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Planning for Citizen Participation in the EU Mission to Restore our Ocean and Waters by 2030

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Abstract

The European Commission's Mission to "Restore our Ocean and Waters by 2030" (Mission Ocean & Waters) is, at the most superficial level, an overarching policy framework with the primary aim of improving the health of European ocean, sea, and freshwater ecosystems. However, its use of the Mission framing and emphasis on fostering social, political, and economic transformations through its activities makes it a much more holistic and ambitious undertaking. *This article explores challenges and opportunities that arise with the emphasis placed on increasing citizen participation in Mission Ocean & Waters, in the context of "Post-Normal Science"* (Funtowicz & Ravetz Funtowicz and Ravetz, Krimsky and Golding (eds), Social Theories of Risk, Greenwood Press, Westport, 1992). We begin with a description of Mission Ocean & Waters, discussing its citizen engagement ambitions through the lens of Post-Normal Science, before describing the research methods used by the Horizon Europe project Preparing the Research and Innovation Core for Mission Oceans, Seas, & Waters (PREP4BLUE). We then present our results, highlighting four citizen engagement-based challenges that the Mission faces, and how PREP4BLUE has engaged with them. Finally, we discuss the future activities or structural changes that will be required if the Mission's citizen engagement targets are to be achieved and for citizens to become core actors in protecting European aquatic ecosystems and developing a sustainable blue economy. These insights should prove useful to those developing and delivering Mission projects and those researching citizen participation in ocean and freshwater related challenges.

Keywords: Mission Ocean, citizen engagement, participation, Post-Normal Science, European Commission, Mission Ocean & Waters, missions

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1. Introduction

The European Commission's Mission to "Restore our Ocean and Waters by 2030" (hereunder "Mission Ocean & Waters" or "the Mission") is, at the most superficial level, an overarching policy framework with the primary aim of improving the health of European ocean, sea, and freshwater ecosystems. And these ecosystems are under stress: In 2020, 60% of European Union (EU) surface waters did not meet the EU Water Framework Directive for good chemical and environmental status; 43% of European ocean shelf habitats were disturbed by sand extraction, dredging, mining, and coastal dumping; Overfishing in the Mediterranean and Black Sea was at a critical level (European Commission et al. 2020, p. 8). As the executive branch of a transnational entity faced with such a reality, the European Commission (EC) tasked itself with devising methods and structures of aquatic care on a continental scale. *This article explores challenges and opportunities that arise with the emphasis placed on increasing citizen participation in Mission Ocean & Waters, in the context of "Post-Normal Science"* (Funtowicz & Ravetz 1992). We begin with a description of Mission Ocean & Waters, discussing its citizen engagement ambitions through the lens of Post-Normal Science, before describing the research methods used by the Horizon Europe project Preparing the Research and Innovation Core for Mission Oceans, Seas, & Waters (PREP4BLUE). We then present our results, highlighting four citizen engagement-based challenges that the Mission faces, and how PREP4BLUE has engaged with them. Finally, we discuss some future activities or structural changes that will be required if the Mission's citizen engagement targets are to be achieved and for citizens to become core actors in protecting European aquatic ecosystems and developing a sustainable blue economy.

1.1 Mission Ocean & Waters

The EC officially launched Mission Ocean & Waters in September 2021. It is an ambitious whole-of-society initiative that, if successful, will transform the health of European waters. By 2030, Mission goals include: to protect a minimum of 30% of the EU's ocean and sea area; reduce by at least 50% plastic litter in EU seas; restore at least 25,000km of free-flowing rivers; and make the European Blue Economy carbon neutral and circular (European Commission 2021, p. 19).[1] Mission Ocean & Waters is one of five equally ambitious Missions that the EC has set for the EU to achieve by 2030.[2] By committing to a large-scale transformation in a relatively short amount of time, the Missions have been designed to be "inspirational, linked to a key societal challenge and relevant to a broad range of stakeholders and citizens" (European Commission et al. 2020, p. 5). The Missions programme was allotted a preliminary budget of €3.4 billion through Horizon Europe, the EU's flagship research and

[1] Adaptation to Climate Change; Cancer; Climate Neutral & Smart Cities; and Soil are the others. A sixth Mission – the New European Bauhaus – was announced in 2023.

[2] The others are Missions Soil, Cancer, Climate, and Climate Neutral and Smart Cities. A 6th Mission – the New European Bauhaus – was announced in 2023.

innovation fund. This is supporting public and private actions in research and innovation, business transformation, citizen engagement, and conservation/restoration.

The birth of the EU Missions reflects an attempted shift on the part of the EC from a sector-oriented to a mission-oriented approach to policy making (European Commission et al. 2018, 2019). Modelled on the USA's Apollo 11 mission to bring people to the Moon during the 1960s, the premise of mission-based thought is that cross-sectoral approaches to grand challenges that leverage support from across society are more likely to achieve positive social impact and transformation in relatively short amounts of time (Mazzucato 2021).

The emphasis on citizen engagement as a central concern has long been an attribute of mission-oriented thinking. The public consultations that led to the development of the Sustainable Development Goals (SDGs) are a good example. "Missions that are as much social and political as technological require a much higher degree of citizen engagement" (Mazzucato 2021, p. 131) – so claims Mariana Mazzucato, the mission-approach expert who worked with the EC in 2018 to develop their five Missions, taking Apollo 11 as her key source of inspiration. Apollo 11 took place in a cultural context of social strife in the USA, but also of the Cold War. The race to the Moon pitted the USA against a tangible external adversary – the USSR – and sought to become a great, all-American project, understandable and shareable by all. Recognising this public buy-in as key to Apollo 11's success, the European Commission has chosen "Public mobilisation and engagement: Citizen participation, engagement, co-creation, activation training and education" as one of two "Cross-Cutting Enablers" that will drive Mission Ocean & Water's success (European Commission 2021, pp. 32-35). This is quite a broad title, so what exactly does engagement mean here?

The Mission Ocean & Waters Implementation Plan describes its Cross-Cutting Enablers as "a system of *support facilities*…[that] will allow for a more, effective and integrated governance and a 'whole of government' approach to the hydrosphere" (ibid, p. 32, emphasis added). It goes on to describe its vision of public mobilisation and engagement as:

> "The Mission will connect Europe's citizens and local communities with the ocean, seas and waters, facilitate broad ownership and education and co-design the transitions within the communities that will allow the European Green Deal targets to be reached. The Mission will act as a new tool to pilot deliberative democratic decision-making that will help citizens to co-design the future of Europe, in terms of sustainable management of aquatic resources…It will leverage social innovation throughout the co-design, co-development, co-implementation, and co-monitoring of solutions for sustainable use of the ocean and waters" (ibid, p. 35).

To understand citizen engagement within the Mission, two things stand out here: Firstly, there is the instrumentalist understanding of engagement as a means to various ends – more effective governance, achievement of the European Green Deal targets, and so on. Language around participation for its own sake or as an ultimate goal does not appear as strongly. Secondly, citizen engagement has a clearly political aspect – both in its activities (e.g., deliberative democratic decision-making) and in its aims (e.g., integrated governance). As such, the Mission's approach to research and innovation is manifestly "Post-Normal", a theoretical approach further explained in section 2.

In terms of what specific activities citizens are to be included in, the Implementation Plan includes a list of Expected Outcomes for its "Public mobilisation and engagement" Cross-Cutting Enabler. These are high-level targets that are grouped around activities such as developing deliberative democratic mechanisms for the Mission, integrating decision-making regarding ecosystem protection/restoration into daily life, expanding participation in and use of aquatic citizen science, and so on (see Table 1).

The Mission sits within a wider ecosystem of global frameworks related to improving ocean and human health. Supporting the EU Green Deal with the necessary knowledge and innovation, as well as aligning with SDG 14 (Life Below Water) are examples. Particularly relevant given the overlapping time periods

is the UN Decade of Ocean Science for Sustainable Development (2021-2030) (hereunder "the Ocean Decade"). A significant number of publications and commentaries are emerging regarding the Ocean Decade, in terms of its feasibility (e.g., Franke et al. 2022), value (e.g., Blasiak et al. 2023; Sammler & Peters 2023), and how to engage with it (e.g., McKinley et al. 2022). Mission Ocean & Waters is yet to receive similar treatment. Both the Mission and the Ocean Decade share a commitment to innovation as a means for sustainable development. They also align with many ocean-related international agreements (e.g. the Kunming-Montreal Global Biodiversity Framework's agreement to protect 30% of marine space by 2030). The Ocean Decade also includes an interest in widening the societal knowledge of the ocean (ocean literacy) and assessing the role of / effects on citizens in relation to evolving marine policy and blue growth agendas. For example, the Ocean Decade's Challenge 10 aims to "ensure that the multiple values and services of the ocean for human wellbeing, culture, and sustainable development are widely understood."[3] While a full comparison between the Mission and the Ocean Decade is outside the scope of this article, we will highlight significant points of convergence or divergence as they relate specifically to citizen engagement.

Below is a description of the different methods used by the authors, both to investigate the EC's specific aims in terms of integrating citizen engagement and citizen-led activity into the Mission, and to help achieve these aims through various activities.

Table 1 *Citizen engagement expected outcomes of the Mission (Adapted from European Commission 2021, p. 36)*

By 2025 the Mission will have:
Tried and applied deliberative democracy mechanisms and social innovation practices for the co-design and co-implementation of solutions for the restoration of the aquatic environment.
Developed and piloted frameworks for participatory governance and deliberative democracy, including an EU-wide network of assemblies to enable citizen and stakeholder involvement.
Up-scaled the pilot citizen science campaign "Plastic Pirates – Go Europe" together with further Member States.
Involved the European Solidarity Corps in restoration projects.
Promoted apps allowing citizens to collect data and observations and will promote (digital) data collection and participatory research involving citizens for the monitoring and restoration of ocean and waters; the collected data will be harmonised and made publicly available through the Digital Twin Ocean, EMODnet and/or the Copernicus Marine Service.
Provided knowledge and methodological frameworks to support the revision of the International Ocean Governance agenda.
By 2030 the Mission will have:
Given all European citizens the opportunity to engage in the preservation and restoration of oceans and waters through participative means, volunteering and citizen science.

