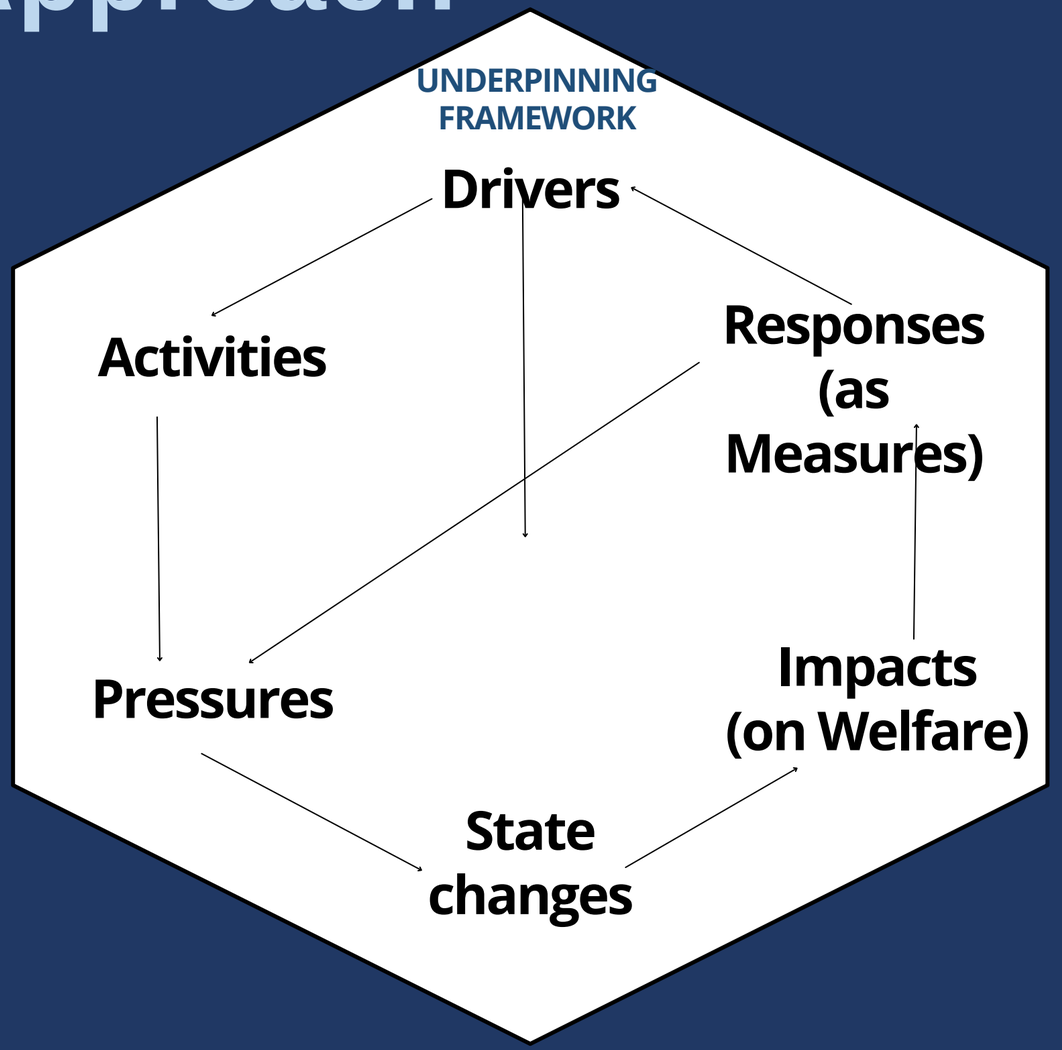
Marine Pollution Bulletin

