



# Deliverable D8.2

## Report on WP8 stakeholder interactions meetings

April 2024/Version 1



## About this document

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Lead Partner	Marine Institute (MI)
Lead Author (Org)	Debbi Pedreschi, Fiona Culhane (Marine Institute)
Contributing Author(s)	Fabio Berzaghi (WMU), Mikaela Gomez (WMU), Matthias Haeckel (Geomar), Christian Riisager-Simonsen (DTU Aqua), Pernille Schnoor (WMU), Mary S. Wisz (WMU), Nathalie Van Isacker (Seascope Belgium)
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## Abstract

The goal for stakeholder interaction within OceanICU is to work with a broad range of stakeholders to understand their perceptions, understanding and needs relating to ocean carbon and use this information to ensure project outputs are appropriately co-designed with and for end users. OceanICU has identified the most relevant stakeholder groups as: decision makers (national/international authorities/agencies/regulators), governments/politicians, NGOs, industry/operators, investors, research institutes (incl. early career researchers (ECRs), students and educators), communities, the general public of all ages. Here we describe our strategy (both implemented and ongoing) for (1) identification and mapping of these different groups of stakeholders, (2) engaging with relevant stakeholders, and (3) initial outcomes of stakeholder engagement interactions to date. We go on to describe how learning from stakeholder interactions will be applied in OceanICU to fulfil project outcomes, such as the development of Decision Support Tools.



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# 1. Introduction

The key goal of OceanICU is to improve understanding of the Ocean's role in carbon sequestration. The goal for stakeholder interaction within OceanICU is to work with a broad range of stakeholders to understand their perceptions, understanding and needs relating to ocean carbon and use this information to ensure project outputs are appropriately co-designed with and for end users. Through iterative engagement with key stakeholder groups, we aim to ensure that project outcomes are useful for providing climate policy advice, address and incorporate industrial processes, and relevant to civil society. We will achieve this through promoting science-based management of human activities in communication of OceanICU outputs to stakeholders including civil society.

This document describes the identification of relevant stakeholders, the interactions with different groups of stakeholders to date, as well as the next steps for interactions. One of the focal project outcomes will be ocean carbon Decision Support Tools (DST). Through stakeholder engagement with stakeholders from the industrial, (fishing and mining) and climate arenas as well as policy makers, we will ensure societal relevance of the DSTs through co-designing, developing and deployment of these tools.



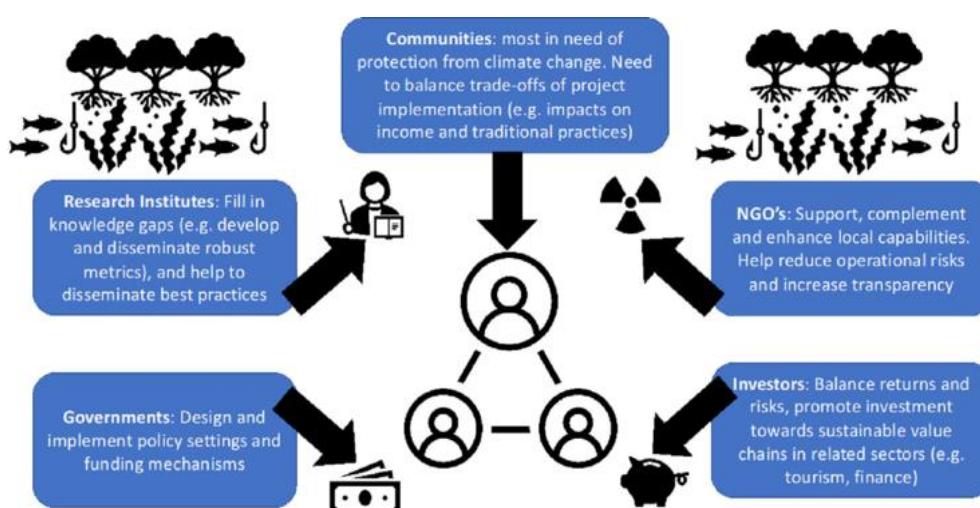
## 2.2. Stakeholder Mapping

### 2.1 Stakeholder Mapping: Overview

The key groups of stakeholders in the OceanICU project consist of;

1. high-level decision makers in the ocean carbon climate nexus
2. industry stakeholders, especially from the fishing and mining industries, and associated eNGOs (environmental non-governmental organisations).
3. wider society, including ocean carbon experts, as well as educators (see Figure 1).

Engaging with these key groups will enable us to have a broad cross-section of where society is connected to ocean carbon from multiple perspectives.



**Figure 1.** International stakeholder groups and their roles (replicated from Denzer-Brown et. al 2021)

The initial point of departure for the stakeholder mapping is the framework (from Denzer-Brown et. al 2021, Figure 1). The model describes five relevant international stakeholder groups: research institutes, communities, NGO's, investors, and governments. OceanICU has identified the most relevant stakeholder groups as; decision makers (national/international authorities/agencies/regulators), governments/politicians, NGOs, industry/ operators, investors, research institutes (incl. early career researchers (ECRs), students and educators), communities, the general public of all ages (Figure 2). The identification of stakeholders will continue iteratively through the project as we understand more about the roles and needs of actors in relation to ocean carbon. Figure 3 illustrates a map of some of the specific relevant actors. This will be built upon and expanded as we move forward through both direct



stakeholder engagement activities (Section 3) and through other strategic activities (Appendix 6.1).



**Figure 2** OceanICU stakeholder groups mapped to project outcomes and impacts from Sanders *et al.* (2023). These groups were mapped to the project outcomes and impacts from an early stage in the project and are illustrative rather than prescriptive. Additional cross-linkages exist between outcomes, impacts and stakeholder groups, and will continue to emerge and be documented as the project progresses.



