MULTI FRAME

An Assessment Approach for Ocean Multi-Use Potential and Marine Decision-Making

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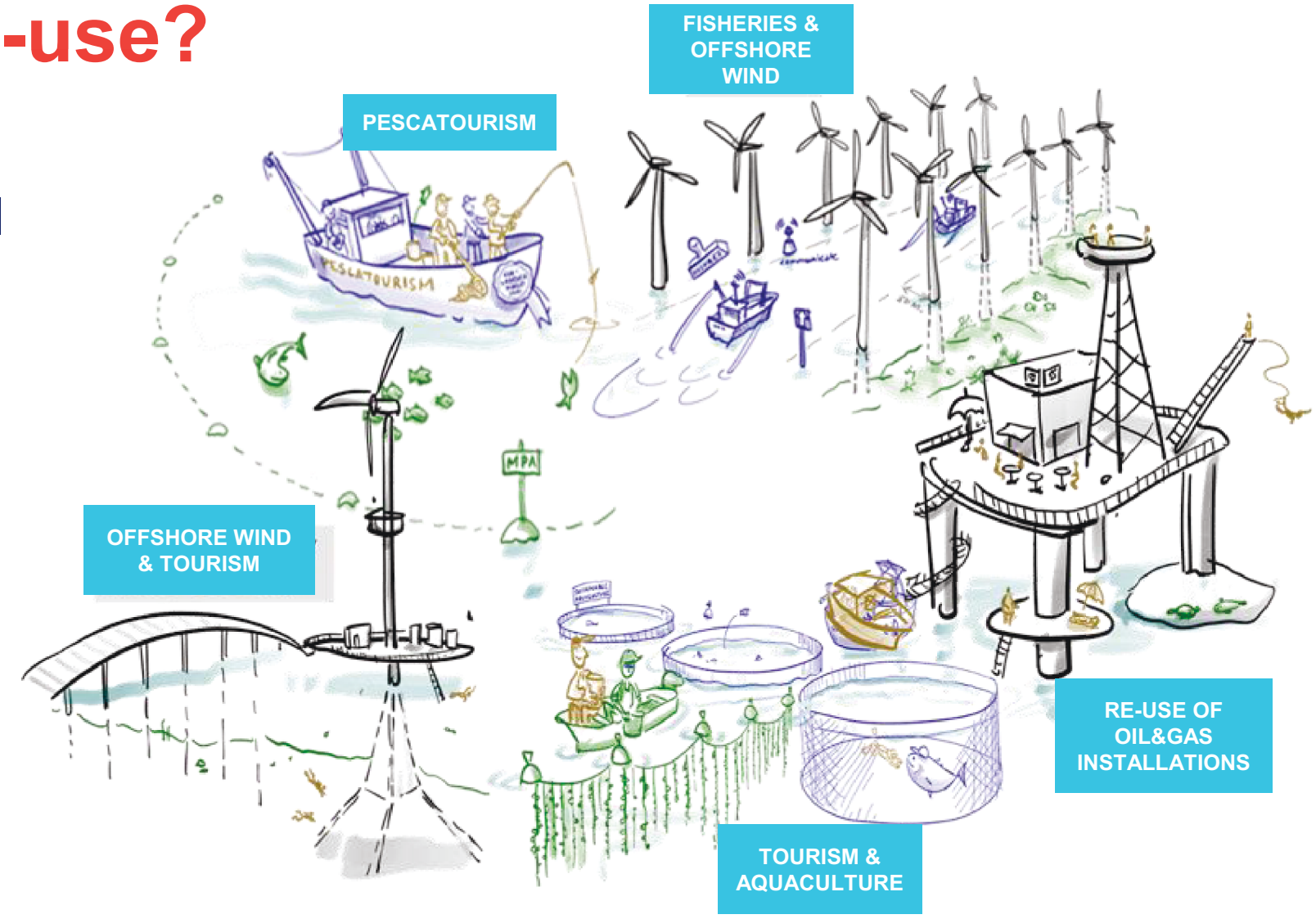
What is multi-use?

"…intentional joint use of resources (physical space, platforms, logistics, etc.) by two or more users.

…a radical change from the traditional concept of exclusive resource rights to inclusive sharing of resources by multiple users."

Much demand on our oceans...



