BLUE CONNECT

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Ocean Literacy Toolkit

DELIVERABLE 3.3

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Contents

Introduction 5
Understanding levels of Ocean Literacy 9
Approach: Targeted Interviews or surveys 10
Knowledge diversity and Ocean Literacy 13
Approach: Integration of knowledge types into decision-making 14
Case Study: Integrating diverse knowledge types 16
Further Resources 18
Behavioural change – bridging knowledge and action 19
Enabling tools and approaches 21
Further Resources 22
Process Literacy - Supporting participation and engagement 23
Approach: Engagement through communication 24
Case Study: Digital Tools used in BLUE CONNECT 26
Case Study: Participatory Tools in BLUE CONNECT 29
Further Resources 31
Knowledge development - Access, experience and learning for Ocean Literacy 32
Approach: Access and Experiences to increase Ocean Literacy 33
Case Study: Citizen Science in BLUE CONNECT 34
Case Study: Education and awareness in BLUE CONNECT 35
Case Study: Virtual Access in BLUE CONNECT 36
Further Resources 36
Developing sustainable Ocean Literacy 37
Further Resources 39
References 40
Appendix 1 - Monitoring and plan activity template 43
Appendix 2 - Results of demonstration site survey of Ocean Literacy baseline, initiatives and barriers to implementation 44

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Acronyms

DS	Demonstration Site
EU	European Union
MPA	Marine Protected Area
MSP	Maritime Spatial Planning
NGO	Non-Governmental Organization
UNESCO	United Nations Educational, Scientific and Cultural Organization

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Introduction

This Ocean Literacy Toolkit has been developed for Marine Protected Area (MPA) managers to support just, inclusive, and effective management of MPAs. Within this document an MPA is classed as a protected area that is "a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values" (Dudley, 2008).

The toolkit aims to enhance meaningful engagement, support informed decision-making, and promote governance approaches that recognise diverse values, knowledge systems, and lived experiences. The toolkit brings together a range of resources to foster and support Ocean Literacy among managers, practitioners, stakeholders, and communities and to support them to embed Ocean Literacy in their conservation practices. This toolkit focuses on the following key concepts within an Ocean Literacy context:

- Understanding Levels of Ocean Literacy
- Knowledge diversity
- Behavioural change
- Process Literacy -Supporting Participation and Engagement
- Knowledge Development - Access, experience, and learning
- Developing sustainable Ocean Literacy

The Toolkit is informed by two surveys completed within the BLUE CONNECT Demonstration Sites (DS) and a review of relevant scientific and grey literature. The surveys established baseline ocean literacy levels within the demonstration sites, the second explored these results and gathered information on barriers and opportunities to enhance Ocean Literacy in the context of existing and future action. This toolkit will feed into the development of resources and actions in subsequent project tasks (e.g. D3.4 – Governance toolbox for co-defining and implementation of conservation and restoration measures).

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Ocean Literacy as concept and tool

A resilient and healthy ocean is critical for life on earth, supporting and influencing a wide range of vital functions from weather, climate and oxygen production, to provisioning services such as food production and cultural services such as recreation. As we face a biodiversity and climate crisis, understanding the link between human activities and pressures on marine systems can help support behaviours which enhance sustainability. Subsequently the need to raise public awareness about the ocean and its role led to the term 'Ocean Literary'. Ocean Literacy commonly refers to the '*understanding how the ocean influences us and how we influence the ocean*', with an ocean literate person understanding the fundamental concepts about the functioning of the ocean, can communicate about the ocean in a meaningful way; and can make informed decisions regarding the ocean and its resources (Cava et al., 2005; Paredes-Coral et al., 2021). Ocean Literacy can be seen as supporting positive change in the relationship between human actions as well as behaviours and our impacts on the ocean (Paredes-Coral et al., 2021).

In the earliest uses of the concept, Ocean Literacy was predominantly considered a tool or approach to promote informed decision-making and responsible behaviours that support the health of the ocean, demonstrating its vitality for climate regulation, food security, and biodiversity. It was initially used in the USA in 2004 to promote the inclusion of ocean-related subjects in formal education (McKinley et al., 2023; UNESCO, 2017). Over time, Ocean Literacy was used in wider educational programs, public awareness campaigns, and policy initiatives towards fostering a deeper appreciation and stewardship of marine ecosystems worldwide, and to "*trigger actions towards Ocean sustainability*" (UNESCO, 2020, p1).

Ocean Literacy can be seen to encompass knowledge of the ocean's ecosystems, processes, and resources, as well as an awareness of human impacts and the importance of sustainable interactions with marine environments. As a concept Ocean Literacy has expanded, and it now includes a number of additional factors which can influence human behaviour, which include emotions and values, as well as politico-economic and socio-cultural factors (Kopke & Dozier, 2019; Stoll-Kleeman, 2019; Brennen et al., 2019; McKinley et al., 2023; McRuer et al., 2025).

Viewing Ocean Literacy as a framework to understand human-ocean connections can provide valuable insights for marine conservation (McRuer et al., 2025). Brennan et al. (2019) proposed a theoretical model with six dimensions to Ocean Literacy: knowledge, attitude, awareness, communication, behaviour and activism. McKinley et al., 2023 expanded on these to include 'emoceans' (i.e., emotional connection to the ocean), access and experience, trust and transparency, and adaptive capacity, and this was further recently expanded to consider 'process literacy' (McKinley and Fradera, 2025). They define "process literacy" as having an understanding of how a regulatory or planning policy process operates, how decisions are made, and how stakeholders (including the public) can engage within these processes. In an ocean context, a process literate individual would, therefore, be defined as someone who has a good understanding of how their ocean area is defined and managed and how to engage with relevant

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decision-making processes to be able to share their knowledge or concerns about management decisions. Process illiteracy can lead to public nonparticipation and exclusion to justice (Fradera et al., 2026). Figure 1 illustrates the ten dimensions of ocean literacy, and the encompassing role of process literacy.

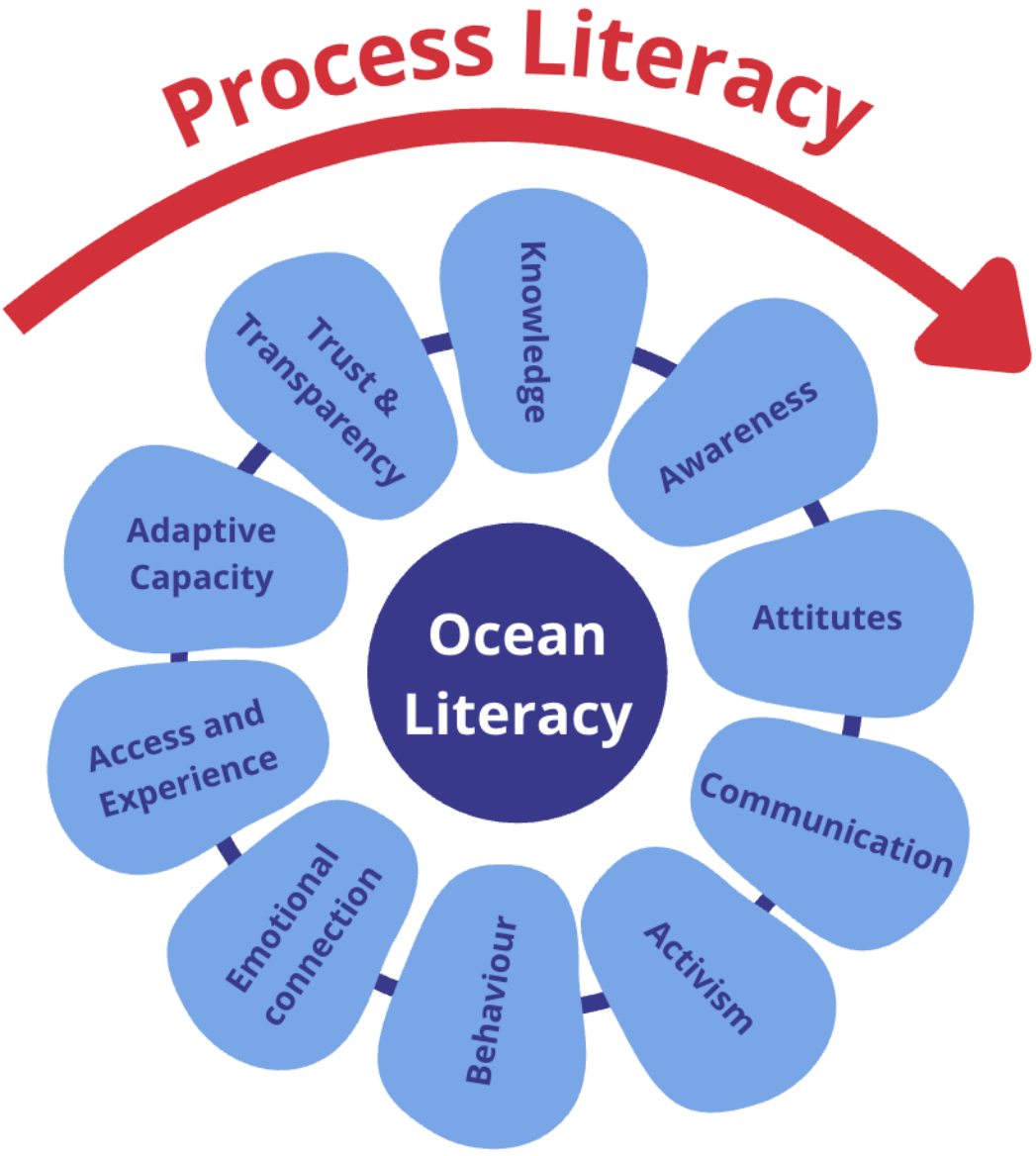

Figure 1. The alignment between process literacy and the ten dimensions of Ocean Literacy. Adapted from McKinley and Fradera (2025)

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MPA managers can use and apply the dimensions of Ocean Literacy as a framework to plan the participation and inclusion of stakeholders and communities, their knowledge and their values within an MPA, Table 1. This toolkit seeks to support the develop of these actions and considerations from the creation of an Ocean Literacy baseline through to developing actions which enhance process literacy and support sustainable behaviour. Whilst the Sections within this Toolkit do not need to be followed sequentially by MPA managers, understanding baseline ocean literacy levels (Section 2) can provide insights and create a baseline to assess the effectiveness of future action. Considering the dimensions of Ocean Literacy can provide a framework to plan activities against clear goals, for example developing 'activism' and 'Awareness' can be achieved via actions to promote Process Literacy (Section 5).