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**Figure 3** Overview of ocean carbon stakeholders with examples grouped by regional level. This includes the Global or Large Marine Ecosystem (LME) scale; the Regional scale, drawing on examples from the European context; and the National scale (individual countries and their Exclusive Economic Zone (EEZ). See Appendix 6.2 for Glossary of terms.



## 2.2 Stakeholder Recruitment Methods

The appropriate recruitment methods may differ for high-level, industry and civil society stakeholders. To date we have recruited stakeholder panels through:

- Canvassing the consortium for relevant organisations and suggested contacts
  - Self sign-ups to the project mailing list and/or panels
  - Advertising the sign-up sheet at project meetings, workshops, and publicly via social media, the OceanICU webinars and newsletter
  - Reaching out to known stakeholders from previous work/projects (i.e. established stakeholder panels)
  - Attending industry events e.g. the Skipper Expo, an industry trade show
  - Attending relevant stakeholder events; e.g. the [Atlantic Stakeholder Platform Conference 2022](#) where we hosted an OceanICU panel
  - Snowball sampling - existing study subjects recruit future subjects among their contacts
- Carrying out online public webinars, e.g. [Fish Carbon Webinar](#)  
[OceanICU Overview webinar](#)

Examples of how these methods have been applied to date (April 2024) for each of the established panels are listed in Table 1.



**Table 1** Recruitment methods used for the currently established stakeholder panels (up to April 2024), and the number of organisations and people recruited to each panel.

<b>Stakeholder Panel</b>	<b>No. orgs</b>	<b>No. people</b>	<b>Recruitment Method</b>
<b>High Seas Fisheries</b>	27	35	Direct invitations and snowball sampling, e.g.; emailing the secretariat of key organisations with an invitation to a workshop, such as Regional Fisheries Management Organisations (RMFOs) and fishery Advisory Councils (ACs), and requesting that they pass the invitation on to their members. Some members were also identified via the self sign-up sheets.
<b>Shelf Seas Fisheries</b>	62	85	These stakeholders have mainly been enlisted through involvement with previous projects with the project partners (especially the Mission Atlantic project), and through word of mouth. Snowball sampling and the sign-up sheets also contributed. Some members of the High Seas Group also asked to join this panel.
<b>Deep Sea Mining</b>	50	77	These stakeholders have been identified through involvement with previous projects with the project partners. Specifically, the Mining Impact project with the project partner Geomar.
<b>Self sign-up</b>		31	These stakeholders have signed-up to stakeholder panels themselves, and have been/will be assigned to appropriate groups
<b>Fisheries - other</b>	13	13	Direct engagement, e.g. via attending a fishing industry trade-show, the Skipper Expo, and speaking to people present.

These methods will be further applied in the recruitment and establishment of future stakeholder panels. Examples of how these will be applied are detailed in Table 2.



**Table 2** Recruitment methods proposed to recruit additional key stakeholder groups, and/or expand existing panels.

Stakeholder Category	Recruitment plans
<b>High-Level Decision Makers, science diplomats and policy negotiators</b>	Direct invitation of identified key stakeholders informed by desk-based policy analyses and snowball sampling.
<b>Industry Stakeholders</b>	Plans will continue as above (see Table 1), expanding the panels as appropriate. We will continue to organise workshops and events around industry events in order to identify and engage relevant stakeholders.
<b>eNGOs</b>	Plans will continue as above (see Table 1), expanding the panels as appropriate. We will continue to organise workshops and take part in relevant events in order to identify and engage relevant stakeholders.
<b>Youth (people aged 16-30)</b>	<p>Engagement through established fora (e.g. the <a href="#">Youth4Ocean Forum</a>, one of the three communities of the <a href="#">EU4Ocean Coalition</a> dedicated to ocean literacy) (see section 3.3 hereafter for details).</p> <p>DTU will engage the youth indirectly through the Mutual Professional Development focus groups with early-career researchers and teachers in IB (International Baccalaureate) high schools. While interactions will focus on the teachers, the new teaching materials will be used at the student level, and thus reach the target group.</p>
<b>Educators</b>	<p>DTU mapping where all project partners are located and proximity to International Baccalaureate Organisation (IBO) schools, and overlap between IBO curriculum and OceanICU objectives.</p> <p>Where project partners are close to IBO schools, partners contacted by DTU and introduced to the options for participating in WP 8 focus groups. This process started at the kick-off meeting and is ongoing</p> <p>The early-career researchers (ECR) network within OceanICU, will form the basis of the interactions, as ECRs in particular are expected to practice core communications skills through this work, which will benefit them in their future career.</p>

1.



## 3. Stakeholder Engagement

This section details the engagement to date for each of the tasks and stakeholder groups, the outcomes achieved, and future plans/directions.

### 3.1 High-level and Policy Stakeholders

Task 8.1 led by WMU will deal primarily with decision-making stakeholders such as negotiators for international/regional conventions/agreements, policy makers and their advisors, NGOs, science diplomats, and industry thought leaders. Their main interests primarily include any of the following; environmental protection, fisheries, deep sea mining, and the industries that support them (e.g. financial institutions, insurers, etc.).

#### 3.1.1 Stakeholder engagement to date

To date, we have engaged with policy decision makers, policy negotiators and science diplomats in several ways, as outlined below. These include both disseminating information and current understanding on ocean carbon and policy, as well as gathering input from stakeholders on their understanding, perceptions, and needs.

##### **Panels and seminars**

On Tuesday April 25, 2023, Dr. Pernille Schnoor, World Maritime University (WMU), was the moderator at an event about fisheries management and carbon management in the Danish Parliament. The event was hosted by the international NGO, OurFish, and the Danish political party, Green Left Socialistisk Folkeparti (SF). Experts and policy-makers were brought together to explain the latest science behind fisheries management as carbon management.