MULTI-FRAME Project Aims

Transdisciplinary Research for Ocean Sustainability

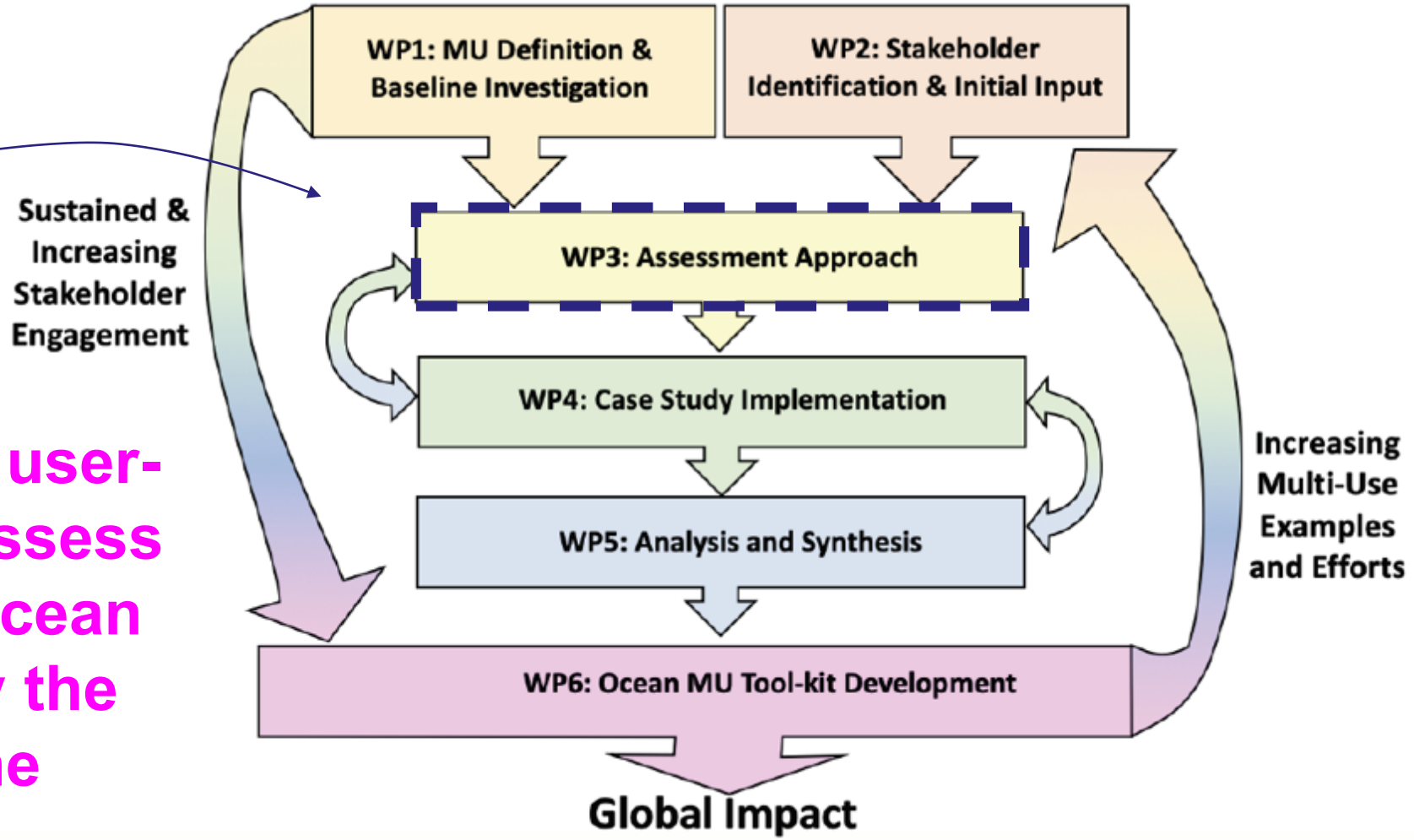
- **Develop concrete open-source tools** for assessing the sustainability of ocean multi-use solutions;
- **Conduct assessment of 6 case study regions** and share the results; and
- **Collect best practice examples** of multi-use world-wide.

To inform and encourage public authorities to systematically consider the concept of multi-use in their marine planning practices and to streamline it in relevant ocean policies

Today's Emphasis on MUAA WP3

A comprehensive and user-friendly approach to assess the sustainability of ocean MU, co-developed by the partnership and the stakeholders.

MULTIFRAME Project Workflow



Purpose and Objectives of the MU Assessment Approach (MUAA)

The MUAA will help MULTI-FRAME project partners and stakeholders:

- **Explore the potential for ocean MU**
- **Determine:**
  - Where ocean MU may be appropriate
  - Who needs to be engaged
  - What type of MU has the most potential for environmental, economic, and social sustainability
- **Gage the potential combined impacts** that may result from MU implementation

Conducted a literature review and developed 3 Phase MUAA plan with team.

Summary and Next Steps

MULTIFRAME for the MUAA

- Ocean Multi-Use is an important goal striving for shared, synergistic use by multiple sectors
- MULTIFRAME is exploring in six cases studies MU potential using the MUAA
- MUAA is 3 phase, multi-step iterative evaluation process
- Science-based stakeholder engagement process is planned and
- Results to be share broadly

Thank you.

Questions?