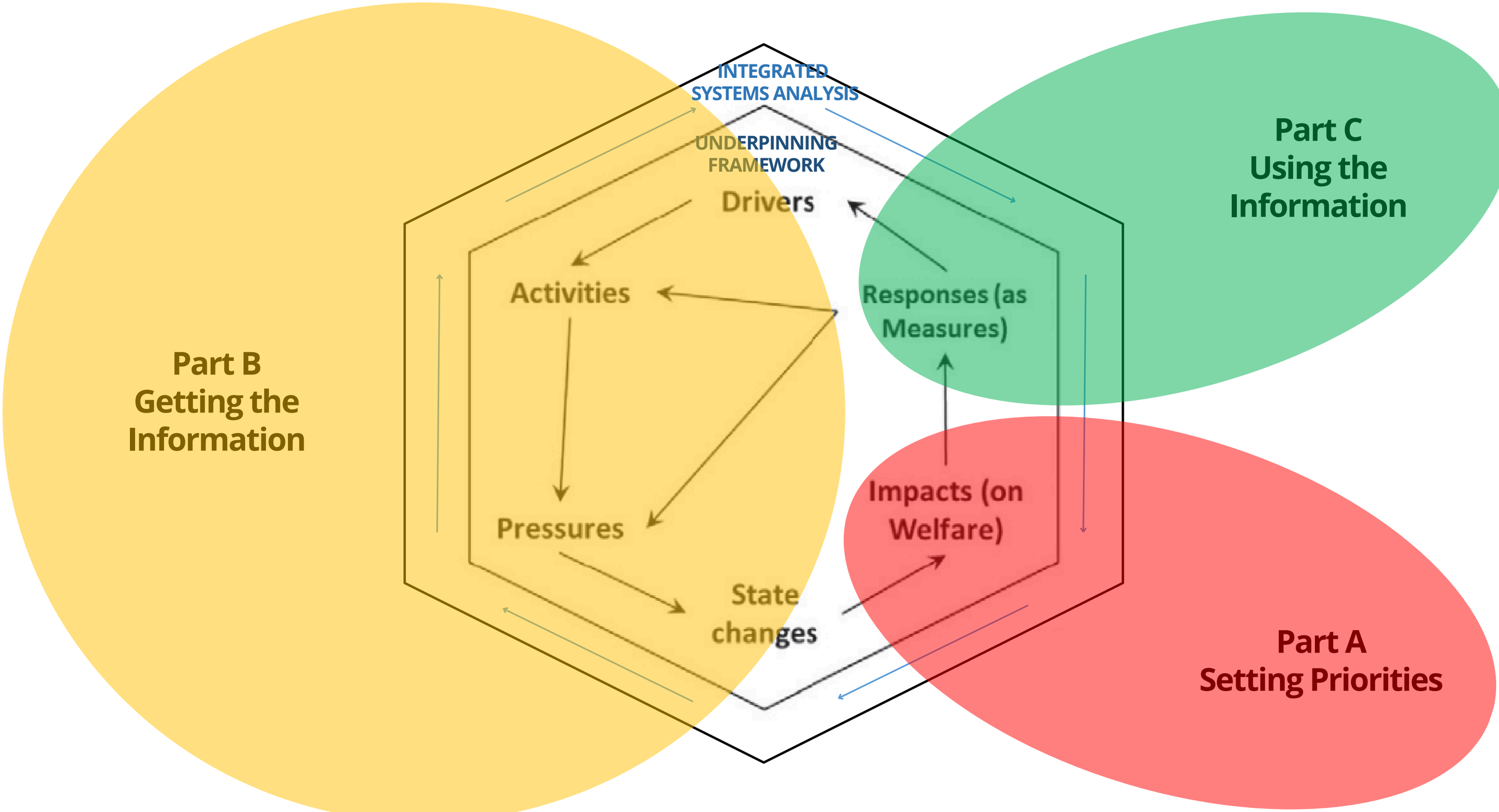
Volume 118, Issues 1–2, 15 May 2017, Pages 27-40