On December 12 2023, Prof. Mary Wisz (WMU) and Dr. Fabio Berzaghi (WMU) and Dr. Richard Sanders (NORCE) were part of the panel of the COP28 Ocean Pavillon, *Managing and protecting ocean spaces for climate, biodiversity and people by 2030* Dr. Pernille Schnoor was the moderator.

On September 28 2023, Dr. Pernille Schnoor was part of the panel at the inaugural webinar hosted by OceanICU titled: *What is the role of the ocean in the global carbon cycle?* Pernille Schnoor focused on policy questions such as: *Is there anything that scientists can do to reduce the effect of cherry picking of scientific results in decision making? And How do scientists help to make sure that the most robust science finds its way into policy?* The webinar was recorded and remains available online to the public [here](#).



Appendix 6.1 Highlights additional strategic stakeholder engagement to date by the OceanICU team with high level stakeholders.

### **Expert panel discussion (in progress)**

World Maritime University will host an online expert panel in April 2024. These panels will focus on how to connect with high-level decision makers to assess the current roadmap to international policy. We specifically want to discuss how policies might affect the Biological Carbon Pump. As such, we are looking to gain insights into policy decision-making in relation to environmental protection (climate, biodiversity, pollution control), fisheries, deep sea mining, and conservation finance. This panel will inform the methods used for identifying, accessing, targeting, and recruiting stakeholders to the high-level decision-making panel/s moving forward.

The method that we will use for this will be a qualitative social science method. We will invite representatives from the different stakeholder groups to an online panel discussion. In this panel discussion we will ask the representatives of the different stakeholders to prioritise high-level decision-makers with a significant interest in the Biological Carbon Pump (BCP) who exert significant influence over the project of protecting the BCP. The online panel discussion also has the aim of assessing siloing and power plays among stakeholder groups.

### **3.1.2 Outcomes**

The engagement to date has contributed to improving awareness of the OceanICU project and the role of the BCP and its importance and relevance to high-level decision-makers. The panels and discussions have helped to open discussions and identify relevant individuals, organisations and policy-relevant issues and questions critical to the success of OceanICU.

### **3.1.3 Future directions**

The findings from the engagement outlined above will be used for sketching a roadmap to ensure greater impact on policy decision-making and to provide knowledge on how to inform policy negotiations in order to protect the BCP and influence other decisions affecting the BCP.

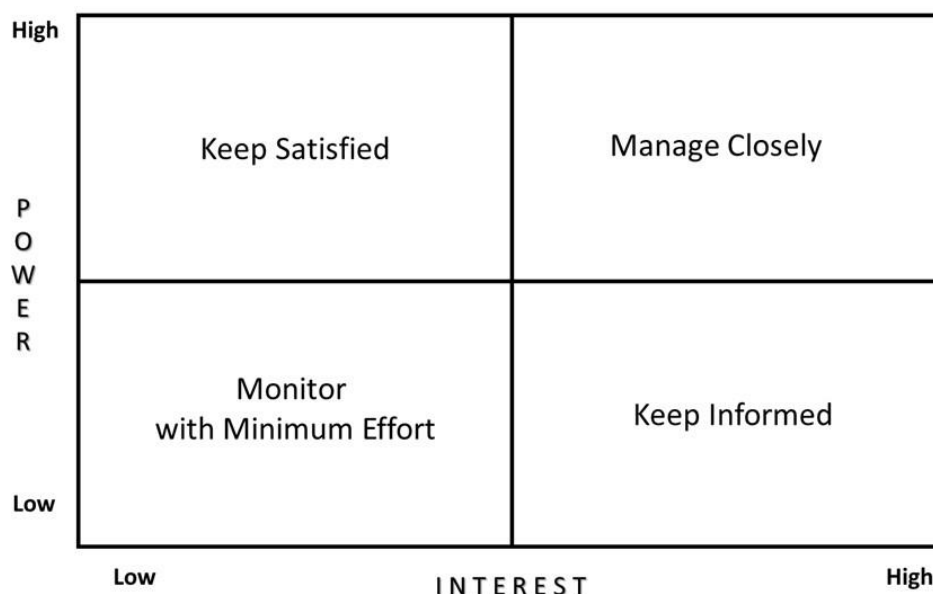
As part of this roadmap we also aim to provide a list of relevant international policy stakeholders based on their power and interest in the BCP and a list of important decision making fora (further details below).



Further key stakeholder meetings are planned for 2024-2027, coupled with interviews and/or panels on the trajectory of policies and decisions with high-level decision-makers that could affect the BCP. We are presenting at the UN Ocean Decade Conference Barcelona April 2024 with a presentation led by Fabio Berzaghi. In addition, we aim to participate in COP29 in Azerbaijan, UN Ocean Conference Paris 2025 and the Global Ocean Forum Virtual Ocean Pavillion COP29. Finally, Prof. Mary Wisz has been nominated by Sweden to participate as an author in the Global Ocean Assessment. This will provide access to key information, emerging science and trajectories that can help to inform the direction of OceanICU work.

### 3.1.3.1 Stakeholder Mapping: Power and Interest

Following on from the identification of the initial high-level stakeholders, we will examine stakeholder relationships in terms of power and/or interest. This exercise will facilitate the identification of relevant strategies to appropriately engage and work with each stakeholder group. Figure 4 presents a two-dimensional matrix with four quadrants; ‘power’ refers to the authority of stakeholders through which they can affect the course of activities and decisions and/or may block or facilitate and accelerate them, and ‘interest’ refers to the different stakeholders’ level of concern about the project’s activities and outcomes, and how they are negatively or positively affected by them.