- J.P. Walsh, jpwalsh@uri.edu

THE UNIVERSITY OF RHODE ISLAND GRADUATE SCHOOL OF OCEANOGRAPHY

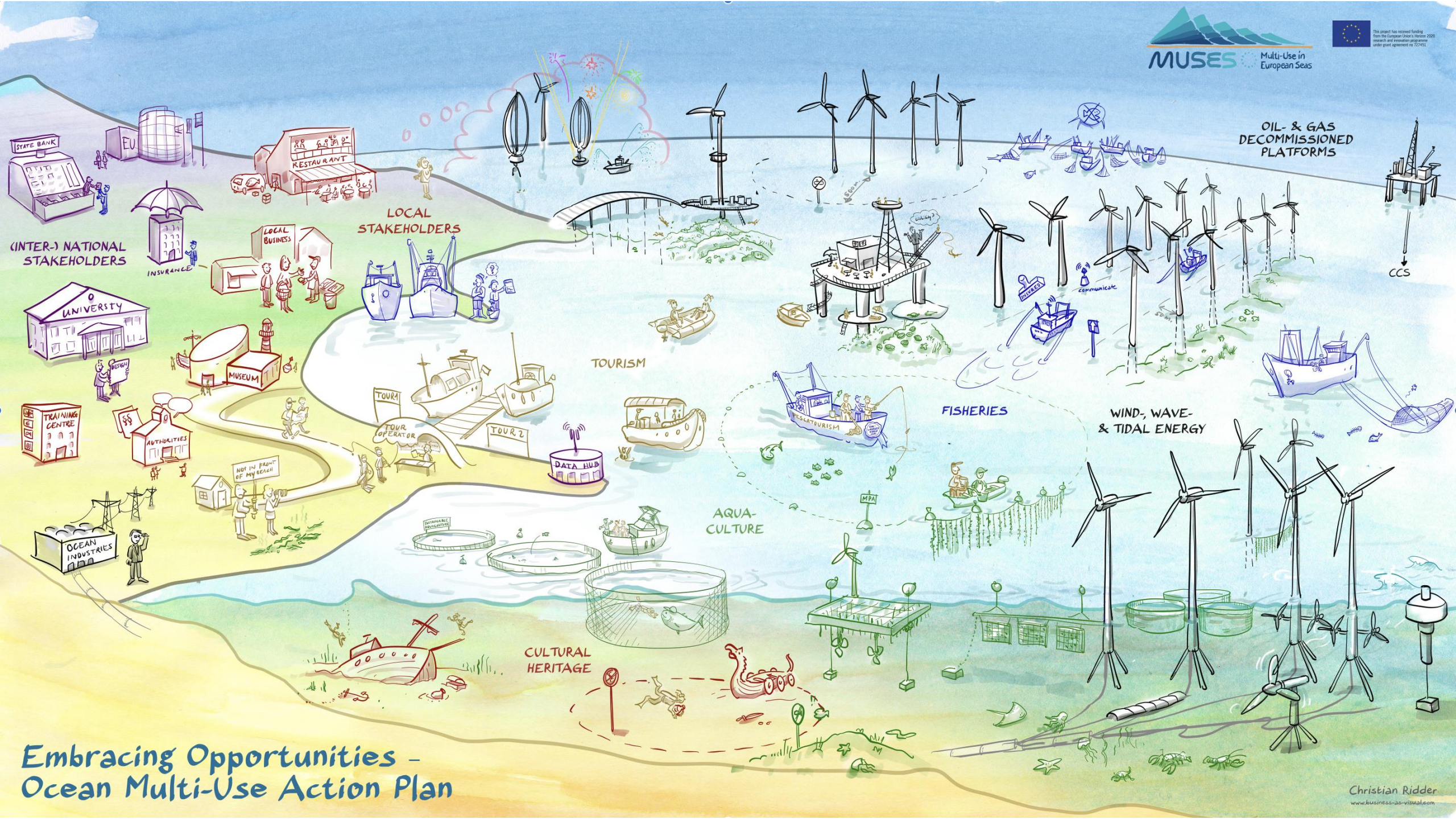
CRC50 COASTAL RESOURCES CENTER

Thanks to:

For our U.S. Funding

Presentation Outline

- What is Ocean Multi-Use (MU) and MULTIFRAME?
- Background for the MU Assessment Approach (MUAA)
- Other approaches from the literature
- The MUAA Plan for the MULTI-FRAME project
- Next steps on stakeholder engagement


MUSES
Multi-Use in European Seas
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 727451
STATE BANK
EU
RESTAURANT
(INTER-) NATIONAL STAKEHOLDERS
INSURANCE
LOCAL BUSINESS
LOCAL STAKEHOLDERS
UNIVERSITY
DESIGN
MUSEUM
TRAINING CENTRE
AUTHORITIES
NOT IN FRONT OF MY BEACH
OCEAN INDUSTRIES
TOURISM
TOUR 1
TOUR OPERATOR
TOUR 2
DATA HUB
OIL- & GAS DECOMMISSIONED PLATFORMS
CCS
INJURED
communicate
FISHERIES
RESLATOURISM
WIND-, WAVE- & TIDAL ENERGY
AQUA-CULTURE
SUSTAINABLE AQUACULTURE
MPA
CULTURAL HERITAGE
Embracing Opportunities – Ocean Multi-Use Action Plan
Christian Ridder
www.business-as-visual.com

Potential benefits of Ocean MU

- reduced conflicts
- efficient use of ocean space
- environmental benefits
- socio-economic benefits

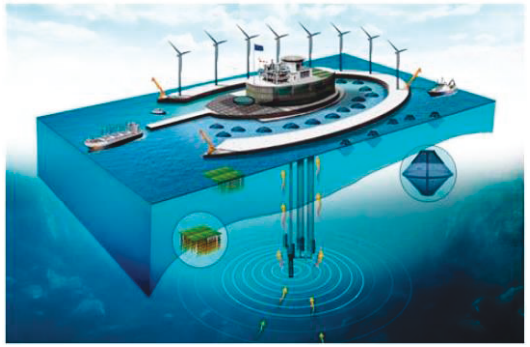
Several projects have explored this topic.