Table 1. Potential considerations when applying dimensions of Ocean Literacy to MPAs and links to sections within this report (adapted from McKinley et al., 2023)

Dimension of Ocean Literacy	Potential considerations	Section
Awareness	Are all stakeholders aware of how to engage in MPA marine management process? Are all stakeholders aware and engaged in the development of solutions and behaviours? Is this considered at a range of scales?	Section 2, 4 and 5
Attitude	Do different perceptions exist within the MPA/ Demonstration Sites? How can management measures reflect these differences?	Section 2 and 3
Knowledge	How are different types of knowledge integrated into co-development strategies? (including Local Knowledge).	Section 3
Emotional Connections	How do people's emotions impact participation and management?	Section 3 and 4
Adaptive Capacity	Adaptive capacity relates to a person's capacity to adapt and respond to changing conditions relating to their ocean (e.g., relating to climate change, change in ocean economies, or changing ecosystem structure or function).	Section 3 and 4
Communication	What methods of communication are most effective for different groups present? How can MPA managers communicate to different groups? What mechanism are required?	Section 3 and 5
Behaviour	What actions can different sectors take to promote behaviours which reduce potential impacts?	Section 4
Trust and Transparency	How can trust and transparency be increased to ensure buy-in to the MPA designation, monitoring and management measures?	Section 4, 5, 6
Activism	How can activism in the MPA management be maximised?	Section 5
Access and Experience	Access and experience relate to a person's real or artificial (through Virtual Reality, for example) experiences and engagement with the ocean, and the various ways in which they can access these experiences. Barriers to ocean access and experiences should also be considered within this dimension.	Section 6

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Understanding levels of Ocean Literacy

Key Challenge

To communicate effectively with communities and stakeholders, MPA managers need to create outreach materials, and participatory decision-making structures which are based on an assumed and shared baseline of understanding about how marine ecosystems function. In practice, coastal communities, resource users and policymakers can have very varied understanding of ocean uses (recreational, traditional, commercial), ocean processes, connectivity between habitats, cumulative impacts, or timescales of ecological recovery (Nursey-Bray et al., 2024).

Beyond differences in ecological understanding, stakeholders may also assign different values and priorities to marine ecosystems based on their social, cultural, economic, or conservation interests (Moscovici, 1988; de Oliveira Júnior, 2021). These multiple and sometimes differing perspectives can lead to conflicting expectations of MPA management and create challenges for achieving meaningful participation, shared objectives, and informed decision-making.

Aim

To establish an evidence-based understanding of what different stakeholder groups understand (and do not understand) about an MPA and wider marine management, ocean ecosystems and MPA function, so that participation structures, communication strategies, and co-management arrangements can be built on realistic assumptions.

Key Questions for MPA managers

1. What do different stakeholder groups and communities (e.g. fishers, tourism operators, local government, youth) already understand about ocean systems relevant to the MPA?
2. Where are the gaps concentrated e.g. general ecological literacy, or specific misunderstandings about MPA rules and rationale?
3. Does Ocean Literacy vary systematically by group, and if so, does that variation map onto existing power imbalances?

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Benefits for MPA management

Understanding baseline Ocean Literacy can:

Approach: Targeted Interviews or surveys

To understand baseline Ocean Literacy levels, and to monitor changes in Ocean Literacy surveys (digital or in-person) or targeted interviews can be utilised. With surveys of Ocean Literacy being undertaking at scales ranging from global (e.g. Fauville et al., 2019) to local (district) level (e.g. Spoors et al., 2022). Examples of Ocean Literacy survey questions, and their link to the dimensions of Ocean Literacy are given in Table 2. Most Ocean Literacy surveys collect information about those completing the survey, such as age, gender and occupation. This information can support understanding of how Ocean Literacy or values differ amongst different community members and stakeholders. Spoors et al., (2022) highlighted that survey responses can vary between sub-regions within the same community, and from national results.

Table 2. Example Ocean Literacy survey questions, and links to Ocean Literacy dimensions. Note not all will be relevant to each management scenario.

Theme	Question Type	Example questions
Awareness	Questions relating to awareness of MPA, pressures and management measures	Are you aware of the MPA? Which of the following activities are managed/ restricted within the MPA? Do you conder the marine environment to be in good health?
Knowledge	Questions relating to scientific terms to understand effective language	Are you familiar with the following marine terms (e.g. Eutrophication, climate change, biodiversity)?
Attitudes	Questions relating to perceived benefits of the marine environment	What benefits do you believe the marine environment (or MPA) provides?

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Communication	Sources of knowledge relating to the marine environment	Where do you gain your knowledge relating to the marine environment?
Behaviour	Questions relating to positive behaviour, can be MPA specific or generic	Do you take action to reduce your impact on the marine environment? Do you take action to reduce your impacts on habitats or species within the MPA?
Activism	Questions relating to how stakeholders and communities influence marine management	Do you participate in marine environmental monitoring? Do you respond to consultations relating to the MPA?
Personal or emotional connection	Types of emotional connection to the marine environment	Which of the following describe your feelings relating to the marine environment?
Access, experience and proximity	Questions relating to access and experience.	Do you use the marine environment for recreation activities? Do you use the marine environment for work? How often do you visit the coast?

Case Study: Ocean Literacy Survey in BLUE CONNECT

A BLUE CONNECT Demonstration Site wide survey supported a baseline understanding of Ocean Literacy relevant to the MPAs (See deliverable 4.1). The survey included specific questions relating to the Demonstration Sites and MPAs, including awareness of the site, support of strict measures, and knowledge of existing management measures. These questions were included due to their relevance to the development of co-management within the MPAs. The survey was completed digitally and promoted within the Demonstration Sites via a range of mediums, including social media, mailing lists, posters with QR codes and at MPA events and workshops. On completion this survey was followed up by a survey of the Demonstration Site leads to evaluate the results of the survey as a tool to support co-management.

The second survey sought to understand whether the results of the initial survey aligned with realities within the Demonstration Sites, as well to gather information on existing actions to enhance Ocean Literacy, and barriers and opportunities to support relevant actions. The results of the second survey are included as an Appendices to this report. Whilst Demonstration Sites broadly agreed with the initial survey results, they highlighted several challenges when collecting and interpreting results:

- Comprehensive surveys are slow to complete, influencing completion and participation rates.
- Areas with small populations require relatively high completion rates to create meaningful results
- Potential bias in results created by those with higher rates of Ocean Literacy or MPA awareness being more likely to be aware of and complete the survey.
- Misidentification of some pressures or management measures highlight challenges in distinguishing between 'correct' answers and true understanding

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Some of these challenges have been highlighted elsewhere, for example, respondents to an Ocean Literacy in the UK revealed that a higher level of respondents believed they lived more than 100km from the coast, despite most of the UK being closer than 100km of the coast.

The survey of Demonstration Sites highlighted low levels of youth engagement as a concern. This included the Scottish MPA Demonstration Site which has experienced low levels of youth engagement with MPA activities (such as monitoring and within the Local Stakeholder Advisory Group). This led to the development of an engagement event specifically aimed at young people aged 12-25. The workshops were structed to gather information and enhance specific elements of Ocean Literacy and MPA awareness. Young people were initially asked ice breaker questions relating to where they gain knowledge about the marine environment, whether they consider it to be in good condition and whether they had seen a marine mammal (and which species). Questions were posed on response boards, with participants provided with stickers to answer the questions. After an interactive workshop on monitoring techniques and information about the Demonstration Site, the young people were asked whether they supported strict management measures, whether they felt monitoring should be increased and if they'd like to participate in innovative monitoring approaches and the current barriers to their participation. The results revelled higher levels of support for strict management measures amongst young people compared to those who responded to the initial survey. Young people also expressed a preference for the opportunity to participate in innovative MPA monitoring sessions specifically aimed at young people, and the need for transport to be provided to facilitate their participation. It was also highlighted that many of the young people were not on social media and younger participants did not have smart phones. Many countries are in the process of restricting social media access for under 16s. Therefore, different routes for inclusion were suggested, including direct school engagement.

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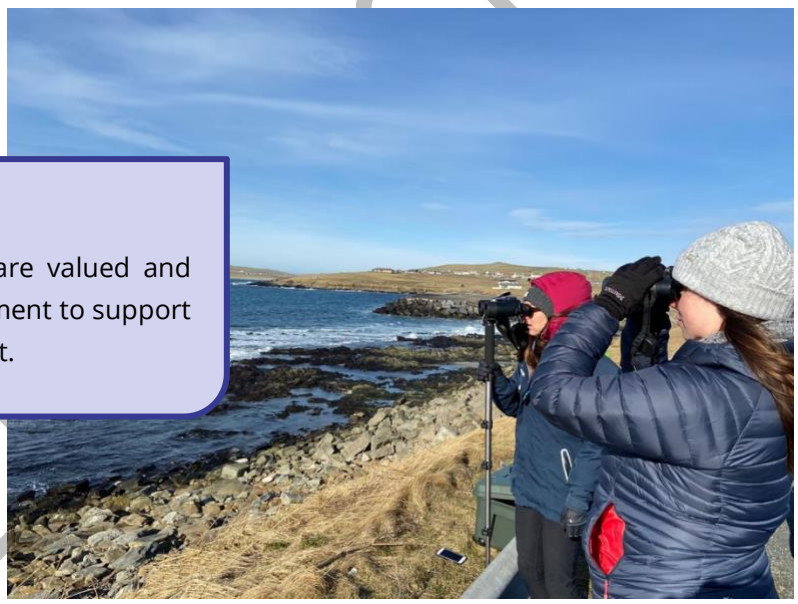
Knowledge diversity and Ocean Literacy

Recognising different knowledge types is important in marine management and governance because people understand, value, and interact with the ocean in diverse ways (Poto et al., 2022). Where MPA managers seek to foster behaviour change among communities and stakeholders (see Section 4), effectiveness can not only depend on providing information, but on how that information is understood and acted upon. People can be more receptive when management messages reflect their own knowledge, values, and lived experiences. When information aligns with existing worldviews and everyday experience, it is more likely to be accepted as relevant and credible. In contrast, Ocean Literacy initiatives that rely solely on abstract scientific knowledge can feel distant or disconnected from daily life, limiting their influence. Within a baseline Ocean Literacy Survey (see Section 2) relevant questions to understanding knowledge diversity might include 'Where do you gain knowledge about the marine environment?'.



Aim

Ensure all knowledge types are valued and included within MPA management to support just and effective management.

Key Questions for MPA managers

1. How does scientific Ocean Literacy relate to, or potentially undervalue, local knowledge already present in the community?

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Approach: Integration of knowledge types into decision-making

Integrating different knowledge types into MPA management can help achieve a range of benefits which support just and effective marine management, Table 3.

Table 3 The benefits of recognising different knowledge types in Ocean Literacy

Benefit	Why It Matters
Inclusivity	Reaches more communities and respects diverse ways of knowing.
Holistic understanding	Combines science with lived and cultural experience for richer insight.
Increased behaviour change	People act more when knowledge resonates with their values and experience.
Legitimate decision-making	Co-created knowledge boosts trust, uptake, and local relevance.
Stronger emotional connection	Drives stewardship
Equity and justice	Helps decolonise ocean learning and empower underrepresented groups.