[3] https://oceandecade.org/challenges. Accessed 23 May 2024.

Empowered all European citizens to be actors in the preservation and restoration of oceans and waters through social innovation, awareness raising, education and training.
Promoted EU-wide ocean literacy campaigns, in cooperation with EU4Ocean to strengthen public awareness and overcome the emotional disconnect from the ocean and waters.
Launched citizen science campaigns as a part of participatory research initiatives to increase the reach, quality and impact of science and boost environmental awareness of participants.

2. Theoretical framing: Post-Normal Science and degrees of participation

Citizen participation is increasingly embraced as crucial not only to grant legitimacy, credibility and salience to a Mission, but also to realise democratic values and social justice (Nogueria et al. 2021, Bjørkan et al. 2023). Moreover, citizen participation allows for a wider and more diversified knowledge base, which is important to cope with the uncertainty and ambiguity inherent to addressing the Missions, and to ensure the salience of the solutions proposed.

Accordingly, this article will draw on Post-Normal Science, as introduced by Silvio Funtowicz and Jerome Ravetz in the early 1990s (Funtowicz & Ravetz 1993). Post-Normal Science challenges the traditional view of science as an objective and detached enterprise. It recognises that when issues are complex and uncertain – for instance, planning for adaptation to sea level rise or making decisions relating to the designation of Marine Protected Areas – the standard model of scientific inquiry falls short: scientific facts alone may not suffice to guide policy and action when dealing with inherent uncertainty and value-laden issues. In situations where "facts are uncertain, values are in dispute, stakes are high, and decisions urgent" (Funtowicz & Ravetz 1993), Post-Normal Science emphasises the importance of involving non-expert stakeholders and citizens in the scientific decision-making process.

The Mission's rhetoric and targets concerning citizen engagement align with the Post-Normal approach in its attempted "incorporation of a plurality of knowledges and an extension of the peer community" (Buchan 2022, p. 1) through the mobilisation of aquatic citizen science, calls for co-design and co-management of restoration initiatives, as well as EU-wide Ocean Literacy campaigns. If successful, Mission activities therefore have the potential to construct knowledge through the creation of "civic epistemologies" (Jasanoff 2005), which suggest that diverse public perspectives can contribute to a more comprehensive understanding of environmental issues. Citizen engagement becomes crucial not only for collecting data but also for integrating local traditional knowledge and values into the decision-making process, promoting a more inclusive and robust approach to achieving the Mission's objectives. If successful, this would work towards correcting an imbalance in ocean science described by Buchan, in which the boom in ocean scientific knowledge seen over the past century "has not been matched by an equal wealth of knowledge about how hearts and minds might share the sense of urgency and morality needed to support and contribute to the actions proposed by science" (ibid, p. 1). Accordingly, we say that the Mission is *superficially* an environmental project because the structure and Implementation Plan for the Mission are designed so that the environmental targets will only be met alongside social, political, and economic transformations that are equally as significant and reflective of the Post-Normal scientific approach.

To undertake a thorough analysis of the Mission's efforts to foster a diverse community and knowledge base, we suggest using a broader "intersectional" framework (Crenshaw 1989, Gustavsson 2022). Intersectional theory acknowledges that each individual's identity and experiences of engaging with their ocean spaces (and the Mission in this case) are influenced by complex intersectional relations, defined by gender, age, but also ethnicity, [dis]ability, sexuality, language, and others. Therefore,

analyses of efforts to support diversity in Mission policy and activities must engage with a broad range of experiences and the way they interrelate. For instance, from the point of view of inclusivity, it may not be sufficient to endeavour for or (in our case) research gender balance among panellists at Mission Ocean events if other intersectional relations such as occupation or language spoken are acting as exclusionary factors.

How to involve citizens can be complicated as it is not a one-size-fits all exercise. Reference to a ladder of participation (Arnstein 1969) is often used to illustrate different forms of participation and the ranges of involvement that they promote, e.g., from differing levels of communication (i.e., receiving information or voicing opinions), to co-designing research questions, up to directly impacting how a research process unfolds or what the outcomes are. In general, there are benefits and challenges with all forms of participation, but there seems to be consensus on the importance of avoiding tokenism or lip service (see for instance Ballesteros & Dickey-Collas 2023). The degree of participation achieved in different Mission Ocean activities will be presented and discussed in sections 4 and 5.

3. Materials and Methods

This article is based on mixed methods research undertaken by PREP4BLUE, a Horizon Europe funded project. Quantitative and qualitative data regarding citizen engagement in the Mission has been gathered using four distinct methods: Analysis of Mission documentation; participant observation and engaged research among Mission-relevant citizen engagement networks and at Mission events; the use of pre/post engagement surveys; and surveys of and interviews with participants/representatives of aquatic citizen science initiatives. Each is outlined briefly below.

3.1 Analysis of Mission Ocean & Waters documentation

The EC outlines the Mission's policies, objectives, and target outcomes across several key documents. These were identified either via the Publication Office of the EU[4] by searching the term "Mission Ocean and Waters", or through receipt from the EC (as the authors are members of Mission-funded project teams, they periodically receive relevant publications directly). As of 2024, important examples of these were:

1) The Mission Ocean & Waters Implementation Plan (European Commission 2021).
2) Baseline studies for the four European sea basins: Atlantic-Arctic, Baltic and North Sea, Mediterranean, Danube and Black Sea (European Commission 2023a; 2023b).
3) The portfolio analysis of Mission-relevant European projects (European Commission et al. 2023).
4) "EU Missions 2 Years On"- an independent review published by the EC (European Commission 2023c).
5) The yearly Horizon Europe Missions Work Programmes, through which Mission projects are funded. These are published online and demonstrate the upcoming challenges and how projects are being asked to engage with them.[5]
6) Emotional disconnect with Europe's aquatic environments: Report for the European Commission's Mission Board for Healthy Oceans, Seas, Coastal and Inland Waters (European Commission et al. 2021).

To analyse how citizen engagement and related concepts are referenced across these documents, a search for a set of predefined keywords relevant to citizen engagement was undertaken (the terms

[4] https://op.europa.eu/en/home. Accessed 15 December 2023.

[5] For example, the 2023-2024 work programme can be found here: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-12-missions_horizon-2023-2024_en.pdf. Accessed 15 December 2023.

used were “citizen”, “co-design”, “co-production”, “engagement”, “inclusion”, “inclusive”, “inclusivity”, “indigenous”, “participation”, “social”, “stakeholder”). Text excerpts including the search term were then recorded. Once this process had been applied across an entire document, the excerpts were then grouped into themes such as “Participatory governance and citizen assemblies for Mission Ocean & Waters”, or “Building social inclusion into Mission Ocean & Waters project proposals”. These themes were not pre-identified but rather allowed to emerge as the team conducted its research. This process uncovered upcoming activities, identified gaps, and the EC’s priorities in terms of supporting citizen participation in Mission activities.

3.2 Participant observation and engaged research among Mission-relevant networks and at Mission events

3.2.1 Participant observation of Mission Ocean & Waters events

“This is not business as usual at the European Commission” – This has been repeated by EC officials at public events on many occasions in reference to the Mission and the EC’s new Mission approach more generally. Both the citizen-engaged efforts of Mission Ocean & Waters and the Post-Normal framework used in this article underscore the now-recognised importance of the social and cultural aspects of this supposed transformation, which, for this article, have in part been researched through participatory observation. This method is often used by social anthropologists to understand communities, practices, values and experiences. A variety of techniques is employed, including interviews, group discussions, and participant observation in events or activities to gather data on peoples’ everyday experience (Roque et al. 2024). The EC and the Mission, as an organisation and activity respectively, are transnational in nature: participant observation has been conducted amongst the mobile community of policymakers, industry representatives, scientists, and advocacy groups that make up the part of the Mission community that travels between its events. Taking inspiration from Schwarzman’s (1987) seminal study of the official meetings of a mental health service in the US as social forms, this study has used official Mission events as opportunities to understand the structures and discourses that produce Mission Ocean & Waters and (re)create hierarchies of power through formalised activities.

Empirical data has been collected at several Mission events through a mixture of in-person and online participation (e.g. the launch of the Atlantic-Arctic Basin Lighthouse, Cork, Ireland, 2022 (in Mission Ocean parlance, “Lighthouse” refers to a type of regional innovation hub working cross-sectorally towards achieving the Mission’s targets); the launch of the Baltic and North Sea Basin Lighthouse, Hamburg, April, 2023; the launch of the Mediterranean Basin Lighthouse, Palermo, May, 2023). This also includes analyses of conference agendas (by theme) and lists of speakers (by gender or stakeholder group).

3.2.2 Engaged research among citizens networks

Of course (and as the EC is keen to emphasise), the Mission also takes place along every coast, lake and river in Europe, amongst fishing communities and everywhere that water plays a critical role in structuring social life (arguably across the whole continent), and consequently grounding value-sensitive decisions based on uncertain scientific knowledge, with a diversity of relevant knowledge producers. Engaging with citizens and stakeholder groups themselves is therefore also critical, and requires a reflection on the mutual positions of each concerned actor within the extended peer community. Engaged research employs methods that “share a common interest in collaborative engagement with the community and aim to improve, understand or investigate an issue of public interest or concern, including societal challenges. Engaged research is advanced with community partners rather than for them (Campus Engage 2022, p. 2).” PREP4BLUE team members conducted engaged research among three different citizen-engaged Communities of Practice (CoP): coastal and

riparian communities, ocean literacy networks, and ocean sciences & arts. These were first selected at project proposal stage due to their relevance to Mission Ocean's objectives and on the basis that they all performed citizen engagement activities. To facilitate engaged research, the final list was decided based either on the physical proximity of the relevant organisations to PREP4BLUE partners (e.g. Catalan Ocean Literacy Network for the Institute of Marine Sciences (ICM), or pre-existing relationships with PREP4BLUE partners (e.g. the Irish Ocean Literacy Network for ERINN Innovation Ltd). The full list of networks/groups engaged is as follows: Barcelona Ocean Cities Network, the Irish Ocean Literacy Network, the Ocean Literacy Italia network, the Catalan/Spanish Ocean Literacy networks (Xarxa d'Escoles Marines at the Catalan level, and Red y Recursos de Educación Marina at the Spanish level, Reeducamar), and Blue Genes ocean science and arts network.