FP7 Oceans of Tomorrow/ Horizon 2020/ Belmont

SPACE@SEA

MARIBE
Marine Investment for the Blue Economy

TROPOS



MULTIFRAME

PLATFORM MARINA

H2Ocean

IMPAQT
Intelligent Management System for Integrated Multi-trophic Aquaculture

MERMAID

MUSICA

MUSES Multi-Use in European Seas

UNITED

However, multi-use developments are few likely due to a **lack of knowledge about potential benefits for the economy and the marine environment.**

Conceptual Framework used for MUAA

“Orders of Outcomes” (Olsen, 2003)

- Framework developed to assess progress toward goals of integrated coastal management
- Guided citing of U.S.’s first offshore windfarm in Rhode Island (McCann et al., 2013; Olsen et al., 2014)
- Advanced integrated coastal management internationally over decades
- Provides a path for scaling up geographically and with respect to governance levels
- **Critical focus: developing “enabling conditions” for effective coastal management**

Modularity of Major Importance!

- **Allow cases to emphasis the parts (steps, tools and methods) most suitable for their type of MU, local context and available resources.**
- **Approach useful for vulnerable areas and lesser-developed coastal areas (boosting remote economies through innovative MU) AND highly contested marine areas (reducing impacts through sector synergies).**

	Aquaculture	Tourism	OWF	Oil & Gas	Protection	Fisheries
1: UN		X	X		X	X
2: UEM–MHN	X	X		X	X	X
3: MFAA	X	X		X		
4: KTH	X	X	X		X	
5: URI		X	X			X

Focus for pairing the case studies:

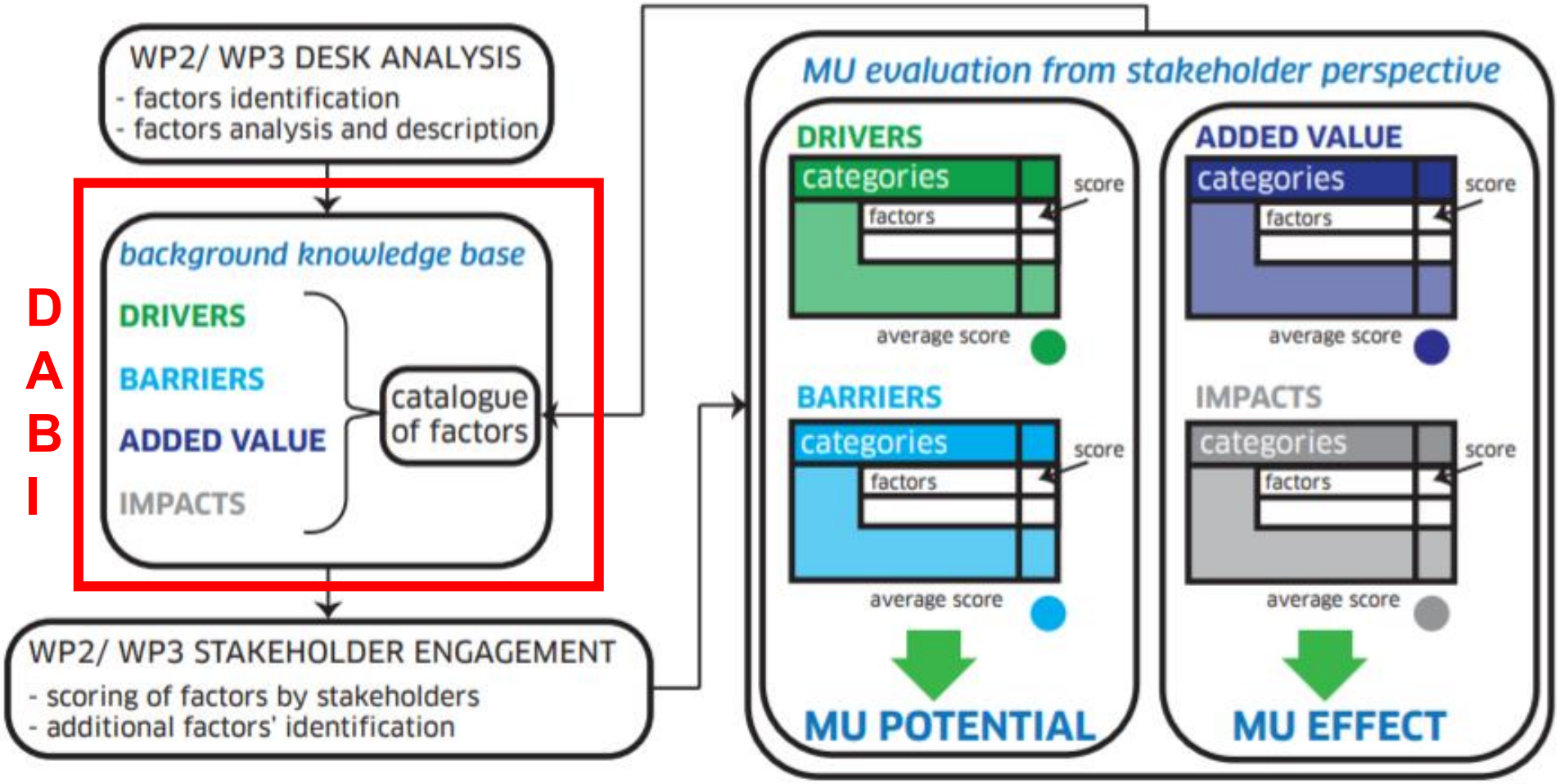
- 1&2: tourism MU with fisheries/environmental protection
- 2&3: re-use and re-purposing of decommissioned O&G installations
- 3&4: Aquaculture with tourism
- 5&4: OWF MU with fisheries/aquaculture