Types of knowledge

Knowledge is always an assemblage of abstract, formal and replicable knowledge (often referred to as 'scientific' or 'universalised') and practical, embodied and experience-near (often called 'local' or 'practical' knowledge (Scott 1998, Turnbull 2000, Tsing 2015). It is important to understand that knowledge appears as different 'types', because what is known about the sea, will shape how individuals, communities and societies value the marine environment, as well as how we shape our relationship to it. In the context of Ocean Literacy however, where the focus lies on integrating a diversity of ways humans come to know the world, these categories can be useful to ensure their recognition and implementation. While knowledge types have been subject to a range of classifications and divisions, here we distinguish between scientific/technical; local; situated and traditional knowledge, Table 4.

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Table 4 Different knowledge types and the benefits to MPA management in their inclusion in management processes

Type	Example	Benefit
Scientific/ technical knowledge	Modelled outputs, scientific survey results	+ Can provide support understanding of species, habitats, nutrient cycling, currents, etc. + Can enrich local experience and knowledge of the local environment + Can support and strengthen the recognition of local and traditional knowledge through qualitative and quantitative feedback-loops + Can assist the recognition of silent or marginalized forms of knowledge through careful translation and representation
Local knowledge	Knowledge drawn from situated experiences and practices drawn from everyday interaction with the seascape, such as work, recreation etc. Local knowledge is highly dynamic and adaptive to change. Includes observations accumulated by fishers, communities, or other coastal users	+ Can enhance scientific knowledge of species behaviours, seasonal patterns, long-term environmental change through local observations + Can enhance understanding of situated knowledge (for example gendered lenses on ocean governance) + Can enhance the evidence base for decision-making and ensure management measures are effective by considering culturally specific stewardship practices and governance norms
Situated knowledge-	Situated knowledge encompass the differences in how men, women, elderly, young, rich, poor etc. engage with, and learn about, the marine environment.	+ Can help to understand the differential impacts of marine policies across gender, age, class, culture etc. + Can help to understand the economic and social impacts of different management measures and options + Can support just management outcomes
Traditional knowledge	Historical knowledge drawn from the long term, intergenerational practices and ontologies. Often embodied and 'silent', embedded in cultural practices and traditions, such as rituals, festivals, stories, myths, etc. Constitutes spiritual, and symbolic relationships with the ocean.	+ Can enhance understanding of past uses of coastal and marine areas + Can help to identify long-term changes in species abundance, coastal development, pollution + Can enhance understanding of traditional navigation, fishing techniques, cultural seascapes + Can help to support management measures through strengthening culturally specific stewardship practices and norms + Can provide pathways for meaningful participation for a wider range of people

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Case Study: Integrating diverse knowledge types

A range of knowledge types have been considered and collected within the Demonstration Site areas, both preceding and during the BLUE CONNECT project. This knowledge has been collected via a variety of methods ranging from interviews to creative practice, such as the Community Voice Method which is a participatory research and stakeholder engagement approach that combines ethnographic video interviews with documentary filmmaking to foster inclusive civic dialogue and shape local decision-making, Table 5.

Table 5 Examples of the collection of different knowledge types within the Demonstration Sites

Term	Description
Local knowledge	The project LIFE CONCEPTU MARIS has conducted a Citizen Science Campaign on cetaceans and pelagic turtles in the Western Mediterranean. This enabled citizens to receive training about and directly participate in the observation of these species, creating direct experiences of protected fauna. Other examples of citizen science projects are also included within the BLUE CONNECT demonstration sites are detailed within Section 4 and include a range of participatory mapping tools to capture community observations and knowledge of the marine environment. Collectively these projects are providing a pathway for local knowledge to be incorporated in marine decision making.
Traditional and local knowledge	In the Scottish Demonstration Site a project has been initiated to collect marine mammal memories from community members. This is specifically targeting memories pre-2000 to help support an understanding of historical trends in species distribution and abundance, enhancing our current understanding of the ecological status of these species. Data is being collected via interviews, an online survey and review of archival material, including books and journals. This data will help to provide information on historic distribution of cetaceans in the Shetland marine area. This approach has led to the inclusion of community members who are not currently involved in data collections or in the MPA management process. A planned interactive exhibition seeks to engage those who are not traditionally engage with conservation.
Situated knowledge	EmpowerUs Women Making Waves This project explored gender knowledge and roles within the EmpowerUs project sites via a series of case examples.
Local and situated knowledge	A Community Shaped by the Sea- Understanding community value and use of the Shetland coastline. Through community surveys and interviews the cultural values associated with the Shetland marine environment were identified. Interviews and surveys included the public, recreational clubs and users and creative practitioners. Information gathered included where people use the coast for activities ranging from beach combing to yoga. The surveys sought to engage as wide a range as people as possible, targeting individuals, artists and creative practitioners, as well as sports clubs. By also asking people about the qualities of the marine environment they valued the resource seeks to help ensure that Shetland community values are considered within decision making processes.

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Term	Description
Situated knowledge	Community Voice method (CVM) an example of using CVM is the Reddin Value film designed to capture community values relating to the sea in Shetland. Interviews were conducted with community members to explore the values they hold in relation to the marine environment. Care was taken to select a diverse range of voices, considering age, occupation and gender balance. CVM can be used in a number of ways, but can have particularly value in contexts where legitimacy, equity, and local knowledge are central concerns. CVM can be considered both a research and governance engagement tool, and can support empowerment, including of marginalised voices, support co-production of knowledge and can be utilised to promote dialogue between communities, stakeholders and authorities. In Shetland the creation of the CVM film took approximately three weeks, with an experienced film editor used to create the film. Some challenges were encountered recruiting people willing to appear on screen, however as a small number but diverse group of people are included this was overcome. Once created it has been used on multiple occasions to aid discussions on sustainable marine management. As the CVM did not focus on a specific issue, rather the broad topic of ocean stewardship, it has allowed the film to remain relevant to a number of discussions. Positive feedback has been received at public events, with communities appreciating seeing a diverse range of views within the community reflected in the film.

Lessons learnt and key challenges

Including different knowledge types within MPA management provides the opportunity to include a diverse range of people in MPA management across the Demonstration Sites. Specific methods such as CVM can be used to target specific groups, for example young people, women or marginalised groups. The collection of information and data requires continuous resource, with many initiatives developed via project funding with a finite time period. In some Demonstration Sites community or stakeholder collected knowledge is providing the primary data source for the region. Institutional and legal requirements can in some instance create barriers for the inclusion of different knowledge types, with scientific knowledge often utilised preferentially (Fradera et al., 2026). However, the development of the local stakeholder working groups (LSWG) within the demonstration sites provides the opportunity to elevate a diverse range of knowledge types.

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Further Resources

Situated Knowledge

- Bonilla Anariba S.E., Sanders A., Canty S.W.J. (2025) Promoting gender equity in marine protected areas: A self-assessment tool. Marine Policy 173 https://doi.org/10.1016/j.marpol.2024.106526
- The Common Wealth Blue Charter (2024) Turning the Tides of Inclusion: A Toolkit for Gender Equality in Ocean Sectors.
- UNESCO (2024) Unchartered waters: an exploration for gender equality and the ocean pp 32
- United Nations Environment Programme and Gender and Water Alliance (2022). Gender Mainstreaming in Mainstreaming in Coastal and Marine Ecosystems Management: Principles, Case Studies and Lessons Learned. Nairobi

Local knowledge

- UNESCO-IOC and UNESCO-LINKS. 2024. Engaging Indigenous Peoples and Local Communities, and Embracing Indigenous and Local Knowledge in Marine Spatial Planning: Volume 2 – Good Practices. Paris, UNESCO. (IOC Technical Series No. 189, Volume 2).

Historical knowledge

- Santana-Cordero A.M., Szabo P., Burgi M., Armstrong C.M. (2024) The practice of historical ecology: What, when, where, how and what for. Ambio 53 (5):664–677. doi: 10.1007/s13280-024-01981-1
- Santana-Cordero A.M., Szabo P., (2019) Exploring Qualitative Methods of Historical Ecology and Their Links With Qualitative Research International Journal of Qualitative methods vol 18 doi: https://doi.org/10.1177/1609406919872112

Traditional knowledge

- Community Voice Method (CWM) - A guide to CVM in the marine environment

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Behavioural change – bridging knowledge and action

Key Challenge

Research on the relationship between awareness, knowledge and behaviour has led to the recognition that a deficiency in Ocean Literacy is not directly linked to individuals' capacity to exhibit pro-environmental behaviour (McKinley, et al., 2023, Heimlich and Ardoin, 2008; Hungerford and Volk, 1990; Hines et al., 1987). Instead, research indicates that collective and individual actions can be encouraged by combining Ocean Literacy with the recognition of people's capacity to identify and implement solutions through empowerment (Jagers et al., 2020). Within a baseline Ocean Literacy Survey (see Section 2) relevant questions to support behavioural change include 'Are you aware of actions you can take do reduce your impact on the MPA?', 'What actions do you take to try and reduce your impact on the MPA?'.

Behavioural change theory helps explain why people act the way they do and how their behaviour can shift toward more sustainable and stewardship-oriented actions. When applied to Ocean Literacy and MPA management, it can help support interventions that motivate and enable behaviour change. While enhancing Ocean Literacy contributes to more effective MPA management, behavioural change theory highlights that knowledge alone rarely shifts behaviour, as highlighted by McHugh, Domegan and Santoro (2016). Meaningful change depends on a combination of capability, motivation, and opportunity, as described in frameworks such as the COM-B model (Michie et al., 2011) and the Theory of Planned Behaviour (Ajzen, 1991).

Aim

To develop and promote behaviour which reduces/ prevents pressures/impacts on the MPA.

Key Questions for MPA managers

Are communities and stakeholders aware of actions they can take to reduce pressures on the MPA, and is this reflected in their behaviour?

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Benefits for MPA management

Behavioural tools can address motivation and opportunity. For example, 'nudges' in the form of subtle design features such as simple, clear signage, social norm messaging, or visual cues, can make sustainable behaviours like compliance with MPA zones easier and more intuitive. 'Budge' strategies, which use regulation or incentives to intentionally shift behaviour, can support Ocean Literacy by aligning institutional structures with stewardship goals, such as offering benefits for participating in monitoring or simplifying pathways for community engagement. Conversely, identifying and removing 'sludge', such as unnecessary administrative burdens, overly complex consultation documents, or inaccessible information, can reduce barriers that undermine both understanding and participation. Alternatively, 'sludge' can be used as a tool to make behaviours which are not considered positive more difficult to do e.g. requiring additional permits to undertaking higher risk activities. Combining plural forms of Ocean Literacy with these behavioural insights strengthens trust, can support meaningful engagement, and fosters long-term stewardship essential for effective and just MPA governance.