The overall engaged research strategy was to examine how to best facilitate and support scalable, Mission-focused initiatives as examples of how citizen-engaged networks can be facilitated to align with the Mission's targets. The CoPs from the different locations were networked through the engaged research team, acting as a coordinating hub. In this way, the different organisations and CoPs could capacitate each other to strategically develop them all.

3.3 Pre/post engagement surveys

PREP4BLUE has engaged with a variety of Mission Ocean & Waters actors – Mission-funded project teams, EC officials, marine advocacy networks, coastal communities. Efforts have been made to co-design and evaluate as much of this work as possible to ensure relevance to the community, and to track impact.

3.3.1 Pre-engagement survey

From October 2022 – January 2023, the PREP4BLUE team undertook a needs analysis of those who engage citizens in marine and freshwater activities across Europe and its waters. The aims of the study were to examine the organisations and projects working on citizen engagement in the space, and to assess their needs in terms of engaging with Mission targets and activities. The study was conducted as an online survey, which was translated into 11 languages and disseminated through research, advocacy, industry, and community networks around Europe. This included online forums such as the Ocean Decade Comms Forum, Sustainable Ocean Alliance's Europe Forum, and through The Marine Social Science Network's monthly newsletter. The survey received 229 responses, of which 92 were deemed invalid due to being incomplete. This left 137 valid responses from 26+ different countries (some were globally active). Respondents included individuals, R&I institutions, ocean literacy and advocacy groups, NGOs, and government agencies and policymakers.

3.3.2 Post-engagement surveys

Across 2023 and 2024, PREP4BLUE delivered a webinar series titled "Planning for Citizen Participation in Mission Ocean and Waters".[6] Following these or other similar workshops, short online surveys were circulated to all participants. This allowed for the collection of feedback regarding the relevance and quality of the training. One key open question was always asked: "what other training could we offer you to help you better engage citizens in marine and freshwater matters?" The answers were then thematically coded into five overarching themes – How to do stakeholder engagement, issue-specific needs, how to apply methods in practice, funding, and communications. From a total of 549 training participants in 2023, 106 returned post-engagement evaluations (a response rate of 19%). Aside from influencing and streamlining the design of future capacity building resources developed by PREP4BLUE, these periodic surveys provided an insight into the challenges being experienced by the emerging Mission Ocean & Waters citizen engagement

[6] Episodes can be found here: https://prep4blue.eu/portfolio/prep4blue-citizen-engagement-webinar-series/. Accessed 15 December 2023.

community of practice as Phase One of the Mission - “Developing and Piloting (2022 – 2025)” advanced.

3.4 Interviews with participants/representatives of aquatic citizen science initiatives

Over spring and summer 2023, interviews were carried out with aquatic citizen science initiatives from across Europe. The aim of the interviews was to share perspectives and recommendations for others starting or running aquatic citizen science projects. These were selected from a database of 1000 aquatic citizen science initiatives built by the PREP4BLUE team (eventually published open access as an interactive resource on the “WaveLinks" platform[7]). As a preliminary step, the initiatives on the database were invited to participate in a short survey to assess the state of aquatic citizen science across Europe, of which 98 responded (roughly 10%), indicating that they were open to participating in a follow-on interview. From these, 14 interviewees were selected based on project topic, project scope, project duration and whether there is a remarkable facet to the project that might be interesting to discuss further.

In all, 14 semi-structured interviews of approximately one-hour were held via video conferences. These covered various themes (biodiversity, plastic pollution, historical climate change, coastal dynamics, entanglements in small-scale fisheries, and more). By choosing a semi-structured interview, a backbone of questions was set, but the conversation was allowed to go where the interviewee led it. This also allowed flexibility for the interviewer to ask additional questions if a certain topic seems interesting or relevant to the project.

To extract usable information from these interviews, qualitative inductive coding was used, executed in the coding program “Taguette”. In this coding method, the qualitative data is the starting point of the coding process. From there, a ground-up approach is used to derive the codes from the data instead of starting with preconceived notions of what the codes should be. The codes used in the analysis are deducted along the way and allow the narrative of the coding to emerge from the raw transcribed data itself. The themes arising guided us to the parts of aquatic citizen science that needed extra information or guidance. During the interview analysis, interesting quotes supporting a reoccurring finding were kept separate to include in the report. All interviewee quotes are anonymised. The full results of PREP4BLUE’s surveys and interviews of European aquatic citizen science were published in the report *Beneath the Surface* (Debaveye et al. 2023).

4. Results

This section presents the results of the research described in section three, highlighting four citizen engagement-based challenges that the Mission faces, and how PREP4BLUE has engaged with them. This section is organised around four results themes in a continuous and integrated manner that emerged through the application of the mixed methods approach and the triangulation of similar results derived from different methods. For clarity, the different methods used to garner the data in question will be mentioned in text at various points.

[7] https://wavelinks.eu/ Accessed 27 March 2024.

4.1 Encouraging inclusivity and building community

One of the four headline commitments of the European Green Deal is to "help ensure a just and inclusive transition[8]." This ambition to increase social inclusion is apparent across the Mission, largely through its funding calls, and as inclusion is referenced during proceedings at Mission events. For example, a Mission Ocean & Waters Horizon Europe call for the 2021-2022 period stipulated that "[p]rojects should actively involve local stakeholders along the value chain, such as fishermen, SMEs and start-ups and relevant commercial actors, marine planners, coastal area inhabitants, local governments, indigenous groups, NGOs" (Horizon Europe – Work Programme 2021-2022 Missions, p. 198). A review of Mission Ocean & Waters documentation, funding calls, and speeches at Mission events demonstrate that gender, youth, indigenous groups and non-coast dwellers are four groups that the Mission explicitly aims to include in activities.

In practice, the EC advances these ambitions principally through the provision of finance through various instruments and funds, and by having its officials promote awareness of the Mission at Member State level and across the different branches of the EC. For instance, from 2022-2030, Horizon Europe is funding several transnational, multi-partner projects under the Mission Ocean & Waters framework. Examples of these include OCEAN CITIZEN[9], which is working with communities to develop participatory approaches to marine forest regeneration, including the establishment of "underwater gardeners" as a new profession; C-FAARER[10] is developing community-driven business models for regenerative ocean farming.

Inclusivity is an example of a theme that is shared by both the Mission and the Ocean Decade. For example, in the Vision 2030 White Paper (UNESCO 2024), the United Nations Educational, Scientific and Cultural Organisation (UNESCO) commits itself to much greater integration of indigenous knowledge and techniques into scientific research. This aligns with both the intersectional approach and Post-Normal Science's focus on the plural nature of knowledge. Both the Ocean Decade and the Mission are concerned with scientific investigation and knowledge production. However, the Mission's remit and activities go beyond this, extending into explicitly encouraging and funding political activity. This is especially true of direct democratic processes that are connected to Mission activities, as is clearly visible in the multiple Mission-funded projects that undertake activities in this area (PREP4BLUE and BlueMissionAA are two of many examples).

There is very often space made at high level Mission events for a youth ambassador or a youth representative of a relevant advocacy group to share the stage alongside European Commissioners or national-level politicians. However, the nature of their participation has sometimes been criticised and the extent to which these efforts at encouraging inclusion and diversity are successful can be called into question: In June 2022 at the outset of the Mission, the EC organised an event in Marseille, France, titled "How to engage with the Mission 'Restore our Ocean and Waters by 2030' ". In an effort to include young people, a "torchlight initiative" was organised, in which four youth ambassadors wore Mission Ocean & Waters t-shirts and were invited to hold torches aloft for an hour behind EU officials as they gave speeches[11]. Young people included in Mission events have at times provided negative feedback about the quality of their role. The torchlight initiative is remembered in the Mission Ocean & Waters community as a more tokenistic attempt at fostering inclusion, and other

[8] 'What is the European Green Deal', factsheet available at https://ec.europa.eu/commission/presscorner/api/files/attachment/859152/What_is_the_European_Green_Deal_en.pdf.pdf. Accessed 15 December 2023.

[9] https://oceancitizen.eu/. Accessed 12 August 2024.

[10] https://www.c-faarer.eu/. Accessed 12 August 2024.

[11] A video of the initiative is available here: https://www.youtube.com/watch?v=6pi5A233Z-g. Accessed 5 April 2024.

efforts have been successful to different degrees. Sections 4.1.1 and 4.1.2 present results of PREP4BLUE's research into these efforts in more detail.

4.1.1 Gender inclusivity

Many of the economic and cultural activities associated with Mission Ocean & Waters (fishing, aquaculture, energy) have traditionally been male dominated. At a superficial level, however, the persistence of male dominance is difficult to spot within the Mission Ocean & Waters community. Surveys of attendees of PREP4BLUE's various training series and workshops consistently point to the dominance of women (usually within the 60% - 80% range, see Fig. 1). Go to any large Mission Ocean & Waters or Ocean Decade event and you will find that the audience is at least 50% women, if not higher. However, the ratio of male to female participation at different levels shifts dramatically depending on the role. While women tend to dominate attendance, men are much more likely to be the political representatives that open conferences, lead panels, represent fishers, and other roles that are presented as key stakeholders. For example, an analysis of the gender of speakers at the launch of the Mission's Atlantic and Arctic Lighthouse in Cork, Ireland, 2022, showed that just 26% of the speakers were female. To give credit to the EC, attempts at greater gender parity of speakers are usually visible from analyses of conference agendas. The issue is that, at all these events, there are many last-minute changes to speakers as politicians get dragged in other directions. This has often resulted in a female politician being replaced by their male spokesperson.