Viewpoint

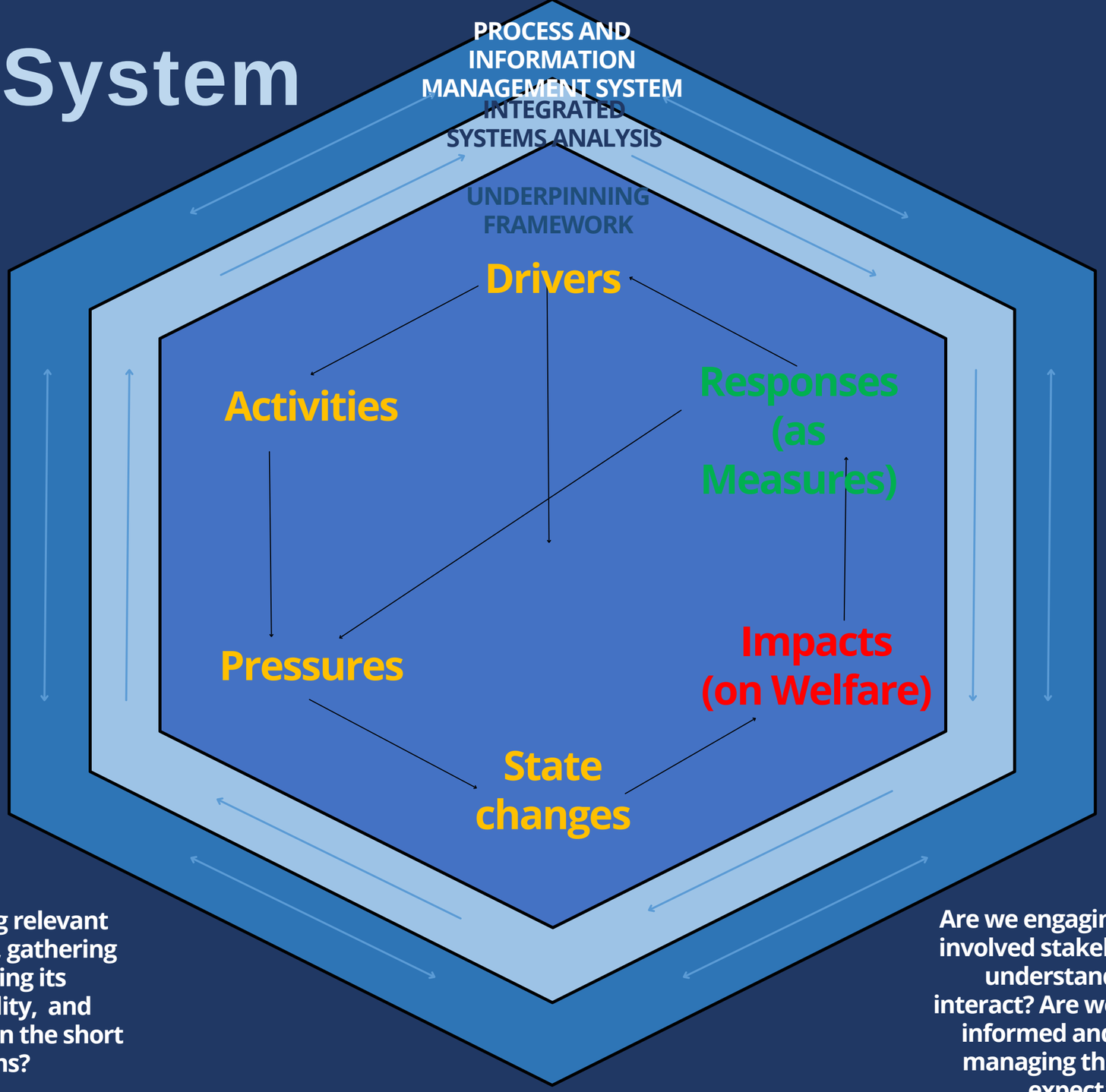
"And DPSIR begat DAPSI(W)R(M)!" - A unifying framework for marine environmental management

Simple SES Approach




INTEGRATED
SYSTEMS ANALYSIS
UNDERPINNING
FRAMEWORK
Drivers
Activities
Pressures
State
changes
Impacts (on
Welfare)
Responses (as
Measures)
Part B
Getting the
Information
Part C
Using the
Information
Part A
Setting Priorities

The PIMS System



Are we progressing to a successful intervention outcome or do we need to re-evaluate what we are doing or what criteria of success are?

What are the intervention deliverables and milestones that we have to reach? Are we on track? Who, what, when, how?

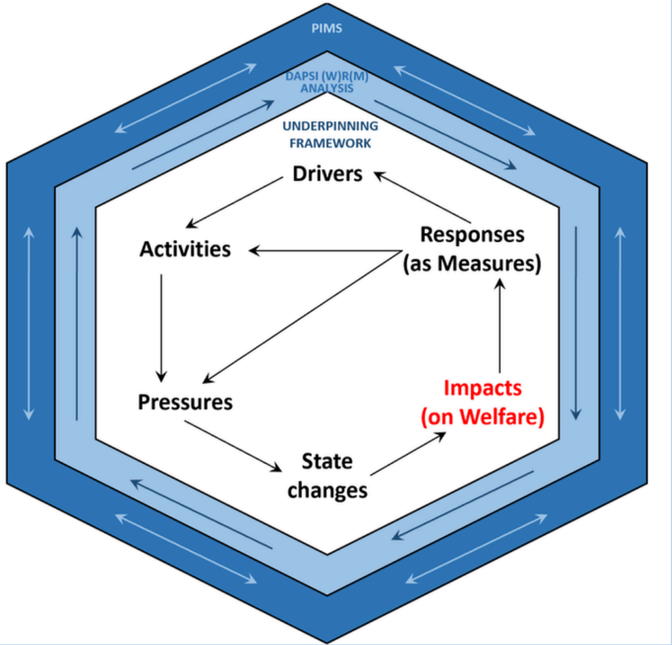
What is the communication and dissemination plan for the intervention?