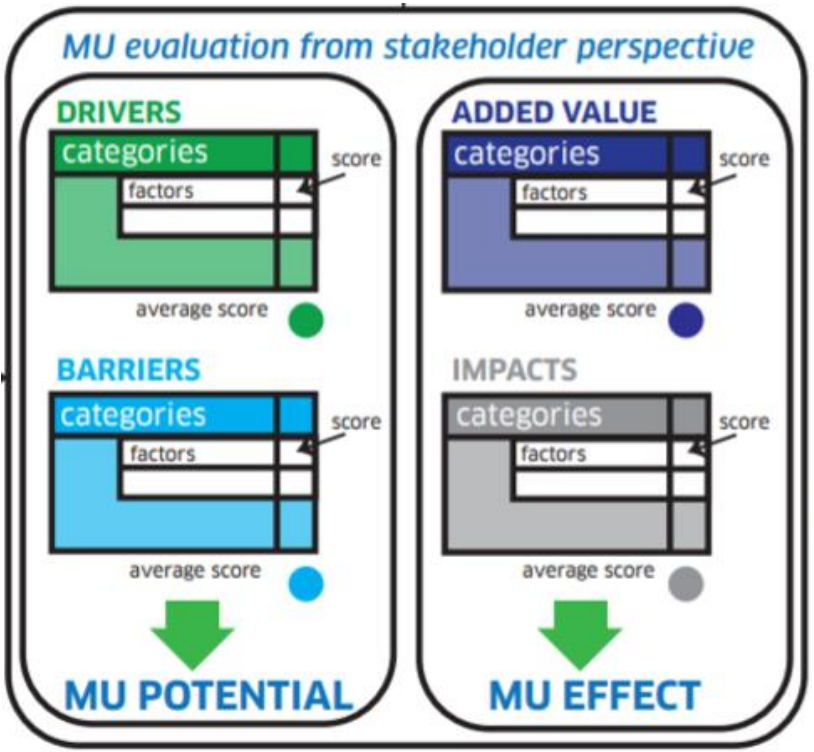
Table 1. MU sectors of interest and focus for pairing the case studies

*Table is missing Brazil case study

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 727451

EVALUATING MU





3.1.2. Scoring system and evaluation method

Identified factors (drivers, barriers, added value, impacts) will be scored by the stakeholders. Results of scoring will be aggregated into synthetic indexes. The process is described in the following paragraphs.

Analysis of MU potential

In order to evaluate MU potential the following steps will be undertaken:

- scoring of drivers by stakeholders
- calculation of the average drivers score (average scores by categories can be also computed to complement the analysis)
- scoring of barriers by stakeholder
- calculation of the average barriers score (average scores by categories can also be computed to complement the analysis)
- MU potential estimation (see below for the description on this point).