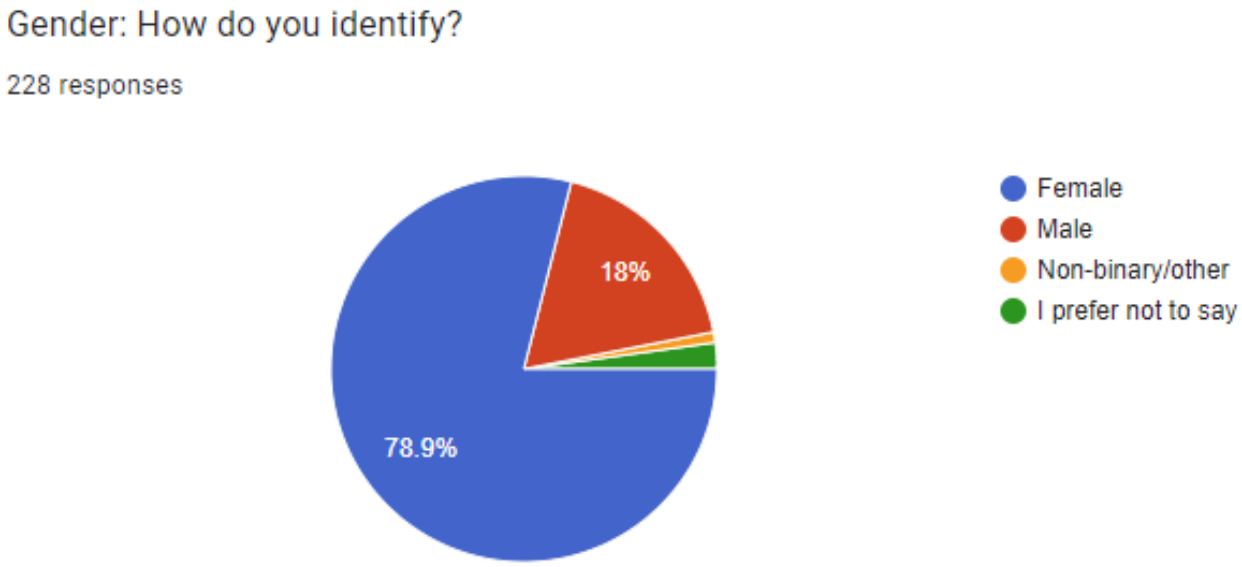


Fig. 1 *A graphic depicting the gender division among attendees of PREP4BLUE's spring 2024 citizen engagement training series. 60% - 80% female attendance was observed across several surveys of participants of PREP4BLUE project activities*

4.1.2 Inclusivity in a broader sense

Inclusion by age and gender is a start, but other intersectional aspects of identity such as ethnicity, [dis]ability, sexuality, language, and others, differently alleviate or exacerbate individuals' experiences of inclusion. There are great examples of projects from across Europe that explicitly design inclusive programmes to connect people marginalised in different ways to their ocean and waters. For instance, the Dutch citizen science project "Water Rangers Twente" focuses on the creation of mental maps of inland waters in Almelo, working exclusively with refugee children and making them acquainted with the macrobenthos community of their local ponds. However, initiatives that explicitly design inclusivity into their project plan from the outset tend to be the exception and not the rule. In PREP4BLUE's survey

of aquatic citizen science initiatives from across the continent, 65% of respondents said that they did not explicitly aim to work inclusively. This is very often the case with such initiatives – everyone is welcome to join, but the majority do not actively target groups or try to ensure diversity among their memberships.

PREP4BLUE has developed several capacity building resources on how to increase social inclusion in Mission activities, from project co-design through to implementation[12], as well as offered travel grants for event attendance to small scale networks and non-funded individuals. This was to ensure the participation of those other than funded scientists and policymakers. Such a focus on the underrepresented is certainly warranted. For instance, a keyword search for "refugee" or "asylum" in the Mission's Implementation Plan returned no results, even though migration and associated humanitarian issues are major contemporary concerns around the Mediterranean.

4.2 Increasing Ocean and "Mission" literacy

In 2020, as the shape of Mission Ocean & Waters was still being finalised, Pascal Lamy, chair of the Mission Board, identified one key challenge that the Mission would have to overcome – "the gap between the importance of oceans and waters on one side, and the very little knowledge and emotional connection that many people have with this, on the other" (EU Science & Innovation 2020; see also European Commission et al. 2021). Bridging this emotional gap is essential to guarantee the support for the Mission beyond coastal areas. The fact that "[e]very second breath comes from the ocean" (Gonzaléz 2017), and the other essential hydrological roles that it plays, are not widely known. In 2017, the BBC released Blue Planet 2, a series narrated by naturalist David Attenborough. One episode included a particularly sad scene concerning dolphins. Following this release, dolphin advocacy groups noted a marked uptick in the level of donations that they were receiving. In their recent update to the ocean literacy concept, McKinley et al. include "emoceans" as one of ten ocean literacy dimensions to acknowledge the increasing evidence "which recognises the fundamental role of emotional connection, including empathy, apathy, fear, enthusiasm, etc., in driving behaviour change" (McKinley et al. 2023, p. 4). Ocean literacy initiatives of many forms have been identified as essential activities that motivate people to act, as evidenced by their inclusion in the Mission's citizen engagement Expected Outcomes. In what is a clear indication that the Mission Secretariat has identified this need to engage the hearts and minds for the improvement of ocean health, James Honeyborne, director of Blue Planet, has given presentations at Mission events alongside EC officials (EU Science & Innovation 2020, for example). The Mission therefore has two challenges in this regard: (1) to increase awareness and value of the Mission itself – we could call this "Mission literacy" – and (2), to increase ocean literacy generally across the population.

In the early years of the Mission, the lack of awareness and understanding of the Mission across Europe's population has proved challenging to immediately overcome. In contrast to the Apollo programme's immediately graspable proposal to send humans to the Moon, the Mission and its objectives are perhaps less tangible (and exciting). Anecdotally, by 2024 – three years since the launch of the EU Missions – those working directly on Mission Ocean & Waters encountered little or no knowledge of it among some EC officials unconnected with the programme, some researchers whose work was highly relevant to Mission activities, and widely across the general public.

The ability to communicate successfully with citizens was highlighted as a major barrier by key Mission stakeholders in our pre-engagement survey of Mission actors across research and innovation, advocacy, policy, and industry. 18% of respondents cited "lack of sufficient means of contacting citizens" as a barrier to their work. When asked the open question "Overall, what is your number one need in terms of engaging citizens", 30% of responses were grouped under the theme named

[12] Examples of social inclusion resources can be found as webinars on PREP4BLUE's website. https://prep4blue.eu/portfolio/prep4blue-citizen-engagement-webinar-series/. Accessed 23 May 2024.

"connecting and amplifying". This was second only to lack of resources. To overcome this obstacle, effective communication strategies are imperative.[13]

To this end, several projects have founded a Communications Collaborative. In the beginning this comprised of representatives from PREP4BLUE and the Mission Implementation Support Platform (MIP Ocean) and from the Coordination and Support actions that oversee the four European sea basin Lighthouses (BlueMission AA in the Atlantic-Arctic region, BlueMissionMed in the Mediterranean, BlueMission BANOS in the Baltic and North Sea region, and EcoDalLi in the Danube and Black Sea region). This group has ultimately expanded as more Mission-funded projects have launched. Its overarching aims are to overcome communications challenges collaboratively, identify different target audiences and different approaches required, ensure Mission communications are consistent, and to provide a direct link to the EC to expedite this work.

PREP4BLUE devised pilot initiatives to help Europeans develop the emotional connection desired by the Mission. These initiatives included a Mission Ocean & Waters Communication Strategy, the website missionoceanwaters.eu, the Mission's social media channels, and a Digital Academy for training people to communicate about the Mission successfully. They were designed to increase Mission and ocean literacy at once, by enhancing recognition, awareness, and understanding of the Mission, foster trust in its efficacy, communicating the critical role played by the ocean and waters to life and European society, and promote opportunities for citizens' participation. These have been targeted at citizens in general and also at research & innovation, policy, industry, and civil society stakeholders.

The Mission Secretariat (the governing body of the Mission composed of EC officials) itself has devised different strategies for increasing Mission and ocean literacy. In 2022 it launched the Mission Ocean & Waters Charter. This is essentially an action endorsement mechanism which can also be used for clustering regional actions or providing networking and support opportunities for signatories. To counter the lack of awareness of the Mission and its value across the upper echelons of the EC, in February 2024 the Mission Secretariat organised for a large group of Charter signatories - islands, ports, municipalities, projects, companies, and more - to attend a session in the European Parliament's Brussels building. This was an opportunity for Members of the European Parliament (MEPs) to listen to the catalysing effect that the Mission was having and the innovation it was driving across Europe. Only a handful of MEPs were present on the day, so while this was quite a milestone in the Mission's timeline and represented a tangible connection with European lawmakers, it was merely a beginning, and more work will have to be done to maintain the political support needed to guarantee the funding streams required.

Almost all Mission-funded activities seem to have at least some role in increasing ocean literacy. That may be by supporting the development of national ocean literacy networks (PREP4BLUE), or doing outreach and education activities to explain the nature of the various activities to the general public. Some projects such as PROBLEU[14] promote ocean and water literacy across schools and develop teaching aids. TIDAL ARTS develops the role of the arts and cultural sectors in supporting the Mission. It does this by funding Mission-focused participatory arts residencies across Europe and by offering ocean literacy resources for artists. That is not to mention the thousands of ocean literacy education and advocacy initiatives that were already or are now active across the continent outside of the official Mission Ocean & Waters umbrella. In all, there is a lot of varied activity aimed at increasing Mission and ocean literacy aimed at diverse target groups from school children to European policymakers.