What is the intervention resource plan? What is actual resource usage? Are we on track?

How are we identifying relevant sources of information, gathering information, assuring its provenance and quality, and managing information in the short and longer terms?

Are we engaging affected and involved stakeholders? Do we understand how they interact? Are we keeping them informed and how are we managing their input and expectations?

Part A: Setting Priorities



Rich Pictures

Delphi

Panarchy

DAPSI(W)R(M) & Behaviour over Time Graphs

Part A Setting Priorities

Exploration of situation considered problematic and identification of issues

Unfolding Complexity and Impacts on Human Welfare
Which of the issues are regarded to be a priority in terms of impact on human welfare? At what level (individual, regional, national or international) do the symptoms of the issue of concern manifest?

Activity 1: Specifying Goods and Benefits related to the Issue of Concern

PIMS

Stakeholder identification and Engagement
Who is regarded as having a stake in the issue of concern?
Who should be regarded as having a stake in the issue? Who is likely to hold information that we will need to engage in the process?

Communication Management
What is the communication plan for the process? What are stakeholders being told about the process and their engagement in it?

Information Management
How is data to be stored and managed to ensure adherence to GDPR? Have all necessary research ethics approvals been secured and consent forms created and used?

Process Management
What needs to be done, how, by when and by whom?

Resource Management
What resources are available to support the process? How is it planned to use the resources to enable the successful completion of the process?

Evaluation
Who actually will decide whether the process has been a success and how? Who should decides whether the process has been a success and how?

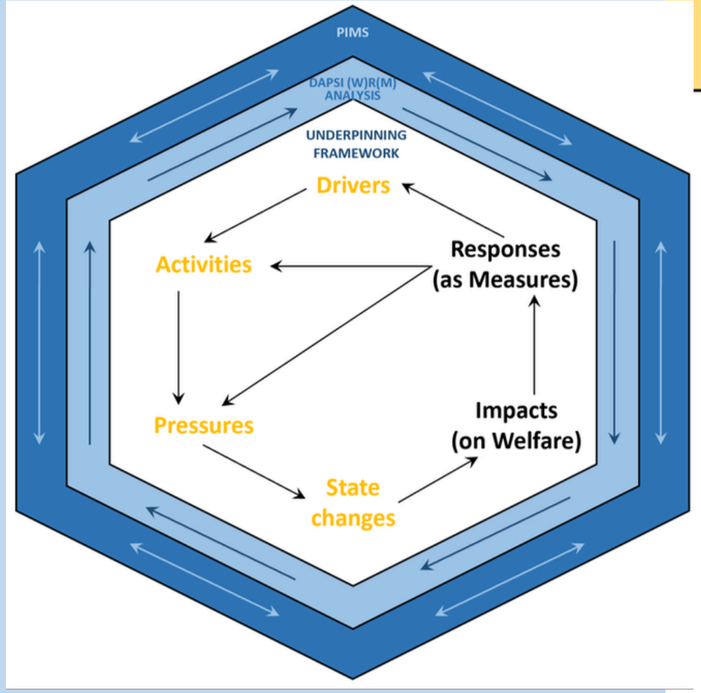
Boundary Critique

Stakeholder Power Grid

Gantt Charts

Budgets

Part B: Getting the Information



DAPSI(W)R(M), Behaviour over Time Graphs & Causal Loop Diagrams

Part B
Getting the Information

- **Activity 2: Specifying Ecosystem Services that affect Goods and Benefits**
- **Activity 3: Specifying Pressures on Ecosystem Services**
- **Activity 4: Specifying Activities that affect Pressures**
- **Activity 5: Specifying Drivers that give rise to Activities**

PIMS

Stakeholder identification and Engagement
How effectively are we engaging: those involved in and/or affected by the issues of concern, and information holders in the process?

Communication Management
What is the communication plan for the process? What are stakeholders being told about the process and their engagement in it?

Information Management
Are data storage and management procedures ensuring adherence to GDPR? Are we adhering to processes specified in the ethics approvals documents?

Process Management
Are we on schedule? What needs to be done, how, by when and by whom?

Resource Management
Are we on budget? Do we need to amend budgets to enable the successful completion of the process?

Evaluation
Given criteria of success are we likely to deliver a successful process or do we need to revise either the criteria of success or what we are doing and how we are doing it?