**Figure 4:** The Power-Interest Matrix (reproduced from Junior et al (2015)).

In assessing the relations between stakeholders, and their relevance for the work of OceanICU, we will ask questions such as:



- Are these stakeholders needed to help produce the outcome that we need for the BCP?
- Can they influence people in positions of high power?
- How do we promote greater participation of stakeholders including policy decision makers in ocean carbon and BCP projects?
- What are the knowledge gaps that hinder the inclusion of ocean carbon ecosystems and the BCP in policy decision making?



## 3.2 Industry Stakeholders

### 3.2.1 Stakeholder engagement to date

To date (April 2024) we have engaged with the fishing and deep-sea mining industry on their interactions with ocean carbon in several ways, as detailed below. These include both disseminating information and current understanding on ocean carbon to industry stakeholders, as well as gathering input from stakeholders on their understanding, perceptions and needs in relation to ocean carbon.

#### Seminars

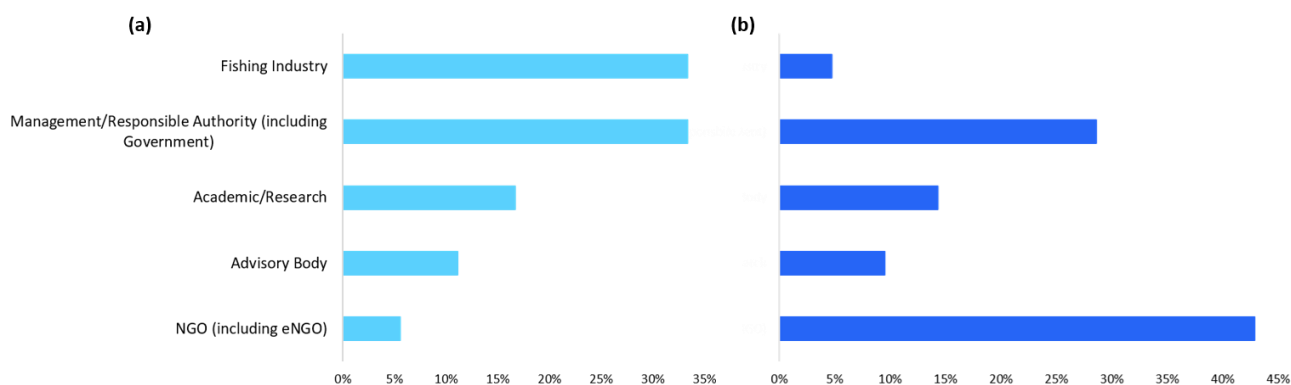
A ‘Fish Carbon’ webinar was hosted by the Marine Institute on 23<sup>rd</sup> November 2023. This webinar had three speakers (Prof. Ande Visser, Dr. Jacob Bentley, Prof. Dave Reid) who described different aspects of fish and their relationship with ocean carbon and was moderated by Dr. Debbi Pedreschi (T8.2 lead). The webinar was available to all and the live event had 53 attendees. Since the live event, the video recording has been watched a total 85 times and is available [here](#).

Prof Dave Reid, Marine Institute, presented on fish carbon at an Irish seafood industry climate action seminar, which was hosted by Bord Iascaigh Mhara (BIM) in Ireland on 28<sup>th</sup> November 2023. This seminar was attended by industry representatives from the seafood sector in Ireland.

Both events advertised the OceanICU stakeholder sign-up QR code.

#### Stakeholder Workshops with the Fishing Industry

The Marine Institute hosted two online workshops, on the 27th February and 27th March 2024 (see Appendix 6.3 for Agendas). These workshops focussed on the fishing industry and its interactions with ocean carbon. The first workshop consisted of stakeholders relevant for fishing in Areas Beyond National Jurisdiction (ABNJ) a.k.a. ‘high seas fishing’ and was attended by 18 participants (Figure 5a). The second workshop consisted of stakeholders relevant for fishing in shelf seas, specifically the Celtic Sea, and was attended by 20 participants (Figure 5b).



**Figure 5** Participant profiles of attendees at (a) the ABNJ-ocean carbon, and (b) the shelf seas-ocean carbon workshops. Fishing industry includes fishers, producers, and their representatives.

Each workshop had a dedicated half-day to discuss ocean carbon and its interaction with fisheries. Both workshops followed the same format. Before each workshop, a survey was sent to participants to gain an understanding of their initial perceptions of the interactions of ocean carbon, climate change, and fisheries (Appendix 6.4.1). At the workshop, presentations were given introducing the OceanICU project, an overview of the pre-workshop survey results, and providing a ‘primer’ on ocean carbon touching on:

- potential changes due to removal of organisms e.g. via fishing;
- potential carbon release from the seabed due to activities that impact on the seabed;
- fishing industry carbon footprint, e.g. fuel use
- emerging/expanding climate change driven industries.

Time was provided for open discussion (Q&A) around the topics presented. This was followed by an interactive session around an ocean carbon and fisheries social-ecological system. Initially, participants were invited to input what elements they think should be included in such a system, organised under the categories: Sectors; Pressures; Ecosystem Components; Ecosystem services and Socio-economic Elements. This information was collected using Polls in MS Teams and presented as Word Clouds (see example Figure 6).

These elements were used as a starting point to build a conceptual model. This was led and facilitated by the meeting organisers and produced live during the workshop via the online MentalModeler software ([www.mentalmodeler.org](http://www.mentalmodeler.org); Gray *et al.* 2013). Elements from the polling were used to form the nodes, and discussion with the participants informed where links should be (i.e. what connections exist). Through this process, the elements in the model evolved, and understanding of the linkages was elucidated (see Figure 7 example of model).