[13] A detailed description of the results of this survey are available at: https://prep4blue.eu/portfolio/results-from-prep4blues-survey-on-citizen-participation/. Accessed 5 April 2024.

[14] https://probleu.school/. Accessed 12 August 2024.

4.3 Different experiences and infrastructures of citizen engagement in the different EU regions/Member States

The EU's 27 Member States are culturally diverse and have very different institutional and political histories. Experience with and infrastructures of public participation in each State, including in aquatic matters, differ across the continent (European Commission 2023b). While some, such as Ireland and Denmark, have formalised direct democratic processes that feed into policy production or constitutional change, others have favoured a state-controlled approach to policy making and governance, with minimal or no formal avenues for civil society's participation. In the early years of the Mission (2022-2024), Mission project representatives and interview participants from certain regions (such as the Danube and Black Sea area of eastern Europe) cited this relatively low level of coordinated participatory frameworks as an early challenge to engaging with stakeholders both systematically and impactfully.

Such a reality requires Mission initiatives to develop flexible, culturally and historically informed approaches to supporting citizen engagement across the EU. This became particularly apparent in the PREP4BLUE team's contrasting experiences of conducting engaged research to support the development of national level ocean literacy networks in different Member States.

In Ireland, the Irish Ocean Literacy Network (IOLN) was established in 2016 to build on the all-island network that was developed during the EU project Sea for Society (Sea for Society 2015). Following the project, an informal national-level body was formed. Since then, the IOLN has brought together around 150 members representing individuals, community groups, industry, research, semi-state and other state agencies. Under the guidance of a voluntary board, the IOLN Secretariat supports collaboration opportunities between the Network members and provides a platform for engagement with relevant stakeholders via facilitation and promotion of regular networking events and workshops. From June 2022, PREP4BLUE enabled IOLN to secure regular human resource support to the Network up to May 2025. With this help, in autumn 2023, IOLN formalised itself as a Company Limited by Guarantee, transforming into an official not-for-profit organisation.

In Italy, Ocean Literacy Italia (OLIta) had a similar genesis in terms of timeline, founding membership profile, and mission. It was also founded in 2016, through the collaborative efforts of researchers affiliated with public institutions, universities, and science outreach associations, in the form of an association of citizens. Since then, however, it has struggled to develop. By Autumn 2022, the prospect of network closure loomed due to insufficient funding, limited activities, and a shortage of volunteers. Despite the unwavering commitment of core members, unresolved issues persisted: conceived as a grassroots movement without official institutional commitments, OLIta encountered difficulties securing commitment from researchers, limiting dedication primarily to those directly involved; its registration as a legal entity was only affected in the minimal terms of a non-profit association of citizens; and the lack of formal employees meant that OLIta's activities relied on voluntary contributions without official recognition; other forms of recognition, like valorisation within the Third Mission activities of the Home Institutes, were also prevented by the absence of an official institutional umbrella. In Autumn 2022, the Italian National Research Council (Consiglio Nazionale delle Richerche, CNR), a PREP4BLUE partner, approached OLIta to support it as a pilot in PREP4BLUE activities. Over three months, a comprehensive evaluation ensued, leading to a unanimous agreement among association members and CNR involved staff that the OLIta network could no longer be sustained in its current form, and that the project had to be refocused.

PREP4BLUE staff at CNR decided to launch a call to institutions, associations, and companies that deal with marine and freshwater engagement at various levels. The aim was to enlarge the Italian hub

of the pilot action on a healthy plastic-free Mediterranean Sea[15] of the EC's Initiative BlueMed, and to promote research and innovation for blue growth and jobs in the Mediterranean Area (the leading project was coordinated by CNR). PREP4BLUE's proposal was focused initially as a purpose-oriented collaboration, to collectively think, plan and jointly realise a communicative action for World Ocean Day 2024, taking into account the diverse contexts, backgrounds and concerns of the engaged actors, as a catalyst for network growth under the banner of BlueMed and with CNR's institutional support. The action is still ongoing at the time of writing, but the first meetings have revealed an interest, both in awareness-raising actions, and training events for volunteers, in order to fill a perceived gap in knowledge and feasible actions in the national context.

What is presented here are the divergent results of supporting two seemingly similar initiatives across similar time periods in two different cultural and historical contexts. Section 5.3 will discuss how social scientific approaches might help us to make sense of this divergence, and how this ought to influence future project design.

4.4 Shallow and uneven coverage in citizen engagement across Mission-relevant activities in places

Even within each Member State, the quality and depth of citizen engagement across different Mission-related activities varies highly. Furthermore, the levels of citizen engagement diverge significantly depending on the sectors in question (e.g., industry versus academia) or the specific theme with which different activities engage (e.g., pollution versus aquatic species). These divergences and the challenges that they pose are especially apparent in the aquatic citizen science space across Europe. Aquatic citizen science is certainly not a new field but has been around for decades (Vohland et al. 2021). However, based upon the research leading to PREP4BLUE's inventory of almost 1,000 initiatives and surveys undertaken with a subset of these, we can demonstrate a clear exponential growth in the number and scope of the projects, with the majority started in the past ten to fifteen years (Fig. 2).

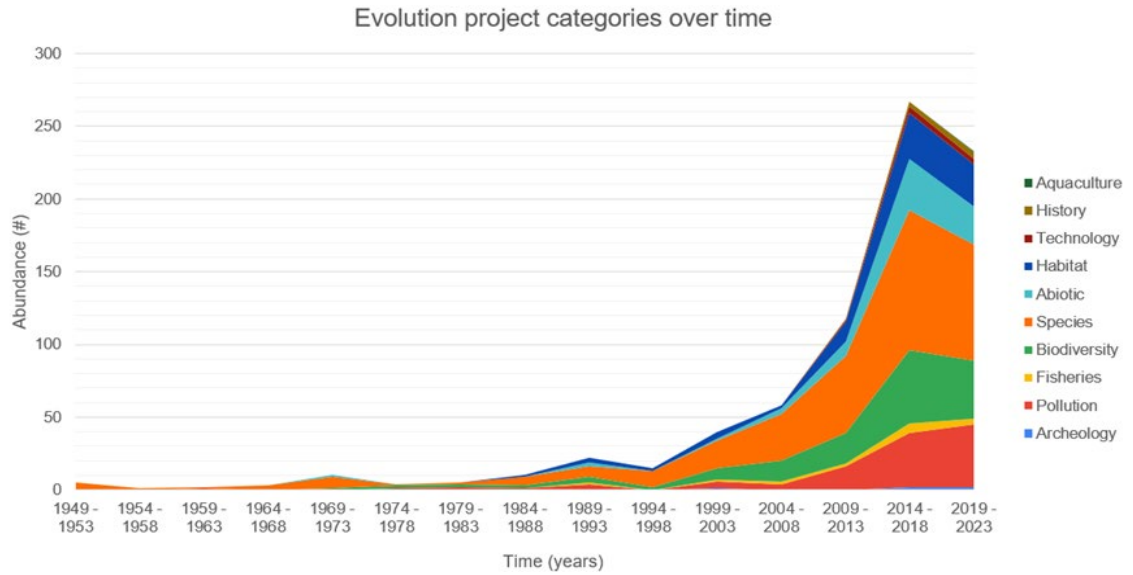


Fig. 2 *Number of newly started aquatic citizen science projects, per topic (1949-2023). Figures are derived from PREP4BLUE's survey of the aquatic citizen science inventory consultable on WaveLinks.eu (Credit: Line Debaveye, VLIZ, 2023)*

[15] http://www.bluemed-initiative.eu/pilot-action-on-a-healthy-plastic-free-mediterranean-sea/. Accessed 23 April 2024.

4.4.1 Bias favours certain themes

However, the research demonstrated a very strong bias towards projects related to biodiversity and species, and to a lesser extent around litter. Most common are citizen science actions dealing with species (41% - focus on marine mammals, birds, and fish species), biodiversity (19%), pollution (14% - beach clean-ups, water quality assessments and research on marine plastic litter) and to a lesser extent habitats (10%) (Fig. 3). For instance, there are almost no projects that directly engage with climate change in or by the ocean. It is also noteworthy that when coordinators of active projects are asked which topics they consider most needed, they again refer to biodiversity and waste.

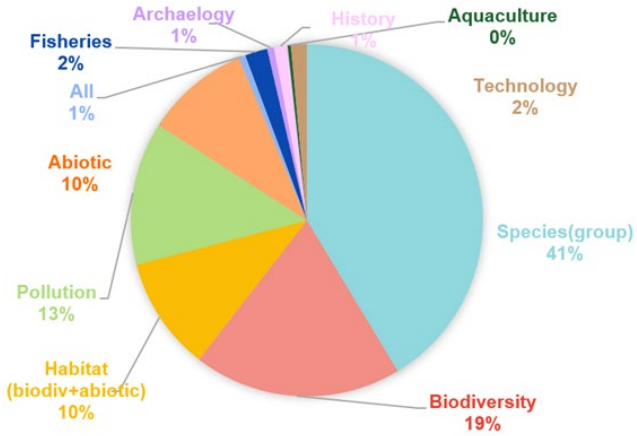


Fig. 3 *An analysis of almost 1000 aquatic citizen science projects (ranging from 1949 to 2023) shows a clear bias towards topics such as" species", "biodiversity", and "pollution" (Credit: Line Debaveye, VLIZ, 2023)*

The connection between inland water bodies and the ocean – although prioritised by the Mission - is also seldom made. Projects typically narrow their attention to either marine or freshwater environments, lacking a holistic approach that encompasses both.

4.4.2 Engagement rather superficial; coordination by usual suspects

The WaveLinks aquatic citizen science database[16] also demonstrates that most of the projects have an engagement level that is rather superficial (Fig. 4). Only a minority of the projects (12%) give citizens the chance to engage in the problem definition, the set-up of the methodology and/or the data collection process ("participatory science"). And only 1% of the projects include citizens from the very beginning, creating the project together ("extreme citizen science"). This contrasts with the ambitious objectives of the Mission, which state that deep public engagement is necessary to achieve a trend change in how humanity treats the ocean and the Post-Normal issues that solving these problems must deal with.