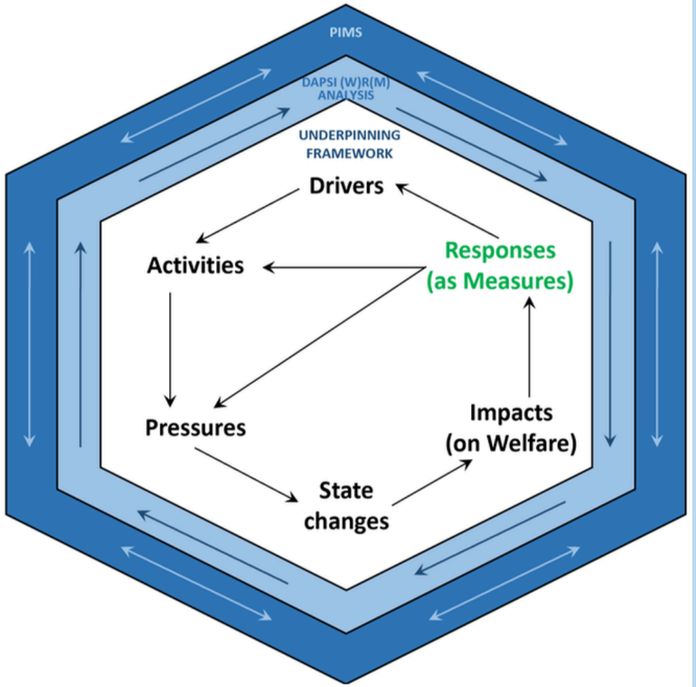
Boundary Critique

Stakeholder Power Grid

Gantt Charts

Budgets

Part C: Using the Information



Causal Loop Diagrams

WP5

Delphi

Panarchy

Gantt Charts

Part C
Using the Information

Activity 6: Creating a Causal Loop Diagram

Activity 7: Clarifying Causal Loops and Leverage Points

Using CLDs: Identification of management decisions and their consequences informed by CLDs

Response rankings and discussion of systemically desirable, according to current governance and legal frameworks, and culturally feasible changes at different levels and over different time periods

Decision making and action planning to improve the problematic situation. What needs to be done, how, by when and by whom?

PIMS

Stakeholder identification and Engagement
How effectively are we engaging: those involved in and/or affected by the issues of concern, and information holders in the process?

Communication Management
What is the communication plan for the final stages of the process? What are stakeholders being told about the process and their engagement in it? Are we assessing decision authority and creating buy-in?

Information Management
What is the legacy plan to ensure data management in the longer term to adhere to GDPR and ethics requirements

Process Management
Are we on schedule? What needs to be done, how, by when and by whom to complete the process?

Resource Management
Are we delivering on budget? Do we need to secure extra resources to enable the successful completion of the process?

Evaluation
Given criteria of success, Was the intervention a success in stakeholder terms?