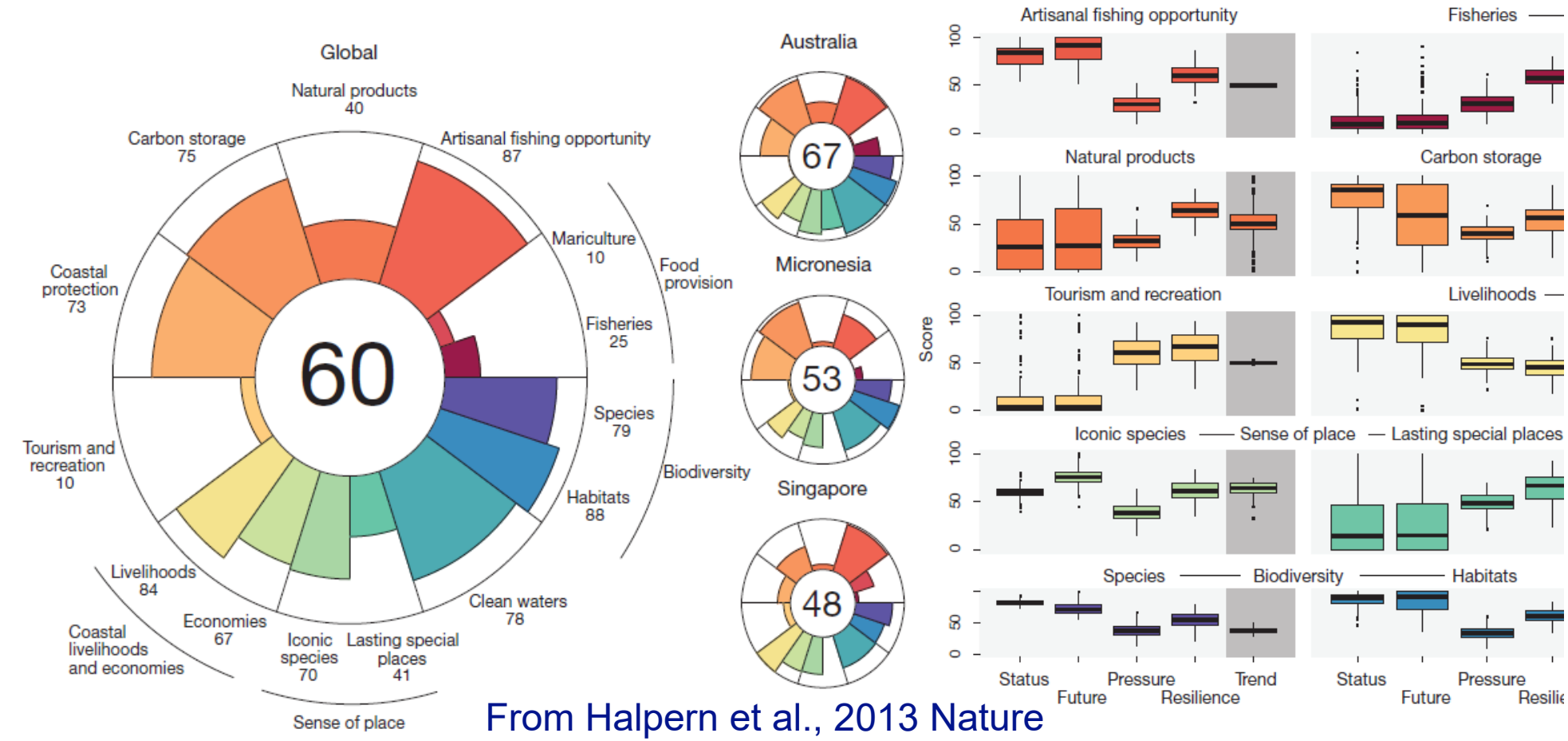
Scoring of drivers (factors supporting / facilitating MU development / strengthening): to factors supporting MU a positive sign is attributed and the following scoring scale is applied:

- high priority — score = +3
- medium priority — score = +2
- low priority — score = +1
- not relevant = the factor is present, but it has no influence on MU potentials or MU effects — score = 0
- absent = the factor is not present — score = 0

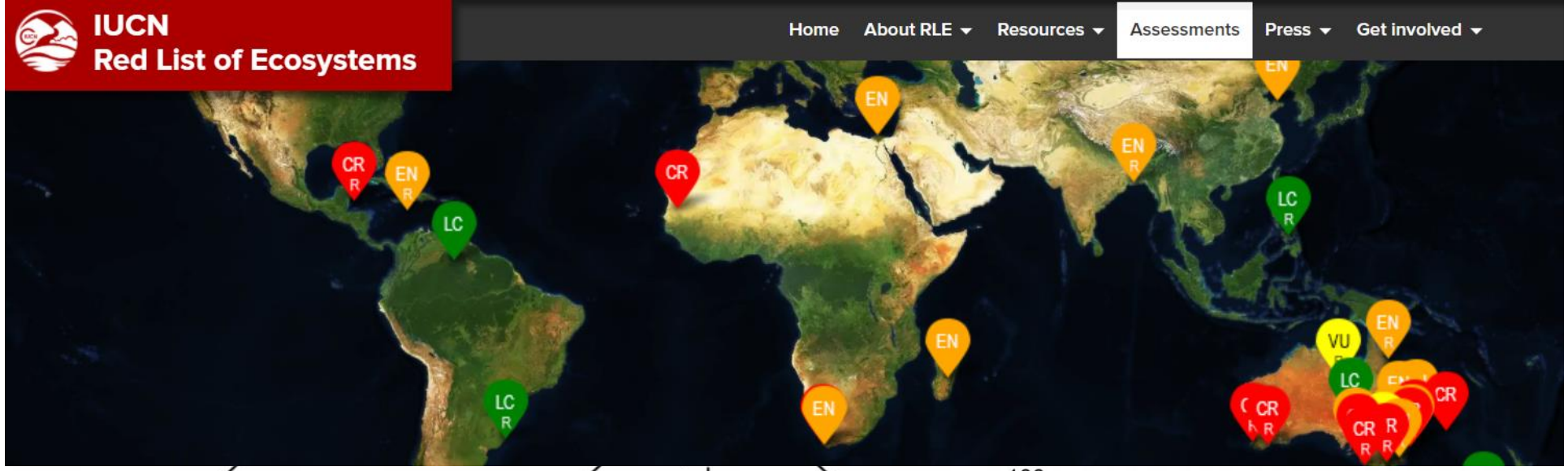
I do not know = there is no knowledge on the factor — no score is given

OCEAN HEALTH INDEX

A healthy ocean sustainably delivers a range of benefits to people now and in the future. The Ocean Health Index is the comprehensive framework used to measure ocean health from global to local scales.