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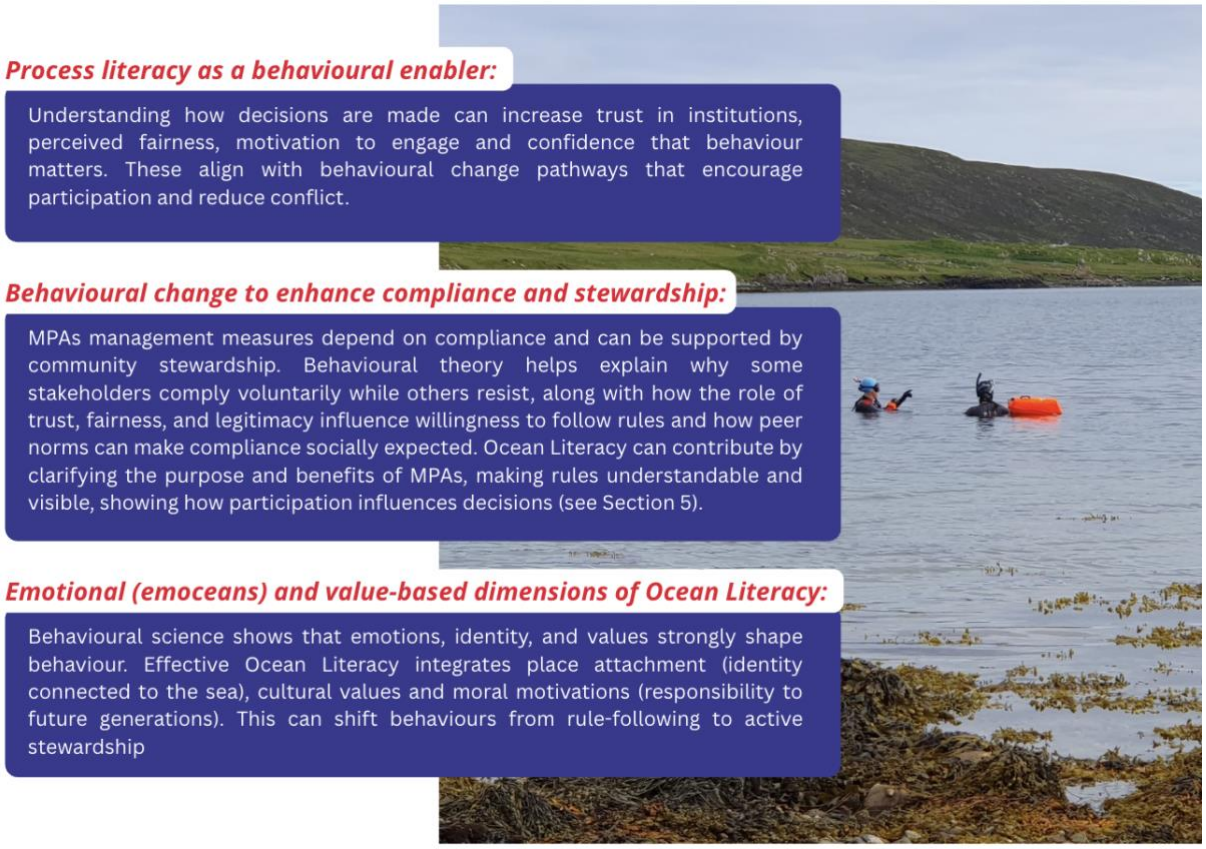

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Enabling tools and approaches

Behavioural change theory can be used as a tool to develop interventions which promote actions which minimise impacts on MPAs.

Behavioural change theory can guide:

Communication • Use framing that aligns with local values • Tailor messages for different groups (e.g. fishers, tourists, youth) • Use visuals, stories, and culturally relevant metaphors • Use different communication tools (social media, local journal, TV)	*Engagement* • Incentivise participation (e.g., recognition, co-management roles) • Reduce barriers (timing of meetings, translation, compensation) • Keep open two-way communication throughout the entire process
Compliance tools • Nudge/ budge/sludge strategies (e.g. clear signage, simple rules) • Peer-monitoring and community guardianship • Stewardship agreements • Feedback loops ("you said–we did")	*Co-management* • Enhance empowerment and ownership through the co-creation of a more holistic, inclusive and actionable knowledge platform, supporting long-term behaviour change. • Create mechanisms for participatory stewardship (council, working group) • Include bottom-up and top-down mechanisms

Examples of compliance tools

Compliance tools can be utilised to address specific MPA pressures on the environment or specific species or habitat. For biosecurity management key risks include commercial boat users and recreational boat traffic. For marine mammals' potential key pressures might include underwater noise, entanglement and disturbance, activities which may exert these pressures include shipping, recreational boat users and industrial activities. Examples of the utilisation of compliance tools to support sustainable behaviour are shown in Table 6.

Table 6 Examples of compliance tools and their utilisation

Biosecurity	
Nudges	Clear signage can remind users to ensure equipment is checked, clean and dry to reduce the spread of non-native species. In the UK a national scheme aimed at recreational users promotes 'Check, Clean, Dry' to reduce the spread of aquatic invasive plants and animals. The campaign has also provided sector specific (e.g. kayakers, anglers, event organisers) posters and leaflets.

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Budges	Biosecurity accreditation for recreational clubs - Clubs that complete biosecurity training and equipment hygiene protocols receive discounts on launching or servicing shifting costs and benefits toward best practice.
Sludge	Controlled access - High-risk locations (e.g., seagrass meadows or sensitive reefs) could require completion of a quick online biosecurity module before issuing a user permit.
Example	Shetland providing regionally specific biosecurity plan templates and guidance to promote compliance e.g. in Shetland or for specific sectors, for example sport events. New Zealand uses a range of measures to reduce the spread of marine non-native species and has clear rules and guidance for international vessels. They have produced video guidance to support compliance and understanding. The range of actions to address biosecurity challenges are clearly communicated via a dedicated website.
Cetacean disturbance	
Nudges	Signage, social media can be used to remind users about responsible behaviour around cetaceans (as utilised in the Shetland DS). Within the Cetacean Migration Corridor Demonstration Site colour coded charts have been used to visually highlight calm-speed zones in blue/green and high-risk zones in red, promoting positive behaviour without restrictions, these areas are clearly promoted via an *Infographic*.
Budges	Training and accreditation schemes for vessels - UK example WiSE accreditation promoted within the Scottish Demonstration Site.
Sludge	For European protected species like cetaceans a licence is required for activities which may causes disturbance. For example, a licence for actions which are higher risk (e.g. acoustic deterrents at aquaculture sites, pile driving).
Example	North Atlantic Right Whale: Conservation and Management- combines statutory and non-statutory measures, guidance across a range of sectors, outreach and education to reduce pressures on North Atlantic Right Whale. These are summarised and explored via a communication webpage.

Lessons learned and key challenges

Behavioural change theory can support MPA managers to plan actions that help ensure that Ocean Literacy strategies relating to education result in positive behaviour, reducing potential pressure on the marine environment. Actions that support behavioural change may require initial investment (such as signage), and continued promotion to ensure all marine users remain aware, and to prevent apathy. However, over time behavioural change messaging can support the normalisation of sustainable actions. However, some actions to reduce pressure e.g. hull cleaning to reduce to the spread of INNS, can require substantial investment in facilities. Monitoring impacts of behaviour change strategies (e.g. number of reported cases of cetacean disturbance) can help to refine actions and assess their effectiveness throughout the management cycle.

Further Resources

- The Decision Lab (2022). 15-minute Introduction to the Behaviour Change Wheel.
- Ocean Literacy Toolkit (Future Seas) A practical resource offering strategies to build Ocean Literacy and support behavioural engagement across communities and stakeholders.
- UNICEF (2023). Evidence-based Intervention Design: Behaviour Change.
- Become ResonpSEAble! Free online training

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Process Literacy - Supporting participation and engagement

Participation in decision-making is an internationally agreed principle of public accountability and is enshrined within the Aarhus Convention (United Nation, 1999). To participate in decision making it is necessary for communities and stakeholders to know how and when to do this. Process literacy is an important aspect of Ocean Literacy and is defined "*as having an understanding of how a regulatory or planning policy process operates, how decisions are made, and how stakeholders (including the public) can engage within these processes*" (McKinley and Fradera, 2025). Process literacy is relevant both to citizens and stakeholders, as well as for decision makers and managers seeking to develop democratic processes. Through increasing process literacy, decision makers can increase meaningful engagement with stakeholders by creating more accessible processes (Fradera et al., 2026). Within a baseline Ocean Literacy Survey (see Section 2) relevant questions to understanding levels of Process literacy might include: 'Are you aware of the MPA?', 'Are you aware of management measures?', 'Are you aware of how to engage in MPA management?'.

Key Challenge

Understanding management processes is affected by the long timescales associated with decision-making cycles, the technical nature and, sometimes, long and inaccessible consultation documents (Fradera et al., 2026). The creation and management of MPAs typically involves multiple stages, including the development of enabling legislation (EU or national), subsequent site designation and the implementation of management measures. These timelines can span decades, creating challenges in understanding processes and evidence that shaped past decisions.

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Aim

To enable the public and stakeholders to access information about the MPA including why the MPAs exists, what values the MPA protects including:

- when and how engagement is possible
- what engagement has already taken place
- how past and current input can influence outcomes
- which decisions are open to input
- how stakeholders and communities' contributions shape outcomes

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Key Questions for MPA managers

Are communities and stakeholders, included marginalised voices, aware of the MPA and do they know when and how to engage?

Approach: Engagement through communication

Effective communication strategies offer opportunities to ensure that communities and stakeholders can understand why an MPA exists and what habitats, species and values the MPA was designed to protect. This can support and enhance specific Ocean Literacy dimensions of trust and transparency, activism, knowledge, awareness, communication. Communication strategies can require tailoring to specific audiences, and multiple approaches of communication can assist in widening participation and the development of just and effective management strategies. A range of tools can be used to support participation and enhance process literacy. Arnstein (1969) presented a "Ladder of Citizen Participation", with five steps from 'inform', 'consult', 'involve', 'collaborate' and 'empower'. Participatory approaches can take many forms from simply informing to consulting (e.g. through surveys), involving people in discussions, collaborating on solutions, and ultimately empowering them to make decisions.

Different tools will align with different objectives relating to who is sought to be engaged and why. Digital tools provide an opportunity to apply a range of innovative approaches which inform stakeholders and communities on how decisions have been made in the past and publicise opportunities for participation in the future. They therefore can be utilised to widen collaboration and empower communities in decision making, which may further utilise digital tools or utilise participatory and social tools.

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Digital Tools

Digital tools to support and enhance process literacy can be embedded within websites or shared via social media and are outlined in **Error! Reference source not found.**. These tools can be used for targeted communication with the general public and marine users, providing innovative opportunities to enhance communication in decision making (Ericksson et al., 2026). They can include specific software such as ArcGIS StoryMaps, a web-based tool that lets you combine interactive maps, text, and multimedia into a single digital narrative. Whilst storyboards are a graphic organizer that consists of simple illustrations or images displayed in sequence, and can be used to document specific process, such as consultations, that have occurred within an MPA.