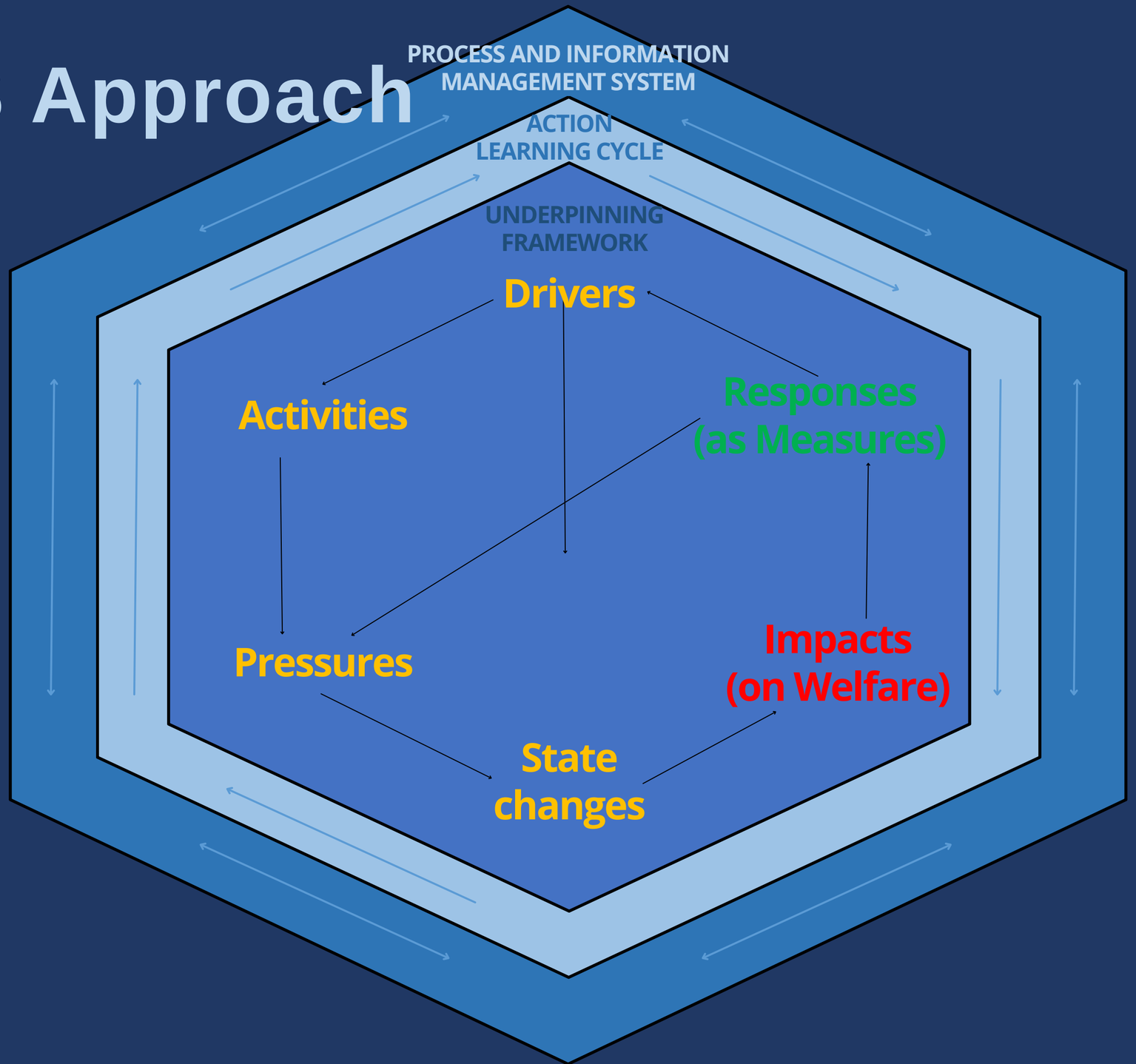
Boundary Critique

Stakeholder Power Grid

Gantt Charts

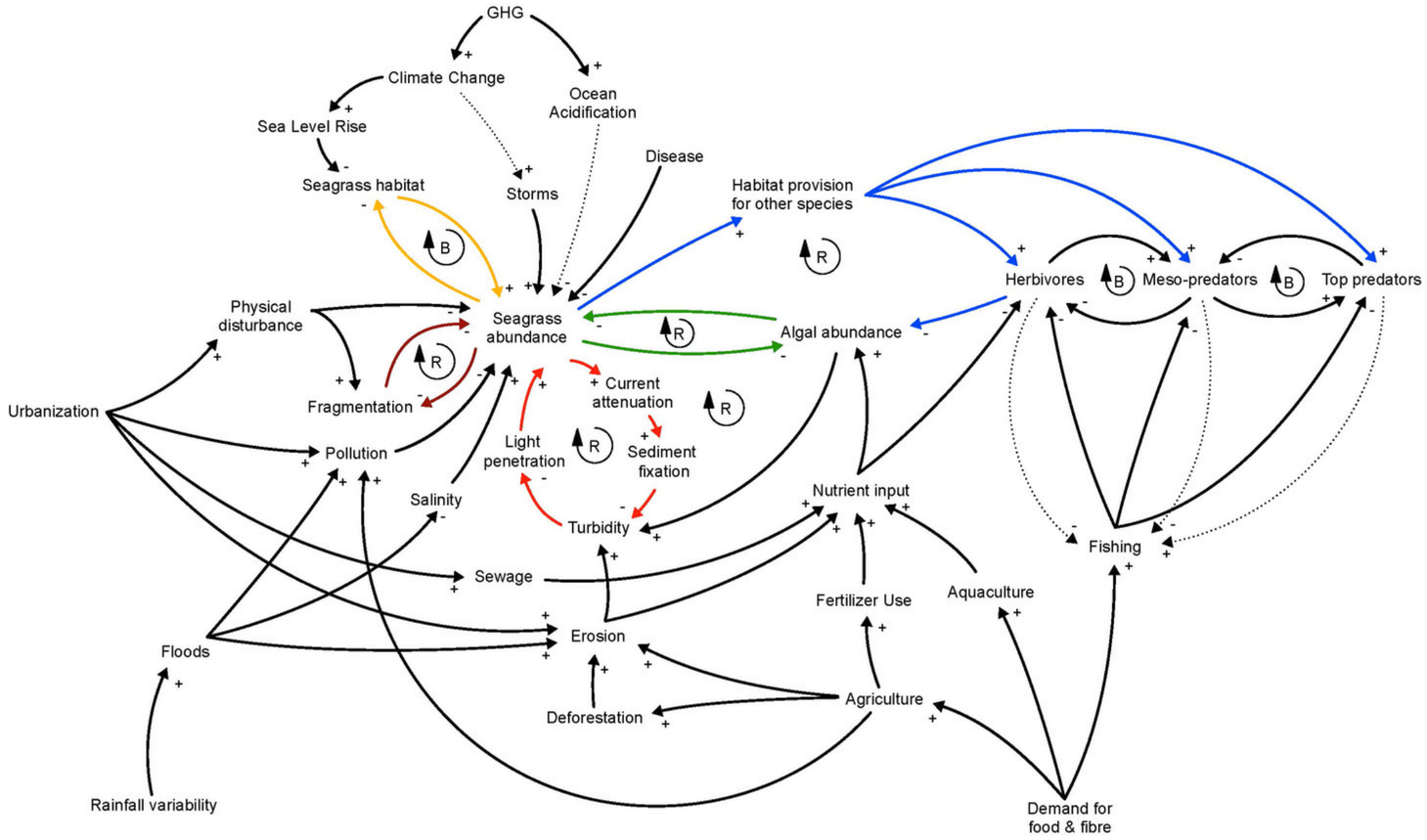
Budgets

Simple SES Approach