From Halpern et al., 2013 Nature



Identify appropriate measure of distribution (maps, sightings)

Assess rate of change **Criterion A**

A1: present
A2: future
A3: historic

Assess current extent **Criterion B**

B1: EOO
B2: AOO
B3: locations
and for B1&B2

Identify appropriate measure of substrate quality

Assess rate of substrate degradation **Criterion C**

C1: present
C2: future
C3: historic

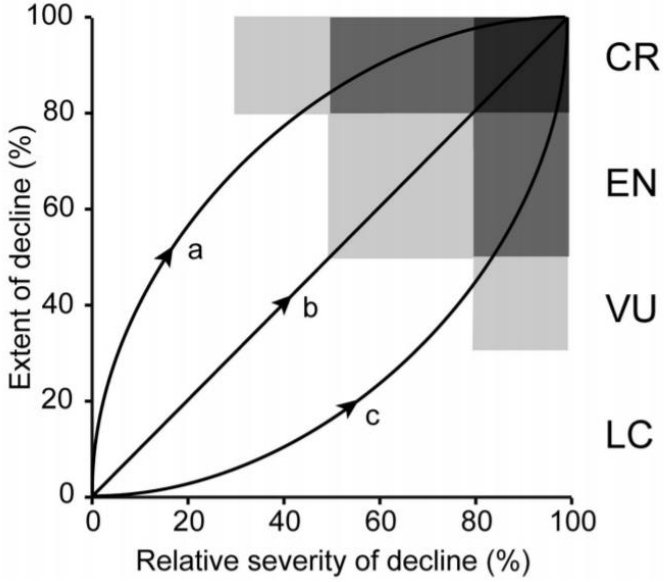
Identify appropriate measure of biotic interaction