[16] https://wavelinks.eu/explore/citizen-science. Accessed 16 May 2024.

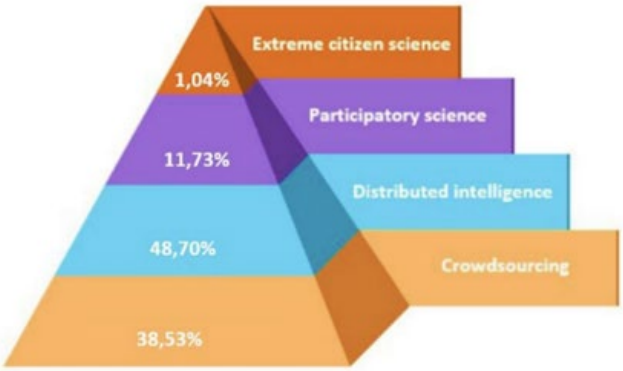


Fig. 4 *Pyramidic representation of different engagement levels in citizen science. Ranging from the lowest form of participation, crowdsourcing (39%), to the highest level of engagement, extreme citizen science (1%) (based on van Hee et al. 2020). Percentages calculated from the aquatic citizen science projects captured in the WaveLinks database (Credit: Line Debaveye, VLIZ, 2023)*

Growth potential also exists by advocating more initiative from groups other than the usual suspects. When investigating the various sectors from which aquatic citizen science projects, listed in Wavelinks database, the most frequently found today are NGOs (38%), communities of people (e.g. clubs or associations - 19%), research institutes (13%) and universities or colleges (12%). Sectors such as policy (10%) or industry (3%) are rather scantily represented (Fig. 5). To foster behavioural change in society, these sectors can be at the base of a sustainable and long-term transition. In these fields, numerous opportunities are left unseized. *Scivil* - The Citizen Science Knowledge Centre (Veeckman et al. 2021) stresses the importance of governmental bodies getting involved in citizen science. On three levels, advantages for local authorities are created by implementing a citizen science approach. New insights can be gained from the legitimation of citizens' knowledge, generating valuable data to support, discuss or enforce certain policy choices. Next to this, involvement of citizens in important policy themes can contribute to general support for topics such as water quality, climate, biodiversity, and so on.

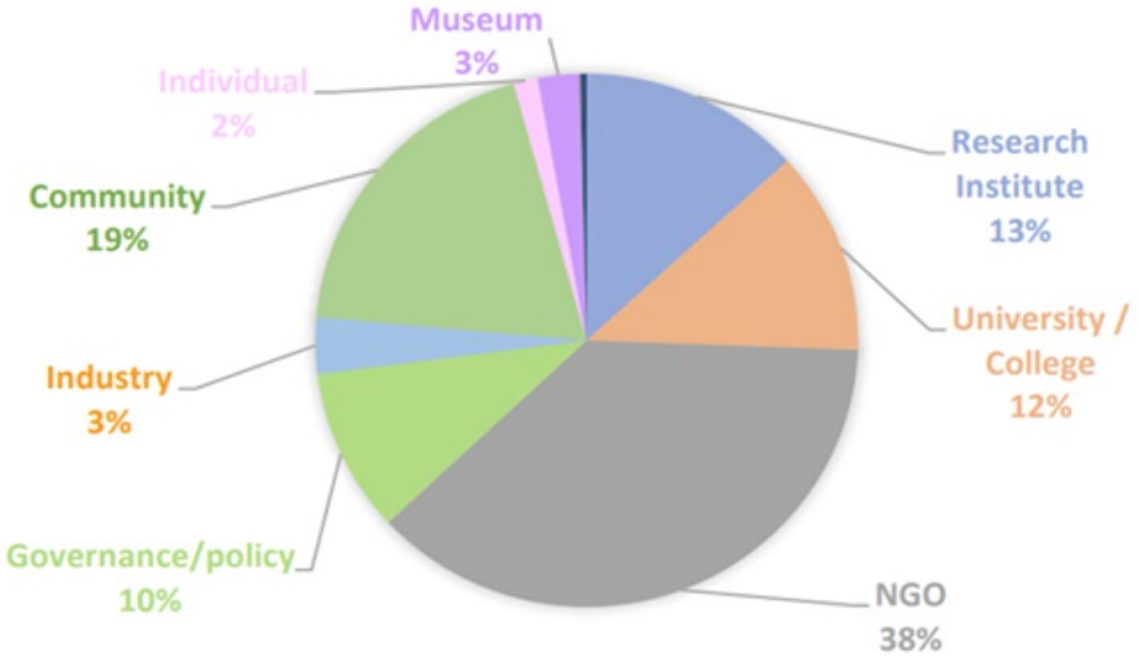


Fig. 5 *Analysis of the aquatic citizen science database on Wavelinks (including projects ranging from 1949 to 2023) reveals that the general project leads in Europe are often represented by NGOs, communities, research institutes and universities or colleges (Credit: Line Debaveye, VLIZ, 2023)*

5. Discussion

5.1 Achieving deeper inclusivity and diversity

The Post-Normal commitment to co-creating innovative policy and technological solutions through the integration of knowledge produced and validated by an extended peer community is clearly visible in its emphasis on the need for broad acceptance of the Mission, and the inclusiveness of its activities. The Mission is designed so that the environmental targets are met through social and political transformations. In its use of language and presentation, the EC itself ties the Mission to its longer-term mission of community building and the development of "European" identity through its activities (Bellier & Wilson, 2000). During participant observation undertaken at the Atlantic-Arctic Mission launch event in Ireland in 2022, John Bell, Deputy Mission Manager, framed the overall aim in these terms:

"The EU is about doing together what is impossible apart. This Mission isn't supposed to do what can be done; it's supposed to do the impossible. With the EU we have made peace in many ways before: First it was with coal and steel; Then reconciling the continent; then through building the single market. Now our latest Mission is to make peace with nature."

The deeper purpose of the Mission is clearly that as European waters are healed, a more unified, content, empowered European community will be created. The explicitly political and Post-Normal foundations of the Mission's Public engagement Cross-Cutting Enabler is further evidence of this. However, it is clear from the above that there is significant work ahead – in dealing with low levels of inclusion of some groups, providing meaningful roles and tasks when increasing inclusivity, and reaching target groups that have not yet been as thoroughly engaged as others.

Gender inclusion has been an area most explicitly targeted so far in Mission activities. Women across Europe still experience exclusion in sectors like fishing, aquaculture, and energy, and this gendered dynamic in ocean-related spaces and roles must be addressed to achieve inclusivity and diversity. This gender disparity is particularly pronounced at sea. However, it is crucial to acknowledge that women have historically played vital roles in sustaining coastal communities and marine industries through their reproductive and productive contributions on land (Szaboova et al. 2022). The critical roles that women play in creating and maintaining communities relevant to Mission Ocean & Waters, including those listed above but also research and innovation, marine policy, and many more, are apparent yet not always equally rewarded or visible at all levels of Mission activity. Accordingly, to appreciate gender inclusivity in Mission related issues, it is essential to focus on the right level of analysis (context, activities, specific tasks undertaken by or allotted to women, definitions of "key" stakeholders, and so on) and use a gender sensitive approach to the object that is studied. Much more effort is required too to increase the gender balance across different levels of participation in Mission activities, from attendance, organisation, invitations to speakers, and jobs across different marine sectors. While this is not an issue owned just by the EC but is pervasive the world over, it is certainly an issue that the Mission can tackle through careful organisation and by going to greater lengths in future to assemble high level teams that are more representative of its largely female community. Doing this with a keen eye on eliminating tokenism as much as possible will be necessary. Reference to ladders of participation and analysis of depths of participation will help to ensure the meaningfulness and value that different roles entail.

Addressing the diverse socio-economic profiles of EU Member States poses another significant challenge to inclusivity. Activities that prove successful in one region may be unfeasible or ineffective elsewhere due to disparities in resources, education systems, and community backgrounds. Moreover, the Mission's impact extends beyond EU borders, necessitating a consideration of how EU ocean

policies affect global citizens. Engaging with neighbouring regions and fostering collaboration through frameworks like the African, Caribbean, and Pacific Group of States (ACP) and the Galway and Belém Statements (that commit to cooperation on Atlantic Ocean research between Europe, North and South American states, and African states) is essential for ensuring inclusive and equitable outcomes on a global scale.

Tailoring support mechanisms and strategies to accommodate regional variations is essential to foster meaningful participation from all communities. Engaging with Post-Normal Science's emphasis on the plurality of knowledge will also help the Mission to identify ways to incorporate alternative epistemologies (local, indigenous, embodied, practice-based) into Mission-related initiative designs. In contrast to the Mission's Implementation Plan, the Ocean Decade's Challenge 10 (Restore society's relationship with the ocean) Whitepaper explicitly identifies indigenous knowledge as an additional knowledge source, and actively calls for the support of not only science that is inclusive of indigenous knowledge but is also led by indigenous actors (Glithero et al. 2024, p. 6).

This deeper attention to the plurality of knowledge and the different actors that might create it would further strengthen the Mission's efforts at engaging a diverse set of citizens. So far there has been quite a visible focus in Mission activities, events, and documents on gender, youth and geographic inclusion, but applying intersectional theory to Mission initiatives shows that there are diverse lived experiences of individuals and groups (Valentine 2007) outside of these that affect likelihood and experiences of participation – ethnicity, being a member of a minority, sexuality, disability and so on. There are numerous examples of water or ocean-related initiatives across Europe that engage with these intersections very well – "Abecedarium" in Italy, for instance, has worked with deaf students to develop a dictionary of sign language to do with marine features[17]. Identifying and explicitly funding more inclusion-related activities would increase the Mission's reach and value across European society. In terms of minorities and migration, our results suggest that a frank appraisal of where the Mission's priorities lie might be required, underscoring the need for a more comprehensive approach to inclusion from policy through to implementation.