Causal Loop Diagrams

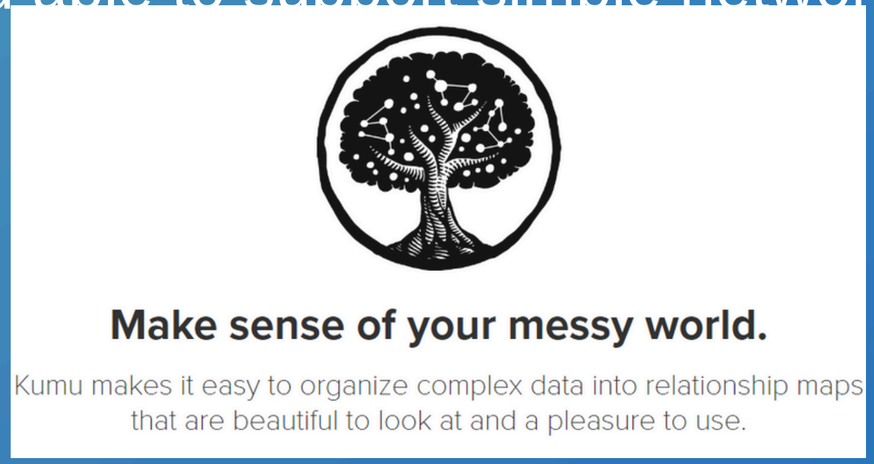
- Data retrieved through ISA process will be used to create causal loop diagrams (CLDs).