Ocean Acidification   mammals and fish   ocean carbon   food provision

**Figure 6.** Word clouds of elements of the high-seas ocean carbon social-ecological system, as chosen by participants of the ABNJ workshop. Elements are categorised under; sectors (or human activities), pressures (mechanisms of change), ecosystem components, and ecosystem services/socio-economic elements.



**Figure 7.** Provisional mental model co-produced with stakeholders during the ABNJ workshop using the software MentalModeler. The elements of the model are represented as boxes and colour indicates the type of element: sectors (orange), pressures (blue), ecosystem components (green), ecosystem services (yellow), socio-economic elements (pink). Grey boxes are elements that can be mechanisms of change but are not necessarily pressures. Links between the nodes are represented by lines. Lines are either positive (elements are positively correlated), negative (elements have an inverse relationship), or unknown (the relationship is either unknown or can be positive or negative). **Note:** this model has not yet been reviewed/consistency checked.

## Semi-structured interviews with Fishing Industry

The Skipper Expo, an Irish fishing industry trade-show, was attended on 23 February 2024, in order to carry out semi-structured interviews with individuals from the fishing industry. The survey consisted of approximately 14 questions and was designed to get an understanding of their perceptions of the interactions of ocean carbon, climate change and links with fisheries (Appendix 6.4.2). Thirteen interviews were carried out, primarily with small scale fishers, but also with others from the wider fishing industry in Ireland (e.g. equipment sellers, marine engineers, fishing advisors, food producers).

Some of the key emergent themes discussed with these stakeholders included:

- The importance of healthy ecosystems and stocks to sustain fishing and fishing livelihoods was a common theme amongst this group. Related to this, there was great concern around pollution of marine ecosystems, both from plastic (related to the fishing industry itself) and from contaminants such as those coming from agriculture.
- Several of the people in this group of stakeholders mentioned the efficiency of their activities, and how they are working towards



becoming more efficient all the time. This could be in relation to the gear used, distance travelled and planning for weather conditions. From their perspective, efficiency is related to cost, such as fuel costs, rather than carbon.

### **Presentations at International Seabed Authority (ISA) Annual Meeting**

We have engaged with stakeholders about deep-sea mining during Part 1 (March 2023) and Part 2 (July 2023) of the Council meeting of the 27th Session of the [International Seabed Authority](#). During the Side Event organised by the Deep Ocean Stewardship Initiative in March 2023 Matthias Haeckel presented on environmental impacts of polymetallic nodule mining, including its effects on carbon cycle processes and the assessment planned in OceanICU and discussed with stakeholders (ISA Council delegates, members of the Legal and Technical Commission, contractors, NGOs) their needs. In July 2023 Matthias Haeckel presented scientific results of impact studies and derived policy recommendations via two posters.

#### **3.2.2 Outcomes**

All workshops and engagement to date have been well-received and have successfully helped to raise the profile of OceanICU, and more importantly of the issues relating to the BCP and their importance/relevance to industry. In particular, the fisheries workshops have resulted in thoughtful engagement, and positive support from the attendees, with some attendees from the first workshop requesting to also attend the second.

Preliminary analysis of the outcomes of the engagement with the fishing industry so far has revealed some key emergent themes. These include:

- Food security (seafood production) and fishing livelihoods
- Fishing in the wider context of land-based activities
  - specifically the relevance of integration between land and sea-based policies
  - the trade-offs between the carbon footprint of fish v. livestock
- Sustainable fishing and impacts related to carbon cycle (bycatch, type of fishing, certification, etc.)
- Efficiency (gear, distance travelled, fuel costs)
- The need for healthy and balanced ecosystems

The iterative process of development with the fisheries stakeholders has proved successful, enabling us to build an understanding of where they are at, tailoring our meetings to meet their needs, providing background understanding and context, identifying the components relevant to the ocean carbon social-ecological system, prioritise those components with the largest



consensus, and build understanding around how they connect, and why they are relevant.

In the context of deep-sea mining the emergent themes with relevance for OceanICU were:

- to develop appropriate threshold values of impacts
- to improve our understanding on the impacts of future DSM activities on the carbon cycle, i.e. the ocean's services to sequester anthropogenic CO<sub>2</sub> emissions and provide food (fisheries).

The discussions around these exercises and topics enable us to ascertain the priority questions and concerns relating to ocean carbon, and ensure OceanICU outputs and the DST work towards meeting industry needs.

### **3.2.3 Future directions**

Additional workshops with Fishing stakeholders will be carried out to follow-up on the outputs above. A workshop with the Deep-Sea Mining community is planned for 2024 and will follow a similar format to the workshops detailed in 3.2.1 above. Interaction with these industry and eNGO stakeholders will be iterative and ongoing, remaining responsive to stakeholder and project needs. Meetings focused on the DST will be arranged as needed in collaboration with WP7. We will also remain open to additional/emerging sectors and issues that may need to be considered as the work develops.

The themes and outcomes identified in Section 3.2.2 will be further explored with stakeholders to:

- develop future scenarios
- identify trade-offs related to food security, carbon storage, livelihoods and nature.
- identify ways in which these scenarios and needs can inform the development of the DST (WP7)
- identify key participants relevant for a sub-panel on the DST to provide input and feedback as it evolves

A webinar on Industrial Carbon and Mining, led by Dr. Matthias Haeckel (Geomar), is scheduled for 2nd May 2024. As per the previous webinars, it will be open to the general public and all interested parties, and a recording will be made available and hosted on the website.



## 3.3 Youth

Task 8.3 is focused on engaging young people aged 16-30 years old. Targeted groups thus include students in secondary school, higher education students, young professionals (including early-career researchers and professionals in all sectors of the economy and non-profit sector) as well as young people who are passionate about the ocean.

Early-career researchers will be invited to take part in the education focus groups described in section 3.4 below whose work will benefit students in secondary schools.