Assess rate of disruption of interactions **Criterion D**

D1: present
D2: future
D3: historic

Model ecosystem dynamics

Assess risk of collapse **Criterion E**

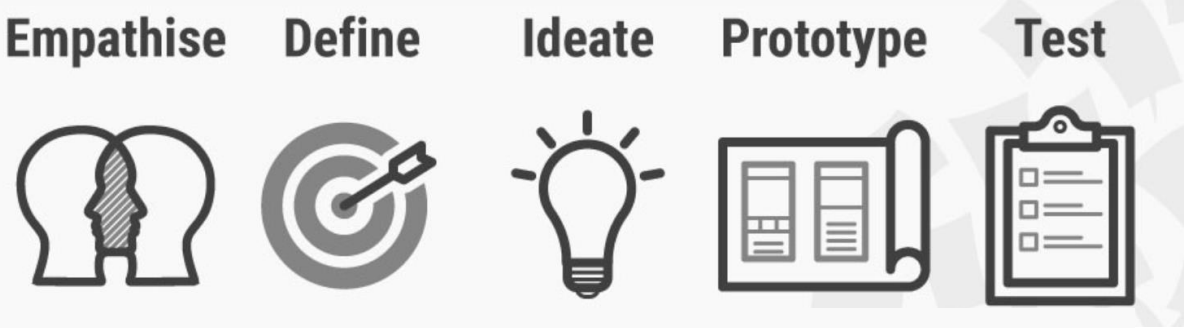


Threatened

CO Collapsed | CR | EN | VU | NT | LC | DD | NE Not Evaluated

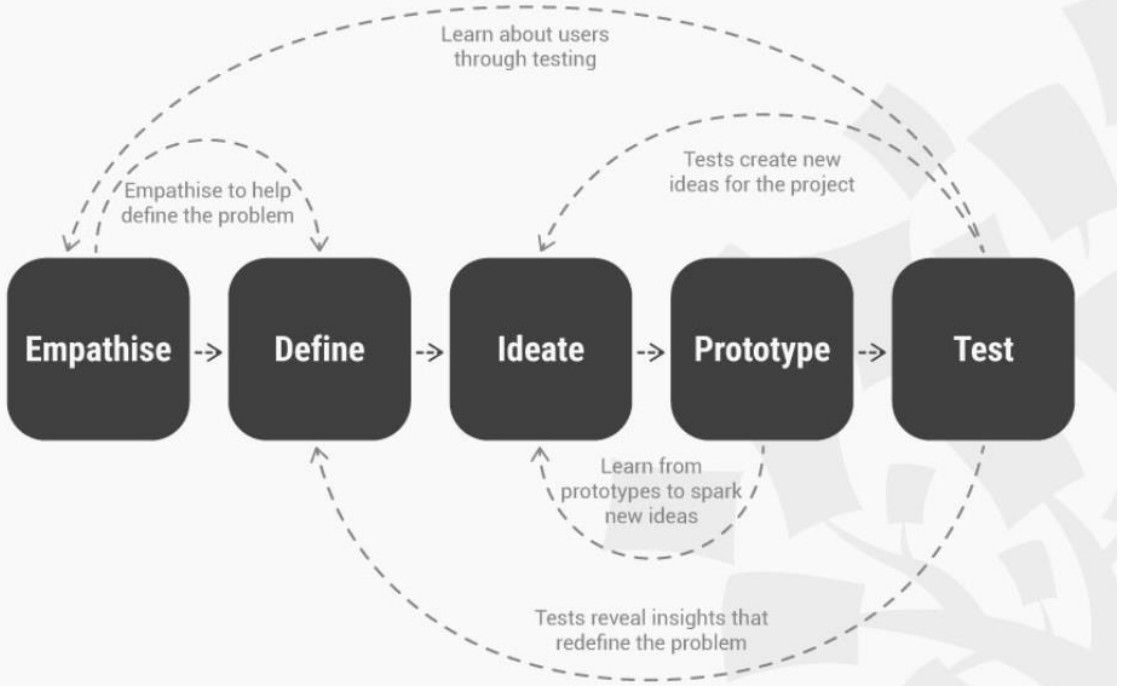
From Keith et al., 2013 Plos One

DESIGN THINKGING
The Five Phases



- Empathise – with your users
- Define – your users' needs, their problem, and your insights
- Ideate – by challenging assumptions and creating ideas for innovative solutions

DESIGN THINKING: A NON-LINEAR PROCESS



MUAA
Phase 1
Setting the Stage

Purpose:

- Understand the capacity and commitment of your stakeholder group
- Develop a plan of action to implement the approach for your case study

Steps:

1. Establish a Case Study Basis
2. Develop Governance Structure
3. Increase MU Knowledge
4. Describe the MU Scenario

Reporting: Basic plan

- Responses to the Basis questions
- Proposed plan of action
- Education efforts
- MU Scenario description
- Questions, concerns, or thoughts for improvement

MUAA Phase 2

Detailed Evaluation

Purpose:

- Clearly define the MU scenario
- Build a greater understanding and capacity to communicate about MU
- Identify challenges that could obstruct, and opportunities that could facilitate, MU

Steps:

5. Define the MU Level
6. Refine the MU Scenario
7. Identify risks, constraints & opportunities

Reporting: Detailed summary

- Refined MU scenario with MU level identified
- Risks, constraints & opportunities exercise results
- Questions, concerns, or thoughts for improvement

frontiers in Marine Science

HYPOTHESIS AND THEORY
published: 02 April 2019
doi: 10.3389/fmars.2019.00165

MULTIFRAME

Step 5 Define the MU Level

Toward a Common Understanding of Ocean Multi-Use

Maximilian Felix Schupp[1,2], Martina Bocci[3], Daniel Depellegrin[4], Andronikos Kafas[5], Zacharoula Kyriazi[6], Ivana Lukic[7], Angela Schultz-Zehden[7], Gesche Krause[1], Vincent Onyango[2] and Bela H. Buck[1,8]*

TABLE 1 | Typology of ocean multi-use with descriptions and examples given for each identified type.

Type	Dimensions				Description	Examples
	Spatial	Temporal	Provisioning	Functional		
Type 1: Multi-purpose/multi-functional	✓	✓	✓	✓	Takes place in the same area, at the same time, with shared services and core infrastructure	Marine renewable energy sources and desalination (Maniopoulou et al., 2017), Scottish Floating Power Plant Design (FPP) (Kafas, 2017)
Type 2: Symbiotic use	✓	✓	✓		Takes place in the same area, at the same time, and peripheral infrastructure or services on sea or land are shared	Proposed aquaculture in OWF in Germany (Buck et al., 2017), combination of Wave Energy generation and aquaculture (Onyango and Papaioannou, 2017)
Type 3: Co-existence/co-location	✓	✓			Takes place in the same place and at the same time	Fisheries in OWF proposed in the United Kingdom (Kafas, 2017) and Germany (Schupp and Buck, 2017)
Type 4: Subsequent use/repurposing	✓				Takes place in the same ocean space but subsequently	Repurposing of offshore structures for new uses like recreational fishing, tourism, aquaculture, or environmental conservation (e.g., Italy) (Ponti et al., 2002; Depellegrin et al., 2019)

Types are ordered by decreasing degree of connectivity between uses and users. Connectivity in any given dimension is symbolized by "✓" in the respective field for each type.

MUAA Phase 3

Final Assessment

Purpose:

- Identify solutions to MU challenges
- Identify and prioritize action plan to respond to MU challenges
- Determine dedication to MU and COP
- Determine if MU is appropriate for your case study.

Steps:

8. Identify possible solutions to respond to challenges
9. Evaluate enabling conditions

Reporting: Final assessment report

- Refined MU and data summary
- Challenges and solutions report
- Enabling conditions report/baseline update
- Decision for next steps
- Questions, concerns, or thoughts for improvement

Global Multi-Use Potential?

Check out:

"Global GIS Mapping of Ocean Multi-Use Potential with Offshore Wind and Tourism"
Sydney Walker and J.P. Walsh

MS Student GIS research project using GIS

2:55 PM on 3/1 -- OP06 Advancing the Blue Economy Following Sustainable Practices 01