Digital tools can be particularly valuable to explain processes to non-specialists, where processes happen over long-time frames (sometimes decades) and where those now currently interested or affected might not have been involved throughout the whole process, for example due to their age, newly engaged, or new to an area. Digital tools can provide specific challenges as well as benefits, and these are highlighted in **Error! Reference source not found.**. This includes the resources need (time and cost) to create digital content, both during its initial creation and in maintain the resource. In addition, where videos or and large file sizes are associated with the digital content it can lead to a requirement for greater digital connectivity to view these resources. People or communities in areas of poor connectivity or without digital access can therefore be excluded. This is particularly problematic if this includes specifically targeted groups.

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Table 7 - Digital tools to enhance process literacy

Category	Tool	Description	Benefits and challenges
Management portals- web based	Story maps, story boards	"One-stop" websites that consolidate: • current status of MPAs • consultation periods • dashboards for up-to-date data • visualise the MPA designation and management cycle (from legislation → designation → planning → enforcement → review). • Allow users to click on each stage to see what has happened, what is happening now, and what is coming next.	+ Enhance trust and transparency and promote activism + Accessible format can support engagement of the civic society - Resources required in creation (time and cost) - May require high levels of internet connectivity to view
Visualisation and simplification tools	Infographics, plain language guides, story boards	To understand how and why decisions are undertaken, infographics and plain language guides can help explain complex legislative frameworks through clear diagrams and their relevance to specific MPAs and/ or explain how evidence feeds into decisions and what constraints decision-makers operate under	+ Can help to communicate complex issues to stakeholders and communities. + Enhance trust and transparency and promote activism - Challenges of transforming complex systems into accessible formats

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	Evidence pathway explainers	Visual tools can be utilised to explain the role of data to support decision making within an MPA. This might include: • what data is collected • who analyses it; how it influences management measures • links between monitoring results and decisions	- Can be time consuming to create
	Digital consultation trackers	Show how stakeholder comments and submissions are incorporated into decisions ("You said, we did" formats).	+ Create transparent feedback loops about how stakeholder input shaped outcomes. + Can support transparent decision making - Resources required in creation (time and cost)
Video explainers	Web or social media-based videos	These can be embedded within story maps or can be stand-alone outputs	+ Can provide alternative formats to documentation + Support process literacy in communities and stakeholders - Resources required in creation (time and cost) - May require high levels of internet connectivity to view

Case Study: Digital Tools used in BLUE CONNECT

While some BLUE CONNECT Demonstration Sites have well developed existing dedicated websites, such as the Raet Demonstration site, prior to the BLUECONNECT project many other Demonstration Sites had only used digital tools to a limited extent. A range of digital tools are being developed for the BLUE CONNECT Demonstration Sites and will be available via the BLUE CONNECT website, this includes the creation of story maps and storyboards. These will help to explain the purpose of the MPA, future engagement processes, and management measures, where present. The Storymaps will combine a range of mediums including imagery and maps to create engaging and accessible content aimed at communities and stakeholders. Training on developing Story Maps is freely available from ESRI- How to make a story map, and provide built in tools tailored for beginners. Storyboards will be used to document management processes within the MPAs, supporting transparent decision maker and providing a resource for future reference. Feedback from one of the Demonstration Site Local Stakeholder Working Groups highlighted the importance of developing a clear engagement strategy to ensure understanding and support of the MPA. Other examples of the use story maps within MPAs are shown in Table 8.

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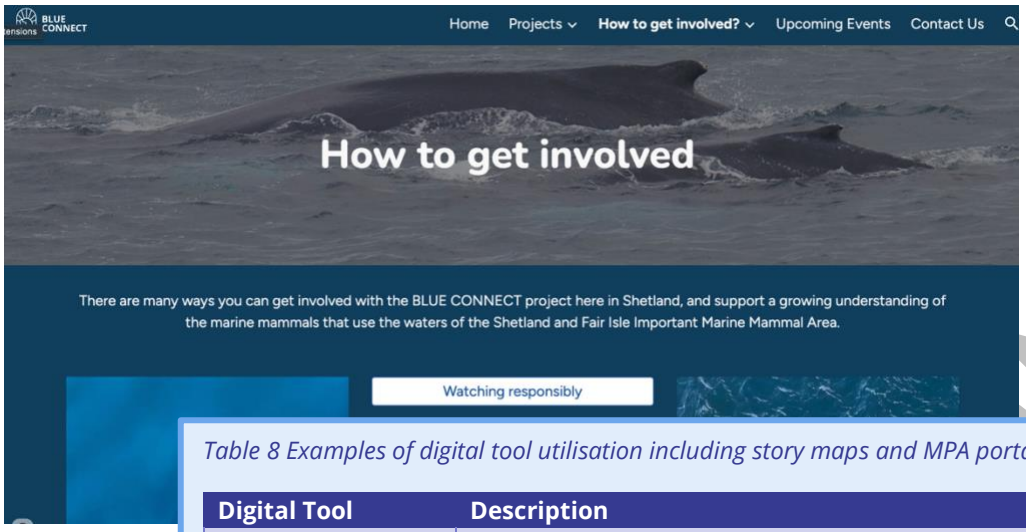

Table 8 Examples of digital tool utilisation including story maps and MPA portals

Digital Tool	Description
Black Sea MPA (Empower Us project)	This story map seeks to communicate the complexity of blue (in)justice and its potential impacts. It provides information and background to the Black Sea MPA.
Sea of the Outer Hebrides	MPA network Scotland. This example highlights the use of story maps to communicate where and why MPA designations exist. It uses maps to highlight different areas of protection and incorporates 'stories from the seas' and communicates benefits of the marine environment. The story map uses video to explain what an MPA is in an accessible format.
NOAAs MPA Center	This story map summarizes U.S. contributions towards six key aspects of successful marine protected area (MPA) networks. It maps locations of MPAs, how MPAs are connected and their effectiveness.

Web-based tools can be linked to specific public facing fact sheets relating to specific stages of MPA development. For example, the evidence used in the identification of the Scottish demonstration site as an Important Marine Mammal Area (IMMA) has been summarised in a short accessible format. The factsheet seeks to develop and enhance understanding of the reasons the area was identified as an IMMA and the evidence used to underpin this decision, including how community-based evidence was used alongside data collected by researchers and government agencies. As part of the BLUE CONNECT project a dedicated website was also developed to encourage continued collaborative data gathering by stakeholders and communities, raising awareness of the different opportunities to support data collection. These resources brought together a range information for the first time and sought to support interest and participation in the MPA management. Web traffic and associated social media engagement highlight the importance of digital tools when engaging with communities.

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Participatory and social tools

Participatory and social tools are approaches and methods that can be used to actively involve people (stakeholders, communities, users, citizens) in decision-making, planning and management processes. They can support participatory methods that focus linked to 'collaboration' and 'empowerment' within Arnstein (1969) "Ladder of Citizen Participation". The Engage2020 EU project developed an Action Catalogue as to help select which tool to use depending on participatory process objectives and include formal steering groups (as utilised in BLUE CONNECT) and the development of focus groups. For these tools to support process literacy, consideration needs to be given to how participants views can be incorporated into decision making and that it is clear to participants how their views will influence management decisions (Fradera et al., 2026). Digital tools can be used ensure that any participatory process outcome is documented in a publicly accessible way, for example via Storyboards. Participatory mapping also provides the opportunity to enhance process literacy where clear links are made between data collection and management outcomes. Considerations of how participatory tools can be utilised to enhance process literacy are summarised in Table 9.

Table 9 - Participatory and social tools to support process literacy

Tool	Key considerations	Benefits and challenges
Stakeholder Advisory Panels / MPA Community Forums e.g. Local Stakeholder Working groups developed in Demonstration Sites	Regular meetings with clear agendas and transparent reporting. Consideration given to ensure a range of stakeholders and community member are represented. Membership can influence management outcomes.	+ Widen participation including marginalised groups. + Support OL dimensions of trust and transparency, activism, knowledge, awareness, communication + Support the inclusion of different knowledge types (see section 3). - Ensuring that a range of voices are represented - Preventing dominance of 'loudest' voices
Community listening/ discussions	Provides opportunity for a wider variety of voices to be heard and influence decision	+ Widen participation including marginalised groups.

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e.g. Citizen assemblies see Action Catalogue		+ Support OL dimensions of trust and transparency, activism, knowledge, awareness, communication + Support the inclusion of different knowledge types (see section 3). - Ensuring that a range of voices are represented - Participation can be time consuming so can be dominated by those who have resource to participate (e.g. time and money)
Participatory MPA monitoring Digital Apps, or websites to collect data, in-person data collection	Links between data collection and MPA process are clear, opportunity to view own and other people's data once submitted.	+ Opportunity to expand MPA awareness, can increase understanding of the evidence base and its limitations, ecosystem health and pressure management. - Ensuring links to management are clear, and that data collected will be one of several data types and considerations in a wider process.

Case Study: Participatory Tools in BLUE CONNECT

As part of the BLUE CONNECT project Local Stakeholder Working Group (LSWG) have been developed across the Demonstration Sites. The LSWG comprise a range of stakeholders including MPA managers, government agencies, researchers, tourism, community members, fisheries and aquaculture representatives, and are regionally tailored to suit local needs. These LSWG are formed to empower communities to support MPA management, including developing monitoring programmes and the development of management measures. The LSWG have evaluated tools to support the co-management process, supporting tool refinement and enhancing process literacy. The outcomes of the LSWG meetings are made available in an accessible and publicly available format.

In some Demonstration Sites the LSWG are also supported by working groups, for example in the Macaronesia Demonstration there are three Working Groups with clear goals. In the Scottish Demonstration Site there is a Working Group focused on co-ordinating and refining community monitoring comprising community members and marine scientists. The purpose of the group is to ensure the role of the community monitoring is clear and that community members are able to influence how data is collected and interpreted.

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Participatory MPA monitoring

Across the BLUE CONNECT Demonstration Sites a range of stakeholders and community members have been engaged in data collection to inform MPA management using a range of digital participatory tools. Examples include:

Seasketch tool- Within the Raet BLUE CONNECT the Seasketch participatory GIS mapping tool has been used to gather information from different users within the park, providing a publicly accessible platform to add and view data. The use of the tool has also been expanded to the Macaronesia Demonstration site. The Macronesia Demonstration Site utilised the Seasketch tool within a public event, which was also live streamed. The event brought together leading practitioners, researchers, academics, policymakers, students, and members of the public interested in ocean governance and conservation. Designed as an open space for dialogue and exchange, the initiative explored how Marine Spatial Planning and offshore Marine Protected Areas (MPAs) are being applied in practice and how they can better connect science, policy, and lived experience. Initial set up of a Seasketch workspace can be achieved rapidly (minutes), whilst the development of more complex functionality requires further development time (days to weeks), with training offered by the software developers. Seasketch provides the benefit of not requiring participants to own or download expensive software and is designed to be easy for non-specialists to use.