All youth target groups will be invited at a later stage in the project to take part in a youth event and a youth competition.

Young professionals can take part in the existing stakeholder panels organised within Task 8.1 and Task 8.2.

### 3.3.1 Stakeholder engagement to date

To engage young people in OceanICU, it is important to connect existing youth networks to the project. For this purpose, SSBE contacted the representatives of Youth and Environment Europe ([YEE](#)) who are facilitating the [Youth4Ocean Forum](#), the youth component of the [EU4Ocean Coalition](#) for ocean literacy which brings together young ocean changemakers between 16 and 30 years old across Europe.

The Youth4Ocean Forum currently brings together more than 360 members including 218 Young Ocean Advocates. [Young Ocean Advocates](#) are young project holders whose projects have been recognised and accredited by the European Commission, as making a meaningful and lasting change for the Ocean.

The following questions were asked to the facilitators of the Youth4Ocean Forum:

- Are there Young Ocean Advocates who have a specific interest in ocean carbon and/or will be organising activities on this topic?
- Are there upcoming events that will bring together young people who may be interested in learning about the OceanICU project?
- Are there any communication channels we should make sure to include in our communication about the project so that interested young people could be informed about OceanICU activities?



### 3.3.2 Outcomes

The facilitators of the Youth4Ocean Forum shared the received information about the OceanICU project with members of the Forum to allow for interested young people to connect to the project.

At this stage, the objectives are to identify how young people can engage in OceanICU and how the planned event and contest could be organised to best benefit both young people and other stakeholders in the project.

The first suggestions indicate that some Young Ocean Advocates could be interested in OceanICU in connection to the project they are developing, for example a research project or developed podcasts. Knowledge and data from OceanICU could be shared with young people in an interactive workshop and serve as input for collaborative work that may lead to different forms of outputs of interest to other stakeholders (e.g. recommendations from the youth, communication campaign). Capacity building and Training of Trainers are important to young people. Building on this, young people could communicate knowledge to the wider public. There are opportunities to develop interactions between the youth and other stakeholders. These first ideas will be further investigated.

Young Ocean Advocates have been invited to subscribe to the OceanICU newsletter and it has been suggested to them that they can get involved in stakeholders activities within the project by registering in the Stakeholder Sign-Up Sheet.

### 3.3.3 Future directions

Contacts and cooperation with the Youth4Ocean Forum will be further pursued as the project progresses.

Opportunities to connect with the [Ocean Citizen Youth-led World Forum](#) will be investigated.

The kick-off event of the [European Youth Week 2024](#) in Brussels will also be an opportunity to learn about the interests of youth and identify how young people could engage with the OceanICU project.



## 3.4 Education

This task is focused on targeting education professionals via teacher-researcher Mutual Professional Development focus groups.

### 3.4.1 Stakeholder engagement to date

DTU delivered a workshop at the International School in Copenhagen on ocean sustainability issues, as a part of the school's annual sustainability day 5. October 2023. The workshop mimicked a recent UN Ocean Decade process, in which the UN Arctic Action Plan was developed. In the workshop the students were provided with the opportunity to reflect on the role of marine science in achieving sustainability targets, and the difficulty of evaluating which proposed projects might have the largest impact. The event was very well received by the school's teachers and a follow-up is likely in 2024.

### 3.4.2 Outcomes

With the engagement of educational professionals International Baccalaureate Schools (IBO) and youth, we aim to demonstrate an approach to connecting science to wider society that can be replicated at a larger scale in future research and innovation projects. This provides a pathway to integrate Ocean Research in the Science, Technology, Engineering, and Mathematics (STEM) curricula and efforts to embed the connection to the Sustainable Development Goals (SDGs) as part of every Horizon R&I project.

The process aligns closely with the methodology applied in the parallel Horizon project [Blue Mission BANOS](#), where a blueprint is being developed in 2024 for all marine research institutions in relation to school engagement processes. A core part of this, is the mutual professional development where both educators and ECRs are expected to benefit professionally from the process of co-developing teaching materials, providing incentives for all partners, while simultaneously injecting cutting edge research into daily teaching experiences of students across Europe.

### 3.4.3 Future directions

In the spring 2024, Ocean ICU ECRs will be invited to a joint meeting to advertise the benefits of joining the mutual professional development teams. In the summer 2024 the first schools will be contacted to identify where opportunities exist for setting up teacher and ECR teams, coordinated by DTU. Based on positive feedback from local schools, work plans will be co-developed to make the responsibility of each actor clear from the beginning.



Where possible work plans will include in class testing. The first lesson plans are expected to be ready by the summer of 2025.

On request (e.g. from local schools) the project will continue to support direct engagement with schools, e.g. as a part of sustainability themed events.

Dissemination of results will be organised towards Ocean Literacy and education networks (e.g. the [Network of European Blue Schools](#)), relevant events and communication channels.

Connection will be made to Early Career Researchers networks (e.g. in ICES and European Marine Board).



## 3.5 General Public

The general public are also key stakeholders relevant to OceanICU.

### 3.3.1 Stakeholder engagement to date

The general public is primarily engaged through OceanICU's communication and dissemination activities described in the Dissemination, Exploitation & Communication Plan (Sanders et al. 2023).

### 3.3.2 Outcomes

Interest from the general public in the project will be seen from interactions in social media and reported in WP1 Deliverables.

### 3.3.3 Future directions

The European Atlas of the Seas will support connection of the project with the general public. This will be done through the development of a new map layer in the Atlas related to ocean carbon, connection to the OceanICU project of a Map of the Week published on the Maritime Forum and, potentially, educational material published on the Atlas' Teachers Corner.