Dealing with these intersections of identity and challenge are part of the complexity through which Post-Normal Science must work. To leverage an extended peer community and work inclusively is no easy task given the diversity of human experience and stakeholder needs. We argue that it is important to always take a critical perspective in Mission activities and to question, for example, who are the winners and losers when Marine Protected Areas are designated, or who actually participates (and who is excluded) when the "open invite" approach is used, how can those other than are usually reached by initiatives be included, which groups are affected by Mission activities, and which of those are not being reached? Assuming that anyone can enter and meaningfully participate in Mission-related initiatives, debates and so on, ignores the way that inequitable intersectional relations influence democratic processes, thus requiring a critical lens on the concept of participation.

One of the criticisms of the Apollo Missions was that they were sucking up a huge amount of public funding at a time when the US was experiencing stark inequalities that were especially visible along race lines (Nelson 2011), and swathes of US society did not feel included in the contemporary vision for American society. The commitment to inclusivity in the EC's Mission programme could be seen as a remedy to the shortcomings of its progenitor. The Mission's citizen engagement Expected Outcomes create a context of activity that aims to distribute understanding, activity, and responsibility for European aquatic ecosystems and resources across European society. If successful, this would work towards countering the "top-down" or "developer-led" critique that has been levelled at Blue Economic development in the past (Blythe et al. 2023). This may help to offset possible opposition to the novel

[17] https://www.ocean-space.org/activities/abecedarium-loceano-in-lingua-dei-segni. Accessed 01 August 2024.

policy framework if the Mission's activities are welcoming and accessible, and if the benefits and disadvantages of the sustainable transformation of European waters are fairly distributed.

5.2 Moving from Mission awareness and emotional connection, to sustained engagement

Mission Ocean & Waters is certainly not the first initiative to recognise the crucial role of increasing ocean literacy in transforming the health of aquatic ecosystems. Instead, the role that has developed for the Mission is to gather the excellent tools, resources, talent and science that supports ocean literacy and build the Mission framing around it. The hope is that this provides the sense of shared challenge that captured US society's imagination during the race to the Moon. This is where "Mission literacy" comes in: The EC seems to be equally as keen to promote the Mission itself as a shared European endeavour – a role it sees as essential as increasing ocean literacy if the ambitious targets of the Mission and the EU Green Deal are to be achieved. In its first three years of activity, the Mission has equipped itself with a wide array of resources and actions for developing ocean and Mission literacy together across different audiences.

By infusing European ocean literacy efforts with the Mission framing, increasing ocean literacy similarly takes on the social and political dimensions of Mission activity. When taken together with the broader participatory aims and philosophy of the Mission, its vision in terms of fostering ocean literacy seems to be a European citizenry that is *aware* of the importance of aquatic ecosystem health (see European Commission et al. 2020; p. 17-18), *capacitated* to engage with solving identified issues, *enabled* and *responsible* for co-managing activities and processes of protection and restoration, and, ultimately, becomes more *unified* and *European* through these efforts. Taken together, this proposes a Post-Normal solution to Post-Normal problems. By educating and integrating citizens into the governance structures of Europe's waters – for example, through EU-wide ocean literacy campaigns and participatory processes to set up and manage Marine Protected Areas (two of the Mission's citizen engagement Expected Outcomes) – the EC attempts to reduce the distance between governors and governed, or policymakers and those affected by policy decisions. The report *Governing Missions in the European Union* (European Commission et al. 2019) is explicit in this regard.

The emphasis on establishing an emotional connection with the ocean across European society is interesting from the point of view of new understandings of ocean literacy itself. Coined in 2004 and having begun life as quite a hydrological concept, one of critiques of the original ocean literacy movement was that it was too focused on a Western, academic notion of knowledge, and that there is in fact a variety of ways – embodied, emotional, non-Western scientific – that one can "know" the ocean (Worm et al. 2021). It appears, then, that the Mission is tackling ocean literacy and communicating its aims using a relatively well-rounded approach. This will aid its efforts to support inclusivity and accessibility.

This resonates with Post-Normal Science's recognition of the need to include the knowledge of the people affected by science and policy in research, in order to reach shared and robust decisions. By engaging citizens' emotions as a means to stimulate action and encouraging citizens to lend their knowledge and take part in its implementation, the Mission reveals connections between Post-Normal approaches to science and conceptions of environmental citizenship from political science. These highlight the effects of human politics on the environment and the responsibility of citizens to engage in sustainable practices derived from these (Dobson 2003). Conceptions of marine citizenship – "the right to participate in the transformation of society's relationship with the ocean, and acceptance of responsibility to make informed decisions and choices about personal and collective actions" (Buchan et al. 2023; p. 1), and their relationship to senses of belonging and rights derived from relationships with ocean spaces (Whyte 2019; Lobo & Parsons 2023) are particularly relevant here. Mission policy

and activity appears to be designed to engage with the uncertainty and complexity of Post-Normal problems in such a way as to encourage deep, emotional connections between European communities and aquatic spaces, while at the same time increasing awareness of the Mission itself as a shared European project.

While it is a shared project, this should not equate to universal or monolithic. Remembering the recent calls for ocean literacy to recognise diversity in ways of knowing the ocean, the Mission ought to leave space in its messaging for various different traditions of connecting to European waters. This is one of the areas where the Ocean Decade is stronger – at least in policy – than the Mission. The Ocean Decade very explicitly aims to integrate traditional ecological knowledge into the science that supports it, for instance by calling for "fund[ing] and support [for] indigenous-led research toward effective codesigned and integrative science" (Glithero et al. 2024, p. 13). In developing communications pathways and resources to establish an emotional connection between people and Europe's Ocean and waters, the Mission must therefore be careful not to repeat the mistakes of the original ocean literacy movement: people's identification with and emotional responses to the ocean derive from a huge diversity of life experiences (Buchan et al. 2024). The messaging, media, and voices chosen to increase Mission literacy ought to reflect this. Efforts on social media, at science fairs, and in classrooms will have to be joined by television, art galleries, traditional food events, and citizen science that integrates traditional practices at the coast (Citizens of Surf, affiliated with the Ocean Decade, is a great example of one of these. It is a citizen science initiative investigating ways of using surfers' equipment and knowledge of surf breaks to collect data on coastal waters).

Effective communication is essential for overcoming epistemic and emotional gaps that exist between Europe's citizens on the one hand, and Mission Ocean & Waters and the challenges facing aquatic ecosystems on the other. The expansion of forms of communication is visible every year that the Mission progresses. Ensuring that the voices, languages, and ethnic/cultural backgrounds of those represented in communications are equally diverse ought to be another area of focus.

5.3 Cultural and historical sensitivity for understanding divergent experiences across Member States

It is difficult to attribute the divergent experiences of supporting ocean literacy network development in different EU Member States described in section 4.3 to any one factor. However, social scientific approaches, together with sustained and early engagement with the local stakeholders themselves, revealed important differences in institutional, cultural, context-related and bottom-up environmental action that ought to influence project designs in different cultural and historical contexts.

In Ireland, the model of community-led, volunteer-dependent organisational structure has a very long history. Its foundations date back to the 1930s when the fledgling state expressed its independence from (Protestant) British rule by instituting a Catholic ethic in its institutional design. Muintir na Tíre (People of the Land) was the first independent development institution to be established in 1931. It officially endorsed the recent papal encyclical Quadragesimo Anno, which, wary of secular communist uprisings across Europe, argued that the state should only play a subsidiary role in social life, and instead promoted communities and families as the primary social and political units (Devereux 1993; Whyte 2020). This is precisely the model that developed, and which largely still characterises social provision and vocational activity in Ireland to this day, in which the state is often a funder but not the primary provider. During research undertaken by one of the authors (Whyte) into Irish grassroots and community organisations in Ireland, it was noted how foreign visiting researchers and practitioners were amazed at the level of voluntary activity across Irish communities and community-facing organisations, who apply for funding for and project manage much of the activities that in other European countries are usually delivered directly by the state (everything from the

provision of sand dune restoration measures, children's playgrounds, and social inclusion supports). As such, the informal, volunteer-led framework that characterised IOLN's early years fit within a model of bottom-up environmental action with which Irish individuals, organisations and the state were accustomed to dealing.

Contemporary voluntarism and grassroots activity in Italy are similarly derived from a Catholic ethic, – in this case of charity (Pastore 2011) – that continues to pervade the institutional structure of many contemporary Italian social and vocational organisations in some form (Muehlebach 2013). However, over the past 150 years, the histories of community-driven organisations in Ireland and Italy have diverged considerably. In Italy, starting in 1890 with Law No. 6972, the state brought the work of charitable institutions under the auspices of public bodies. From there, the rise of the Italian Left and influence of organised labour further pushed the Italian state into taking a central role in the provision of services (Pastore 2011, pp. 55-56). For much of the 20th century, volunteer-led and/or bottom-up organisations in Italy transitioned from primary provision to supplementing the state, mainly in areas "where the state and the market do not reach" (Salvini 2011; p. 151). This contrasts with the Irish case where such voluntary structures and community-level organisations were cast as primary providers.

Through research and engagement with volunteers from varied organisations to develop a national ocean literacy body in Italy, it became apparent that partnering bottom-up activity with a top-down institutional element would be desirable, possibly overcoming the fragmentation of institutions dealing with the sea in Italy. The latter would provide an institutional framing that could add gravitas, formal recognition, and avenues to the persistence of the network outside of the efforts of dedicated individuals. As such, CNR itself has taken on this role, and has changed tack by gathering key stakeholders to revitalise the BlueMed network on marine and freshwater plastic, using this as a vehicle to establish a wider ocean literacy movement.