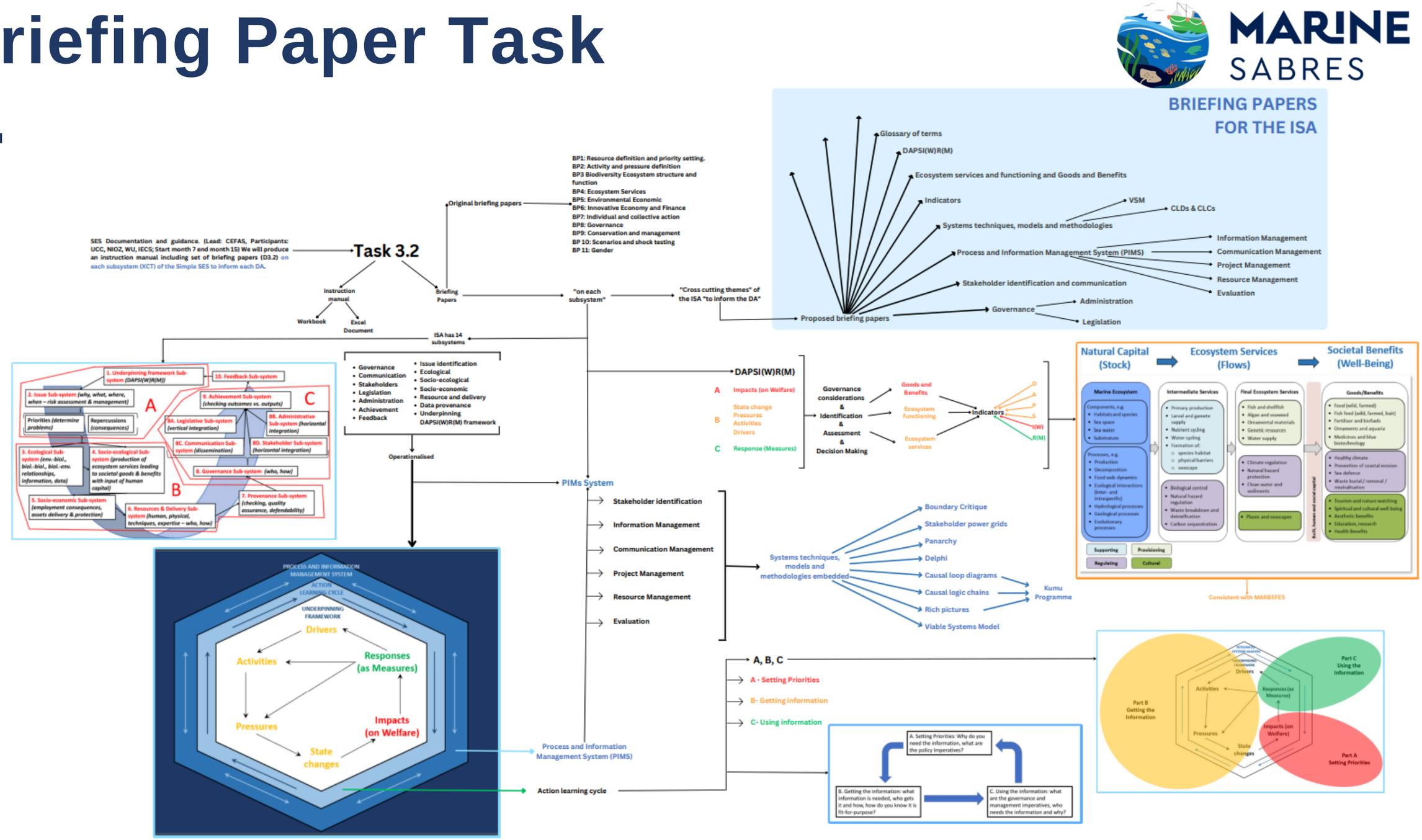
(Biggs, et al., 2018)

Kumu Programme

- Reviewed several programmes to facilitate construction and analysis.
- Kumu Programme makes creating CLDs simpler and aids with analysis and interrogation.
  - User-friendly and able to support simple network analysis
  - https://kumu.io/



Briefing Paper Task 3.



Briefing Paper Task 3.2

- Glossary of terms
- DAPSI(W)R(M) overall framework
- Marine Ecosystem Services
- State changes and relevant indicators
- Pressures and relevant indicators
- Activities and relevant indicators
- Drivers and relevant indicators
- Systems techniques, models, and methodologies
  - Kumu Software
  - CLDs
- Process and Information Management system
- Stakeholder engagement and communication
- Governance
  - Legislation
  - Administration

Next steps…

- Receive priority components from WP2 and ensure incorporation of these elements.
- Disseminate literature review once internal evaluation is complete for information and comments from the consortium.
- Complete guidance document to inform briefing papers comprehensively.
- Communicate with WP5 on how the scenarios align with SES and visa versa.

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Thank you!

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SES Reviewed papers

Integrated Systems Analysis Approach (ISA)/ DAPSI(W)R(M)	https://doi.org/10.1016/j.ocecoaman.2020.105315
Social-Ecological System Framework (SESF).	http://dx.doi.org/10.5751/ES-06387-190230
Ecocycle Framework (EF)	https://doi.org/10.1177/105649269434008
Social Ecological Action-Situations framework (SE-AS).	https://doi.org/10.5751/ES-13268-270307 https://doi.org/10.5751/ES-11012-240311
The systems analysis framework (SAF)	https://doi.org/10.1007/s10640-007-9176-6
Sustainable livelihood approach (SLA).	https://www.livelihoodscentre.org/-/sustainable-livelihoods-guidance-sheets
Ecosystem Approach Framework (EAF)	https://doi.org/10.1007/s10640-007-9176-6
The Turner et al. (2003a) vulnerability framework.	https://doi.org/10.1073/pnas.1231335100
Integrated Ecosystem Assessment (IEA)	https://doi.org/10.1093/icesjms/fsw201