## 4. Discussion

### 4.1 Application of Knowledge

A key focus of the ongoing work is engaging with the wider OceanICU consortium on how stakeholder knowledge and input can be used and applied within the project moving forward. This was a primary focus of the recent (March 2024) OceanICU general assembly where each WP was asked to highlight how stakeholder knowledge could be used and/or what information would be useful for them. This information will be reviewed and compiled by WP8 to identify leverage points and opportunities for the application of stakeholder knowledge.

A specific focus of stakeholder engagement relates to the development and tailoring of the DST. As such, WP8 have engaged with WP7 on their needs and agreed an iterative implementation to engagement as the DST develops. As the DST matures, we will engage with the relevant stakeholder groups to ‘test’ and review the DST, and provide input and feedback into how to make it ‘fit-for-purpose’ to meet their needs.

More widely, we expect that stakeholder interviews and panel discussions may be able to inform when DST scenarios should be co-created with decision-makers, and when results from analyses/models need to be ready to communicate with stakeholders and decision-makers in time to be considered for negotiations. Furthermore, assessing levels of current understanding provide us with information on the size of the ‘knowledge gap’ that we need to bridge, but additionally, at what level tools and outputs must be pitched, and what language/communication styles are most appropriate in order to facilitate use and uptake by stakeholders and non-specialists outside of the project.

Scenario development with stakeholders, through workshops, panels, interviews, and activities such as ‘futures visioning’ can help us to identify potential and alternative future trajectories for management and intensity of human activities (industrial futures). These scenarios can be elaborated within the quantitative modelling work of the project, which can in turn feedback into the conceptual models built by stakeholders to help us to identify relevant impacts and trade-offs to be considered by policy-makers, industry, managers, and society.



## 4.2 Conclusion

This Deliverable outlines the progress made in introducing the OceanICU project and engaging directly with a wide range of stakeholders around ocean carbon, including assessing their understanding and needs. Progress has been made in relation to all target stakeholder groups, and work is ongoing in engaging with these groups and identifying leverage points and topics for further engagement and interest. The engagement thus far has been extremely useful in providing the baseline knowledge needed to ensure maximum uptake and application of the work of OceanICU during the project, and contributing to its legacy.



## 5. References

- Gray, S. A., Gray, S., Cox, L. J., & Henly-Shepard, S. (2013, January). Mental modeler: a fuzzy-logic cognitive mapping modeling tool for adaptive environmental management. In 2013 46th Hawaii international conference on system sciences (pp. 965-973). IEEE.
- Pacagnella Júnior, A. C., Porto, G. S., Pacífico, O., & Salgado Júnior, A. P. (2015). Project stakeholder management: A case study of a Brazilian science park. *Journal of technology management & innovation*, 10(2), 39-49.
- Sanders, R., Torrez, P., Larkin, K. and Falvey, J. (2023) Dissemination, Exploitation & Communication Plan including website with integrated KPIs. OceanICU Project Deliverable D1

## 6. Appendices

### 6.1 Strategic stakeholder engagement activities

Strategic engagement activities enabling identification of additional stakeholders and networking with relevant individuals and organisations. These engagements additionally provide critical contextual information about current and emerging issues, and the trajectories of stakeholder concerns, industrial developments and future policies.

- Mary Wisz contributed to Global Ocean Forum Policy briefing presented at COP28 in December 2023  
Mary Wisz, Fabio Berzaghi and Pernille Schnoor contributed to briefing notes on the climate benefits of role of ecosystem based fisheries management, and bridging science to policy for COP28 following Monaco Blue Economy Round Table
  - Mary Wisz presented the climate benefits of ecosystem based fisheries management at the Monaco Ocean Week High-Level Panel on Fisheries Management March 2023
  - Fabio Berzaghi attended the One Ocean - Blue Economy Summit at the Milano Ocean Week June 2023, and engaged with and recruited stakeholders (representing blue economy, climate finance, and conservation finance) for the OceanICU. We aim to include them in our interview and panel activities to understand policy opportunities and trajectories for the BCP



Fabio Berzaghi attended the CITES 77th meeting of the Standing Committee invited as a speaker by Whale & Dolphin Conservancy on the ecosystem and climate services of wild animals- bringing the OceanICU message to the IUCN community, and recruiting high level stakeholders for the OceanICU project

- Fabio Berzaghi and Mary Wisz attended the ICES WKFishCarbon workshop – Copenhagen in June 2023. The workshop produced a report on the status of fish carbon research and implications for policy, and in support of OceanICU science to society aims.
- Side Event and Poster presentation at ISA Annual Meeting in March & July 2023 (Matthias Haeckel)
- Fabio Berzaghi attended the UN Ocean Decade Conference April 10-12 2024 in Barcelona to present the work on the global mapping of the BCP. His presentation was one of 500 selected presentations out of 5000 submitted abstracts
- Fiona Culhane attended research workshops e.g. “Future Governance of Ocean-based NETs Scenario Workshop” organised by the Research Institute for Sustainability – Helmholtz Centre Potsdam



## 6.2 Figure 3 Glossary

BCP: Biological Carbon Pump

COP: Conference of the Parties of the United Nations Climate Change Convention

DGMARE: Directorate-General Mare, EU Commission for maritime affairs and fisheries