Monitec- Azores Cetacean conservation (within Macaronesia Demonstration Site) - in the Azores an app has been developed to collect, store, organise and disseminate cetacean data voluntarily collected by whale watching companies in the Azores. This helps to raise awareness of the MPA and collect novel data by tourism operators. To date it has collected over 45000 sightings, across 12000 trips, submitted by 26 companies.

iNaturalist-Within the L'Albera Demonstration site the online tool iNaturalist has been used to record both flora and fauna within the region but also during specific public events, including a 'bioblitz'. A bioblitz is a citizen science activity that brings people together to document as many species as possible in a given location over a short period of time. The collective effort provides a snapshot of biodiversity and the state of an ecosystem at a particular moment. Tools such as iNaturilist are suited to recording and storing biodiversity data and support users with species identification via uploaded images. Data sharing via open platforms such as iNaturalist, are highly valuable for both research and the management of natural areas, providing an opportunity to make the data publicly available.

Shetland marine mammals (Scottish Demonstration Site)- As part of the BLUE CONNECT project a dedicated webpage was developed to highlight opportunities for engagement in data collection and promote wider awareness of the MPA. This includes directing users to a range of recording Apps (developed by environmental NGOs), to allow people to record cetacean sightings whilst at sea (e.g. fishers, kayaking, tourist boat operators) and from land (e.g. walkers and sea watchers). The website seeks to provide a route for all sea users to participate in data collection and therefore participate in the evidence used to inform management. Feedback from users has been sought, and whilst most reported the Apps to be easy to use, some challenges have been encountered by users when signal is lost or poor in more remote locations within the Demonstration Site. However, it has led to increased data recording and an increase in effort-based observations. Feedback on the apps have been collected by the LSWG and have been fed back to the developers.

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Lesson learnt and key challenges

Apps and online tools provide an opportunity for a diverse range of people to participate in data collection, allowing participants to contribute their knowledge while enhancing their awareness of the MPA management process. Where collected data is shared back with participants it provides an opportunity for a clear link between participation, MPA awareness and MPA management. These tools have provided clear opportunities for data collection by the public and commercial users, which otherwise would not be available to MPA managers, and the participants would not be actively involved in the MPAs management. The use of Apps and data portals can provide stable and supported platforms to record data in an accessible way. Ensuring the link between participation and impact on the MPA management is understood and visible is a key challenge for MPA managers. Within the Demonstration Sites several of the tools have been embedded within websites to contextualise data collection process within the wider MPA management process. In addition, the use of public events, working groups and social media has been utilised by Demonstration Sites to support the visibility of these linkages (see 'Digital Tools').

Further Resources

- EmpowerUs - EU funded project to empower communities
- Guide t Participatory process

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Knowledge development - Access, experience and learning for Ocean Literacy

Key Challenge

Access and experience are central to developing Ocean Literacy because people learn best when they directly engage with the marine environment (Cummins and Snively, 2000; Greely, 2008). This connection underpinned much of the initial work and efforts of Ocean Literacy educational programmes. This can include physical access, such as visiting beaches and the coast, where individuals observe ocean processes and marine life firsthand. It also involves cultural and recreational interactions, including traditional fishing practices, surfing, or community coastal festivals, further strengthening personal connection to the ocean. It also includes guided learning opportunities such as education programmes, or experiential learning opportunities such as participation in citizen science programmes, or visitor centres. Within a baseline Ocean Literacy Survey (see Section 2) relevant questions to developing educational programmes might include 'What benefits do you think the ocean provides?', 'What pressures you think exist within the MPA?'

Aim

By increasing opportunities for people to access and experience the ocean in diverse ways, communities can become more aware of the ocean's influence on their lives and are more likely to show more informed and responsible stewardship.

Benefits for MPA management

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Key Questions for MPA managers

Are there opportunities within the MPA for stakeholders and communities to learn about the ecology of the MPA and how human activities might impact the habitats or species within it?

Approach: Access and Experiences to increase Ocean Literacy

There are a range of ways communities and stakeholders can access and experience the marine environment, providing an opportunity to enhance understanding and connection, ***Error! Reference source not found.***.

Table 10 Different types of access and experience relevant to MPA management and Ocean Literacy

Term	Examples	Benefits/Challenges
Citizen science and hands-on marine activities	Participation in a citizen-science program that monitors environmental quality (e.g. water quality) or ecological factors (e.g. seagrass growth, or replanting as utilised in L' Albera Demonstration site	+ Provides an opportunity for participants to learn about the MPA, its pressure and ecological significance. Strengthens knowledge base on which decisions are made. - Financial challenge of providing ongoing support to volunteers, ensuing data quality. - Participation can be dominated by those with free time.
	A community snorkelling or diving program lets participants experience marine life up close, deepening understanding of marine ecosystems	+ Provides an opportunity for participants to learn about the MPA, its pressure and ecological significance. Strengthens knowledge base on which decisions are made. - Financial challenge of providing ongoing support to volunteers, ensuing data quality. - Barrier to participation based on health and cost.
Educational programmes	School or community based educational programmes designed to deepen understanding of oceans and/or enhance OL	+ Programmes can deliver a wide reach across the community. - Ongoing cost to maintaining programmes
Virtual and digital access	Photographic or film exhibitions	+ Inclusive, relatively low cost - Can be viewed by many people - Can be hosted online and in-person
	Virtual Reality (VR) headsets	+ Inclusive, relatively low cost - Only one person can use at a time. - Often requires support staff

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	Immersive cube technology	+ Inclusive, can allow multiple people to use at the same time Can be moved to new locations - Relatively expensive, requires a relatively large space
	Video sharing hosted 360-degree footage	+ Inclusive, low cost; can be viewed from anywhere - Not as realistic immersive experience Editing time

Case Study: Citizen Science in BLUE CONNECT

Across the Demonstration Sites a number of citizen science programmes support several aspects of Ocean Literacy (see also Section 5). In Madeira (Macaronesia DS) the "Kids Dive" programme for children learning scuba diving has provided an alternative route for ocean literacy and additionally a Madeiran citizen science app has been developed to track marine litter. In L' Albera the Neptune project has engaged communities in seagrass restoration via replanting, with training and education embedded within the project. In the Scottish Demonstration Site online training has been developed, trailing the use of free online software to support community participation in citizen science programmes, including marine mammal photographic identification: Marine Mammal Photo-ID: A Volunteer's Guide | Genially, and Marine Mammal Volunteer Training. These resources provide a clear learning component of volunteer opportunity, supporting effective community data collection. These online resource training resources have been made freely available to other regions undertaking marine mammal surveys. The creation of online training resources was found to be easy to create, with several online platforms permitting the creation of courses without the need to purchase specialist software and providing templates to support the development of interactive content and test quizzes.

Lessons learnt and key challenges

The survey of Demonstration Sites highlighted a number of benefits and challenges in developing and maintaining citizen science programmes. While programmes enhanced evidence base for management in the MPA whilst enhancing participant knowledge and emotional connection, the ongoing cost associated with maintaining monitoring programmes can prevent longevity. In addition, data processing and storage challenges can be associated with data collection, particularly where imagery is collected. In Shetland this led to the development of the Photographic Image guidance to try and improve image capture and reduce the number of unsuitable images that needed to be processed.

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Case Study: Education and awareness in BLUE CONNECT

Several of the BLUE CONNECT Demonstration Sites have well established educational and awareness programs, or national programmes, this includes Raet National Park, Burgas Bay, Macaronesia, L' Albera, Vlaamse Banken and Central Romanian Coast, ***Error! Not a valid bookmark self-reference.***. Within the Azores an innovative curriculum for primary school teachers has been developed, integrating Ocean Literacy across subjects (literature, ecology, law, geography etc). Demonstration Sites have also developed outdoor and nature-based education courses and events, like "Ciência Viva" (Expolab - Centro Ciência Viva). All MPAs in Norway have visitor centres linked to MPAs providing information about the MPA, as seen in the Raet Demonstration Site, and this helps to raise awareness of the MPA and enhance Ocean Literacy.

Table 11 Examples of Demonstration Site education and awareness programs

Demo Site	Education and awareness programs
Burgas Bay	1. *Bulgarian Architecture Awards | "FISHERMEN'S TALES" – CHILDREN EDUCATIONAL PLAYGROUND*
L'Albera	1. *National Centre for Environmental Education (CENEAM)* and REEDUCAMANDO *section on Ocean Literacy* provide a collection of educational materials 2. BioDivOcean project 3. *We are Blue Schools*
Macaronesia	*1.* Azores*: Educating a blue generation Program Azores* *2.* Canary Islands*: Loro Parque Fundación marine conservation in Canary classrooms* *3. Maderia Kids Dive Program* *4. Guardiões do Mar* *5. "Ciência Viva" (Expolab - Centro Ciência Viva) - Outdoor and nature-based education courses and events*
Vlaamse Banken	1. *Belgian North Sea* Education programme for the Belgian North Sea area
Central Romanian Coast	1. *Environmental and Ocean Literacy in the Black Sea Basin,* Education Manual (Yuva Dernegi, 2025)
Raet National Park	1. *Lær i tide (Learn in Time)* SALT, on behalf of The Norwegian Retailers Fund, gathered educational material on the specific challenge of marine litter available in Norway.

Lessons learnt and key challenges

While formal educational programmes can help to enhance Ocean Literacy, a number of challenges have been identified by Demonstration Site, this includes:

- Ongoing cost to maintaining programmes
- Linking knowledge to positive changes in behaviour
- Developing Ocean Literacy activities that extend beyond school programmes
- Developing material in local languages

However, where Ocean Literacy is embedded within school curriculum ongoing costs can be reduced and can be used to normalise the school learning to the marine environment. There is also an increasing range of online resources to support Ocean Literacy activities, in a range of languages (e.g. BioDivOcean project), helping to reduce the costs of developing and setting up new Ocean Literacy programmes.

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Case Study: Virtual Access in BLUE CONNECT

Scottish Demonstration Site

In the Scottish Demonstration Site, 360° cameras have been tested as part of the BLUE CONNECT project to capture footage and create immersive content on habitat restoration and species (marine mammal) behaviour. This has been used within VR headsets (see Figure 2), immersive cubes and made available via Youtube on topics relevant to the Shetland Demonstration Site. These have been used at a variety of outreach events and with a wide range of people, from children to adults. This has allowed people to experience Shetland's marine life without specialist equipment or boats. With Shetland's waters cold and often stormy weather most residents do not experience the underwater environment first hand, and some of the footage captured is from surveys conducted as part of the BLUE CONNECT project that is many miles from shore whilst onboard commercial fishing vessels.

Most 360° cameras come with bespoke software allows you to upload to a headset, with software relatively accessible, and with relatively low data processing time. Once captured the same footage can be used across multiple digital platforms (e.g. VR headsets and immersive cubes) as well as online. 360° cameras are relatively low cost (~EUR 500).