As already stated, we do not wish to claim that the divergent experiences of developing ocean literacy networks described above are attributable to any one factor: It is likely far more complex than that – perhaps, for example, different reactions to the Covid-19 pandemic and factors unique to specific volunteers and memberships also played a part. The real aim of this section has been to discuss how, when working on a multi-state scale on science-centred projects, it is valuable to build in social scientific perspectives, including attention to cultural histories, co-designing projects with local stakeholders (ideally from proposal stage), and providing spaces for reflexive design rethinking, capable of creating more context-relevant solutions. This helps to ensure that the approach taken, and solutions developed are culturally appropriate to each location, enhancing the social impact of actions.

This is true of many other of the Mission's citizen-centred activities. For example, in supporting the development of Mission Ocean & Waters citizen assemblies in different regions (a core Mission target), some preliminary questions might be: What level of experience do the people and institutions in the target locations have with such political forms? Are there ongoing direct democratic processes that initiatives could link with *(e.g. Folkemødet*[18] in Denmark), or should they be newly founded? This also requires that projects' methods and work plans should be sufficiently flexible to evolve with the realities on the ground.

5.4 Depth of participation and Post-Normal citizen science

The field of aquatic citizen science is witnessing a surge in projects, reflecting a growing understanding among scientists that the study and preservation of aquatic environments needs public support and participation. A European citizenry continually participating in data gathering, monitoring and analysis to support marine and freshwater science and policy is perhaps the strongest Mission Ocean & Waters-

[18] https://folkemoedet.dk/en. Accessed 30 January 2024.

related image yet of the extended peer community that Post-Normal Science attempts to leverage. Despite this upsurge in activity, however, there remains a notable gap in providing citizens with clear demonstrations and examples of what can be achieved through their involvement in aquatic science. This lack of illustrative guidance hinders the full potential of aquatic citizen science in Europe by limiting awareness and understanding among potential participants about the impactful contributions they can make.

Furthermore, citizens today lack dedicated spaces where they can become acquainted in depth with aquatic citizen science. A good model for this is offered by the ZEEKERWETEN[19] aquatic citizen science & public engagement festival in Ostend, Belgium (15-16 June 2024). This not only illustrated the benefits and achievements possible when citizens are aware of the possibilities in participation but also represents a pioneering effort to create a dedicated template for participation and involvement in this field. The festival demonstrated the benefits and results that can be achieved when citizens become aware of their ability to participate in research. It also highlighted the untapped potential of how the public can be enthused and inspired to feel more engaged with the ocean and waters.

The lack of connection between citizen science initiatives concerning inland water bodies and the ocean highlights another challenge for the Mission, keen as it is to emphasise connectedness between rivers, lakes and ocean, and the need for joint approaches in solving their collective problems. One way of countering this division would be to continue to support networking and cooperation initiatives that link discrete initiatives. The Mission-funded OTTERS[20] project does this by making links between citizen science projects along the Danube, from source to sea.

While connecting discrete initiatives is one challenge, increasing the depth and meaningfulness of participation is another. This necessitates a shift towards a more inclusive and democratic scientific method. The traditional tactic of dispensing "neutral" facts to the populace falls short in addressing these socio-environmental dilemmas. Instead, a more Post-Normal strategy, embracing a multitude of perspectives, inter- and trans-disciplinary cooperation, becomes imperative (for a discussion of this relating specifically to Mission Ocean & Waters, see Bjørkan et al. 2023). Decision-making processes must evolve to reflect the intricate interplay between society and the environmental crises at hand. Here aquatic citizen science could play a role both by offering an avenue for participation in marine activities and also by providing data and monitoring activities for informed decision-making. However, the low levels of deep engagement across aquatic citizen science initiatives in Europe would suggest that regardless of its connection to citizens and communities, more work needs to be done before the sector is ready to act as a key driver for the type of meaningful participation that the Mission requires.

A plea for more depth and involvement in aquatic citizen science projects does not mean that low-threshold initiatives that require little effort from citizens are not important and even necessary. We stress that having projects where great volumes of data are being collected remain incredibly valuable. Since the number of citizens greatly surpasses that of professional scientists, incorporating non-professionals into scientific endeavours undoubtedly opens new possibilities in spatial and temporal scope of achievable outcomes (Cigliano et al. 2015). As one of the Mission's ambitions is to create a Digital Twin of the Ocean, great volumes of data that are consistently updated will be a necessity. Citizen participation can support this needed increase in data collection.

As an example of a citizen-engaged sector that interacts with European waters and ecosystems, aquatic citizen science is rich and exploitable through Mission-relevant activities to achieve the kind of public buy-in that the Mission aims for. However, simply integrating aquatic citizen science into the Mission framework will not in itself be enough. Qualitatively, the depth of citizen participation, as well as the themes covered by aquatic citizen science initiatives currently falls short of the ambition for this space

[19] https://www.zeekerweten.be. Accessed 16 May 2024.

[20] https://otters-eu.aua.am/. Accessed 12 August 2024.

at the heart of Mission Ocean & Waters policy. As these shortcomings have now been made apparent through research, it would be valuable for future projects and funding to engage directly with networking the aquatic citizen science field across the continent, stimulating deeper, more meaningful levels of public engagement, and incentivising key partnerships that are currently lacking but could prove valuable to Mission activities (e.g. aquaria-led citizen science initiatives, or those connected to fisheries).

6. Conclusion

At the beginning of this article, we stated that the European Commission's Mission to "Restore our Ocean and Waters by 2030" might be *superficially* described as an environmental project aimed at improving the health of European's hydrosphere ecosystems. By examining the Mission's citizen engagement targets and actions in greater detail, however, we have identified the deeper social and political transformations that the European Commission is attempting to bake into this framework through its Mission framing, emphasising social inclusion and the ambition to transform relationships of governor and governed through Mission activities. The Mission's citizen engagement targets are clearly articulated in Mission literature and by European Commission officials at relevant events. They are pursued through the provision of finance, such as in European funding calls through Horizon Europe, and through activities to encourage Member States to engage with the Mission and with the broader environmental targets of the European Green Deal.

Nevertheless, we have identified significant challenges to reaching these headline citizen engagement targets: achieving meaningful increases in inclusivity and diversity through Mission activities, raising awareness of Mission Ocean & Waters and increasing ocean literacy, challenges related to transforming governance and due to the greatly different experiences and infrastructures of citizen engagement across the EU's Member States, and finally related to increasing participation in and use of aquatic citizen science.

These can be overcome by the emerging coalition of Mission actors – coastal and river-based communities, aquatic citizen science initiatives, NGOs, industry, research and innovation projects, and policymakers from local up to European Commission level. However, this should not be taken for granted and will require a collaborative effort across Member States that leverages the good practices established and emerging in some regions, while remaining sensitive to the different cultural realities on the ground that makes Europe such a diverse yet challenging place to work across. Specifically, Mission-related activities should attempt the following:

- Inclusion: Put more emphasis on considering social inclusion at project/activity design stage (ideally co-designed with target communities to enable collective problem framing), engaging with how different intersections of identity affect experiences of inclusion, and avoiding tokenistic attempts at inclusion later in the project/activity lifecycle. Project managers need to ensure they engage the necessary participation and facilitation expertise required to enable social inclusion and meaningful engagement.
- Increasing ocean literacy and "Mission literacy": Maintaining and increasing the diversity in messaging, media, and voice will be important if the Mission is to overcome the "emotional gap" that separates much of European society from the ocean. Emotional connection is becoming recognised as a key component in ocean literacy. Continuing to explicitly integrate more ocean practices into Mission activities - embodied/practice-based, artistic, food-based - will only increase the Mission's ability to connect itself and the ocean, seas and waters with citizens.
- Dealing with disparities across the EU: Remain keenly aware that the different regions of Europe have different baseline experience and capacities for formally including citizens in

governance, monitoring, and co-designing policy. A one-size-fits-all approach to fostering citizen engagement for the Mission will not work across the continent.

- Fostering participation by strengthening aquatic citizen science: The same is true of different activities and sectors (e.g. citizen science initiatives vs marine research institutions). Simply upscaling activity without engaging with the structural and cultural aspects of the contemporary European landscape might lead to failures in reaching the desired depth of citizen participation envisioned in the Mission's targets and objectives. For instance, data provision by aquatic citizen science alone will not transform the governance of marine ecosystems until appropriate structures of citizen co-management and decision-making (such as citizens' assemblies) are established.

The application of the Mission framework across Europe signifies the acceptance on the part of the European Commission of the necessity of doing science and innovation under the Post-Normal framework if the challenges that the European Green Deal engages with are to be solved. These problems are not just environmental but also economic, social, cultural and ethical. Use of the Mission framework across the EU is made particularly unique by the level of cultural diversity that is encountered across the Union. In this way, by bringing Mission Ocean & Waters together with the literature on Post-Normal Science, we can learn the power of examining how culture, history, and systems of governance affect innovation and science-informed participatory processes in different regions, and how this examination ought to form the basis of any such process. In a way, Mission Ocean & Waters is just the latest chapter in the European Commission's ongoing struggle with governing alongside the reality of significant cultural diversity (Bellier & Wilson 2000). The fact that concepts such as participation, co-management, and co-designed transdisciplinary science are making their way into headline European policy is a positive in this regard and should help to make European solutions more understandable, fit-for-purpose, and valued at local and regional levels. These insights should prove useful to those developing and delivering Mission projects and those researching citizen participation in ocean related challenges.

In terms of future research in this area, it would be interesting to see a bottom-up assessment of the success of the Mission in reaching its citizen engagement targets at the end of this decade and the wider impacts of this approach. If it were based on multi-sited ethnography and emplaced research among communities across the EU, this would complement the top-down assessment that the European Commission will (presumably) undertake and would provide a sense of the change made by European policy on the ground. The theory (or perhaps hope) that the mission framing will help to create a sense of shared challenge, and that engagement with the Mission will help to create a shared identity among Europeans, comes from a long history of the European Commission's efforts in this area. A participatory assessment of the extent to which this is successful would provide new knowledge on mission thought and European political culture.

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