DSM: Deep Sea Mining

EEA: European Environment Agency

eNGO: environmental non-governmental organisation

EU: European Union

ICES: International Council for the Exploration of the Sea

IPBES: Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

IPCC: Intergovernmental Panel on Climate Change

LME: Large Marine Ecosystem

OceanNETs: Ocean Negative Emission Technology

ORE: Offshore Renewable Energy

RMFO: Regional Fisheries Management Organisation

WWF: World Wildlife Fund



## 6.3 Workshop Agendas

### High Seas Fisheries and Ocean carbon – An interactive online workshop

27th February 2024, 14.00 – 18.00 CET/13.00 – 17.00 GMT

Online Teams Meeting

Website: <https://ocean-icu.eu/>

#### Agenda

Time (GMT)	Program
13.00 – 13.30	Introduction to workshop, housekeeping, and OceanICU project
13.30 – 14.30	Presentation (30 minutes) and open discussion (30 minutes) on high seas fisheries and carbon
14.30-14.40	Results from the pre-workshop survey
14.40 – 15.00	Break
15.00 – 15.30	Exercise: elements of an ocean carbon-high seas fisheries system
15.30 – 16.40	Exercise: co-producing a model of an ocean carbon-high seas fisheries system
16.40 – 17.00	Wrap up and final words



## Fisheries, socio-economics, ecosystems, and ocean carbon in the Celtic Seas

27th March 2024, 10.00 – 18.00 CET/09.00 – 17.00 GMT

Online Teams Meeting

Time (GMT)	Program
<b>PART ONE: Morning session, OceanICU project</b>	
09.00 – 09.30	Introduction to workshop, housekeeping and OceanICU project
09.30 – 09.40	Results from the pre-workshop survey
09.40 – 10.40	Presentation and open discussion on shelf seas fisheries and ocean carbon
10.40 – 11.00	Exercise: elements of an ocean carbon-shelf seas fisheries system
11.00 – 11.20	Break
11.20 – 13.00	Exercise: co-producing a model of an ocean carbon-high seas fisheries system



## 6.4 Survey Questions

### 6.4.1 Stakeholder Workshops

Questions asked to participants of the High Seas and Shelf Seas online workshops. This survey was sent as an online survey to participants in advance of the workshop, supported by the SurveyMonkey software.

#### Pre- workshop Survey Questionnaire

##### About you

1. What is your institution (to be included on a participants list)?
2. What type of institution is this [drop down box] (e.g. management, fishing industry, food producer, eNGO, academic/research, advisory body, responsible authority, other)?
3. What is your role in this institution?
4. What is your email?
5. Do you know of any key organisations that we should contact to add to our stakeholder list?
6. May we contact you about news and future events related to this research?

##### About Ocean Carbon

This section includes a number of questions related to your perceptions of ocean carbon. There are some free text questions. Feel free to answer these in as much or as little detail as you want.

1. What comes to mind when you hear the term 'ocean carbon'?
2. How important do you think the ocean is for helping us to manage or improve climate change? [Likert scale: extremely important – not at all]
3. How important are the links between carbon and fishing for understanding the Biological Carbon Pump and/or climate change? [Likert scale: A great deal – none at all]
4. In what ways do you think *ocean carbon* affects *fishing*?
5. In what ways do you think *fishing* affects *ocean carbon*?
6. How concerned are you about the carbon footprint of fishing? [Likert scale: A great deal – none at all]
7. Which aspects of fishing do you think are most important for its carbon footprint?
8. \*How concerned are you about the fact that bottom trawling can cause carbon to be released from sediments?



9. What comes to mind when you think about which living organisms are important for capturing and storing carbon?
10. How concerned are you that removing fish, other animals, plants and algae (like seaweed or plankton) from the ocean removes ocean carbon? [Likert scale: A great deal – none at all]
11. Are you aware of any new or growing marine activities that are related to carbon and climate change? (Which ones)
12. How concerned are you about these activities? [Likert scale: A great deal – none at all]
13. Based on your responses to the previous questions, will there be implications for you in your work? (e.g. changes to your practices, policies, focal areas, etc.) (Briefly describe)
14. Are there any other topics related to fishing and ocean carbon not covered in this survey that are of interest/concern to you? Briefly describe:

\*Question 8 was not asked to ABNJ stakeholders as trawling was not considered relevant to the High Seas.

#### 6.4.2 Semi-structured interviews

Questions used for semi-structured interviews with stakeholders at the Skipper Expo

##### Ocean Carbon

1. What comes to mind when you hear the term ‘ocean carbon’?
2. Do you think ocean carbon and climate change are related?
3. How important do you think the ocean is for helping us (society) to manage or improve climate change?
4. Are you aware that ocean carbon and fishing are related? Yes/No
  - a. In what ways do you think *ocean carbon* affects *fishing*?
  - b. In what ways do you think *fishing* affects *ocean carbon*?
5. Do you have an idea of the carbon footprint of your activities at sea?
  - a. What aspects of fishing do you think are most important for its carbon footprint?
6. Are you aware that bottom trawling can cause carbon to be released from sediments?
  - a. Follow up: Are you concerned about that? [Likert scale: A great deal – none at all]



7. Are you aware that removing fish, other animals and seaweed from the ocean also removes ocean carbon?
  - a. Follow up: Are you concerned about that? [Likert scale: A great deal – none at all]
8. Are you aware of any new or growing marine activities that are related to carbon or climate change?
  - a. Follow up: Are you concerned about that? [Likert scale: A great deal – none at all]
9. Have you or are you planning any changes based on the impacts on and from ocean carbon that we have discussed?

**About you:**

1. What is your role in the fishing industry?

Fisher -boat owner    Fisher -crew    Aquaculture - fish    Aquaculture - shellfish    Food producer    Rep-resentative    Scientist    Manager

Other: \_\_\_\_\_

2. What gear types do you use/type of fishing?

Dredges    Gillnets or similar    Hook & Lines    Pots & Traps    Demersal Seines    Pelagic trawls    Bottom/Otter Trawl    Beam Trawl

Other: \_\_\_\_\_

3. Do you have a primary target species? Which one(s)
4. How long is your average trip length?
5. What size is your vessel?
6. How long have you been working in fisheries/your industry?
7. Do you have any other comments or questions from me? – do you have a message you would like to tell us?