Lesson learnt and key challenges

The use of virtual and immersive technology has provided a novel way to engage people in the MPA, with relatively low costs for data capture. Higher costs are associated with immersive technologies (e.g. cube or VR headsets) and can normally only be used in locations where they is on hand support (to prevent theft and to provide user support).

Figure 2 Virtual reality headsets used to create immersive marine experiences within the Scottish Demonstration Site

Further Resources

- UNESCO Ocean Literacy resources
- Ocean Literacy Toolkit Connecting to the oceans: supporting Ocean Literacy and public engagement
- Sustainable Blue Economy Partnership Ocean Literacy Toolkit
- A new blue curriculum UNESCO

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Developing sustainable Ocean Literacy

Actions within the BLUE CONNECT project directly and indirectly support and enhances Ocean Literacy. Engaging people in ocean governance requires an understanding of their current knowledge levels, how they gain their knowledge and providing pathways for their knowledge, views and values to develop management processes which are just and effective. Systematic mapping of relevant activities and actions can help to identify opportunities to utilise Ocean Literacy to develop and promote sustainable behaviour which fits the local context. These actions can support both short, medium-, and long-term outcomes supporting transformative change (Weiss, 1995; Vogel, 2012), as identified within the UNESCO Ocean Literacy strategy.

The UN Ocean Literacy Strategy (UNESCO, 2021) supports actions which collectively provide ocean solutions that will contribute to system change and ultimately provide an opportunity to enable the Sustainable Development Goals to be achieved. Examples of connections between activities and short-, medium- and long-term outcomes are shown in Figure 3. Consideration of Ocean Literacy dimensions within a MPA context can support these activities (see Table 1).

Planning Ocean Literacy actions and monitoring their outcomes in MPA management supports managers understanding of whether engagement, communication, and learning efforts are effectively supporting conservation and governance goals and can help in selecting approaches and tools. Systematic monitoring can cover potential changes in knowledge and awareness, as well as shifts in attitudes, trust, participation, and behaviour over time. By embedding Ocean Literacy monitoring into MPA management, it can support adaptive, outcomes-oriented processes for inclusive governance, strengthening legitimacy, and contributing to more effective and equitable outcomes.

A spreadsheet to support demonstration sites and MPA managers to record and monitor Ocean Literacy actions can be found in Appendices 1 within this toolkit (and will be made available as a spreadsheet on the BLUE CONNECT website). Within the spreadsheet and Table, examples of challenges and actions are given. It is intended this will help to guide structured planning and recording of activities within demonstration sites and MPAs to support transformative change.

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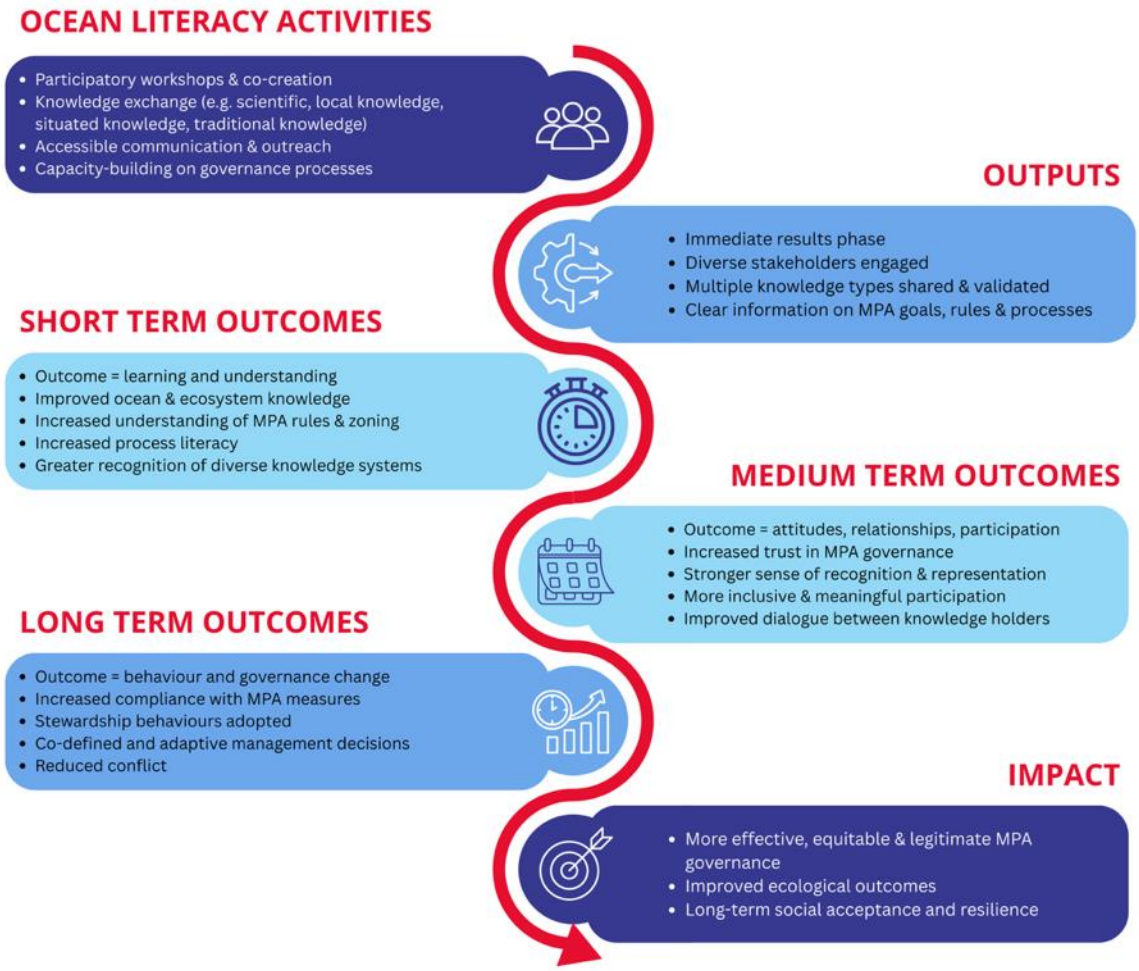

Figure 3. Linking Ocean Literacy actions, outputs, and outcomes to achieve impact.

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Further Resources

Ocean Literacy toolkits and resources:

Resources	Sea area	Overview
National Marine Educators Association	USA based	Ocean Literacy resources including webinars
UNESCO Ocean Literacy resources	UN	A range of resources including educational resources
EU4Ocean	EU	The EU4Ocean Platform is the focal point for organisations and initiatives to connect, collaborate and mobilize efforts on Ocean Literacy.
Sustainable Blue Economy Partnership	EU	Webinars and training, games
Ocean Literacy for All- A toolkit- IOC Manuals and Guides	UN	Background to OL and guidance
Empower Us	EU	Resources to empower coastal communities to transition towards more resilient, inclusive and sustainable coastal development
Ocean Literacy within the United Nations Decade of Ocean Science for Sustainable development: a framework for action	UN	Framework to support OL
An Ocean Literacy Toolkit for Namibia	Namibia	Showcases region specific toolkit creation including exemplar educational material by following the 7 principles
Ocean Literacy Toolkit Connecting to the oceans: supporting Ocean Literacy and public engagement	Worldwide	10 best practice principles for ocean learning communication and OL activity/ intervention design framework

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Appendix 1 - Monitoring and plan activity template

Table 12. Monitoring and plan activity template to deliver enhanced MPA management

Consideration	Examples
Sector	Recreational boat users, fisheries
Challenge	Pressure management
Aim	Reduce spread of non-native species; Raise awareness of MPA management
Activity Description	Signage to clean boats at marinas; Leaflets, social media and web resources
Action type	Behavioural change, Communication, Digital tools
Action category	Dimension of Ocean Literacy e.g. Awareness, behaviour
Indicator category	Choice of: **Cognitive**: understanding of MPA purpose, zoning, ecological processes **Affective**: attitudes towards conservation, sense of place, trust in managers **Behavioural**: compliance, stewardship actions, participation in monitoring or governance
Outputs (immediate results)	Change in knowledge, understanding of MPA management
Outcome and impacts	e.g. positive stewardship behaviour; Greater awareness, effective management
Outputs	e.g. Leaflets produced and number of leaflets given out
Supports co-management	Yes/No
Supports co-definition	Yes/No
Supports Effectiveness	Yes/No
Existing or new measures	Existing/New
Date	Date of actions

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Appendix 2 - Results of demonstration site survey of Ocean Literacy baseline, initiatives and barriers to implementation

To support the development of this toolkit a survey of demonstration sites was conducted. This survey built upon the findings of 'D4.1 Scoping and shortfall analysis on baseline data and practices to support achieving efficient MPA conservation and management', which provided a baseline of relevant Ocean Literacy (OL) for the demonstration sites (DS). This additional survey was conducted to understand and interpret the survey results of Deliverable 4.1 and also sought to identify marine governance barriers and opportunities linked to OL, including examples of best practice from the DS. The results of these surveys are summarised here, and these surveys' findings and examples of best practice have been incorporated into this Blue Connect Ocean Literacy tool kit, where relevant.

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Q1- Does your country or demonstrate site have an existing Ocean Literacy plan or actions?

Whilst national OL plans exist in some nations or regions, across the DS there are a limited number of formal OL strategies or national plans. The Azores is an example of a well-documented OL programme, 'Educating a Blue Generation', which is implemented under the broader Blue Azores Programme. Whilst other countries and regions lacked specific national programmes, many DS benefited from initiatives and project-based actions, contributing to the advancement of OL, which support potential future strategic development. Examples include: The EmpowerUs Horizon project, Black Sea Blue Academy 2025 initiative, engaging local partners, youth and educators; in Spain the National Centre for Environmental Education (CENEAM), which forms part of the Ministry of Ecological Transition and Demographic Challenge, coordinates REEDUCAMAR, which is a network and resource inventory for marine environmental education.

Where these programmes exist, they:

- Raise public understanding of marine and coastal issues
- Strengthen local engagement and stewardship
- Provide a foundation for a future coordinated OL plan

Awareness and process literacy

Q2- From the survey carried out as part of the Task 4.1, do you agree with the findings of the awareness of your demonstration site?

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Background surveys completed as part of Task 4.1 demonstrated a general awareness of the MPAs associated with DS, although awareness levels varied between DS, as well as in different regions within a DS. DS highlighted that stakeholder awareness was influenced by factors such as time from adoption and distance of the MPA to population centres (e.g. distance offshore). At several DS understanding of specific conservations measures was found to be low, including misidentification of measures. This misidentification by those completing the 4.1 survey, included believing management measures were in place where they were not (e.g. fisheries restrictions), or not being aware of management measures which were already in place (e.g. dredging restrictions). These results suggest opportunities for further targeted and continuous engagement and communication efforts.

Q3+Q4- Are all stakeholders aware of how to engage in MPA marine management processes? Do you provide specific guidance or approaches to support this? Are there any specific barriers to engagement (including institutional, legal)? Are all stakeholders aware and engaged in the development of solutions to pressures within the MPA or opportunities to support evidence gathering? Are there any specific barriers to this?

Due to the different stages of MPA management across the DS, awareness of how to engage in MPA management also varied, with some actors lacking awareness and guidance on how to engage effectively. However, some DS have specific programmes in place or in development, for example in the cetacean migratory corridor DS a management plan is being created via a participatory process, which includes all major stakeholders, led by the Ministry with support from the project LIFE INTEMARES. The process follows the Guide to participatory processes for the LIFE INTEMARES Governance Strategy. In Bugus the Municipality of Burgas has launched dialogue platforms and public forums such as: *EU Mission Ocean* event: "From the Danube Source to the Black Sea – Healthy Waters and Healthy Life" (15 October 2024) and Black Sea 2030: Partnership for a Sustainable Future international forum (25 October 2025).

DS highlighted that a range of stakeholders are engaged in developing solutions and supporting data collection. However, that stakeholder engagement was in some DS partial and uneven. NGOs, research institutions, and some municipal actors, or government agencies were more likely to be involved. In Scotland, the development of the Local Stakeholder Working Group (LSWG) is providing an opportunity to engage a range of stakeholders in the development of improved local governance, and have developed a dedicated website to support engagement in data collection.

The Blue Connect project also supports the measures which reduce these barriers via LSWGs and WP4 and WP7.

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Highlighted barriers to engagement include:

- No coordinating authority for some DS
- Fragmentation of responsibility between institutions and regions
- Limited trust and coordination between institutions
- Lack of formal guidance on participation in decision-making
- Lack of structured participation mechanisms
- Fragmented communication and limited access to marine management information
- Insufficient information on the role of stakeholders in marine management
- Resources and capacity to sustain long-term involvement and gather evidence
- Negative perceptions between stakeholders
- Lack of data to support pressure analysis and solution development
- Complexity of pressures, e.g. international fisheries, with complex mechanisms for pressure management and lack of local representation

Opportunities to improve stakeholder engagement in the development of solutions to pressures included:

- Enhanced communication and facilitation
- Clear engagement pathways
- Enhanced funding to support engagement
- Simplification of institutional roles or decentralisation of responsibilities to local actors
- Improved data to support solution development

Behaviour

Q5- Do you have any specific examples of actions to promote behaviours which reduce potential impacts? Are there any specific barriers to this?

Across the DS there are several examples of actions. In the Scottish case study, social media and targeted campaigns have been utilised to promote positive behaviour over a range of topics including community litter removal, biosecurity, shipping, and fishing practices which reduce entanglement. In Vlaamse Banken, a campaign targeting shipping companies giving practical ways that ships can reduce underwater noise (for example routeing, speed reduction, quieter propeller design) has been developed, and in Spain within the 'Cetacean migration corridor', an infographic has been created to communicate regulations to reduce tourist boat pressures on cetaceans. In Shetland (Scotland), Spain, Cabo Verda and Belgium, the fishing sectors have been engaged to develop and promote seabed friendly fishing methods and increase awareness of habitats or species impacts.

In Bulgaria, research has shown a willingness to change behaviour if it benefits the Black Sea, but they need clearer strategies and trusted guidance to enable action (see EmpowerUs 2025, *National Ocean Literacy Needs for an Empowered and Resilient Future*). In Cabo Verde, there are several

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initiatives to promote behaviours which reduce impacts, such as beach cleaning, plastic recycling, community-based monitoring programmes (illegal activities, marine megafauna, fisheries), capacity building to promote good practices in fishing activities and fish value chain.

In Macaronesia, the OL programmes target behaviour change among school children and teachers (e.g., integrating awareness of human impacts on the ocean). The press release for "Educating for a Blue Generation" indicated students were more aware of ocean importance and human impacts (Press-Release- -Educating-for-a-Blue-Generation-pilot-programme-is-ready-to-scale-nationally- -Apr24.pdf).

In many DS specific efforts can be:

- sporadic, without ongoing follow-up
- uncoordinated, with stakeholders acting independently
- limited by human and financial resources
- NGO led, requiring external funds, which are usually short to medium term

To create lasting behaviour change, actions need to be part of a systematic, long-term approach, supported by education, partnerships and policy.

Activism

Q6- How can stakeholders and communities contribute to governance within the demonstration site? Are there any known barriers for specific groups e.g. sector (tourism, fisheries), gender, age, geographical sub-area to participate within governance of your demonstration site (lack of awareness or knowledge)?

In most DS, stakeholders can contribute to governance through a formal participatory process, and within most DS there have been public consultation processes related to the creation of the MPA management plan. Within the Cetacean migratory corridor, the only barrier identified by a specific group (maritime transport) is lack of knowledge (as discussed in a workshop organised by UMA, November 2025).

Examples across DS for stakeholders and communities to contribute to governance include:

- Participation in consultations and co-planning processes
- Citizen science and environmental monitoring
- Sharing local and traditional knowledge; and
- Engagement in awareness and decision-support activities.

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Barriers

Barriers to participation persist, including:

- Lack of awareness or understanding of governance processes
- Limited access to information
- Sector-specific challenges (e.g. time and resource constraints in fisheries and tourism)
- Lower participation among youth and some rural coastal communities due to limited outreach
- Women may be marginalised in some sectoral discussions (e.g. fisheries)
- In archipelagos with limited transport connections and a centralised government, such as Cabo Verde and Shetland, the geographical barriers and lack of governance autonomy at island level present challenges to inclusion.

Q7- What do you perceive as main barriers to engaging more people in citizen led marine monitoring activities?

Across all DS lack of time, interest and knowledge were seen as barriers to engaging people in citizen led monitoring activities. Other identified barriers include:

- Lack of awareness of how to get involved or what contributions individuals and stakeholders can make
- Social dynamics
- Logistics/geographical access (remote islands, offshore areas)
- Low levels of marine knowledge and skills - combined with limited training and support
- Perception that monitoring is difficult or only suitable for experts
- Cost/resources (equipment, training)
- Coordination/continuity
- Access to data/results (ensuring participants see the impact of their contributions)

Q8- Are there any specific strategies to maximise participation in governance arrangements?

Across the DS a number of strategies have been developed, including:

- Improving accessibility in terms of finance, logistics and language
- Ensuring the arrangements are more interactive and dynamic
- Developing and improving the communication strategies to disseminate information
- Ensure that monitoring/management feedback loops are visible: i.e., participants see the results of their contributions to keep them motivated
- Tailored engagement to specific stakeholder types (tourism, fisheries, women's groups, youth) and provide flexible participation options (e.g., online, island-based, seasonal)

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- Using outreach/awareness campaigns that link OL to local livelihoods, culture and economy (so stakeholders see relevance)
- Providing logistical/financial support for remote island participation (transport, equipment) and scheduled to accommodate seasonal/part-time stakeholders
- Promoting partnerships with schools, NGOs, universities, local authorities to embed monitoring/governance into existing community structures
- Developing specific events e.g. *EU Mission Ocean* event "From the Danube Source to the Black Sea – Healthy Waters and Healthy Life" (15 October 2024, Burgas) and *Black Sea 2030: Partnership for a Sustainable Future* forum (25 October 2025, Burgas)

Communication

Q9- What methods are used to communicate with stakeholders and the public?

Across the DS a range of communication methods are employed to engage targeted stakeholders and the public. This includes:

- Digital communication e.g., email, social media, websites, online educational material
- Printed communication e.g., leaflets, booklets, policy briefs, guidance documents, signage
- In-person events e.g., meetings, educational programmes and events
- Participatory opportunities e.g. beach cleans, monitoring, training for participants
- Creative methods e.g., art installations, films and photography, immersive technologies

Q10- Do you use any innovative approaches?

Not all DS report using innovation in OL strategies. Within the DS that have trialled or embedded innovative methods, these have been context specific and utilised a range of interdisciplinary methods, including creative methods.

Within the Bulgarian Biodiversity Foundation in Burgas, activities under the Horizon project EmpowerUs included:

- Storytelling initiatives under the "Blue Justice" framework, linking marine issues with social and climate justice and giving voice to local communities.
- Experiential learning methods to bring people closer to the marine environment in a direct and personal way by the *Women Make Waves* campaign activity book and *Photo Voice* campaign.
- Partnerships with local communities, businesses and cultural actors, as well as integrating marine topics into urban and cultural events, making these actions both innovative and context-specific for the region.

In Shetland creative methods have included:

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- VR and immersive technologies
- Films and imagery

Innovation has also been used in the Azores curriculum for primary school teachers, integrating OL across subjects (literature, ecology, law, geography etc); Madeira has the "Kids Dive" programme for children learning scuba diving, citizen science apps for marine litter tracking (https://mare-madeira.pt/outreach); and outdoor and nature based education courses and events, like "Ciência Viva" (Expolab - Centro Ciência Viva).

Knowledge

Q11- Are there opportunities for different forms of knowledge to inform the management of the demonstration site, for example in co-defining measures, creation of evidence base, monitoring etc? Are there any barriers to including different knowledge types?

Across the DS different forms of knowledge are integrated utilising a range of methods. This includes:

- Historical knowledge – Shetland is using interviews, archival material and oral history to understand historical distribution of marine mammals
- Within the Burgas Bay DS, local knowledge and sectoral experience (e.g., fisheries, tourism, conservation) informs co-defined measures, monitoring, and evidence-based management.

Identified barriers include:

- Validation of community data for national measures due to incompatibility with government systems
- Perception of data which is not 'scientific'
- Integrating local/traditional knowledge may be challenging due to institutional inertia, language or cultural barriers
- Co-management is not legally recognised at all DS
- Lack of clear mechanisms and coordination processes
- Absence of shared platforms for data and experience
- Limited trust and a weak culture of knowledge sharing
- Insufficient capacity to systematise and integrate informal data

Despite these barriers, interest and the potential for collaboration was highlighted by DS, particularly among local communities and professional groups.

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Q12- From Task 4.1 do you feel the responses to identification of pressures accurately reflected the pressures in your demonstration site? If not, why do you feel this difference occurred?

DS confirmed that the survey responses reflected current pressures. However, more detailed information is available on pressures than captured within the survey. Changes over time (e.g. trends) were also highlighted. For example, respondents noticed changes in pollutant concentrations and the impact of new offshore infrastructure. Therefore, while respondents correctly identified key pressures, the ranking may not be exactly accurate.

Q13- What tools do you use to collect different knowledge types? Are there any specific challenges of integrating this within your demonstration site?

At DS data is collected via a number of routes:

- Tracking scientific research and publications
- Citizen science including recording Apps
- Project activities
- Public surveys and interviews
- Education and communication events
- Informal contacts within local communities, NGOs, and sector representatives (e.g., fisheries, tourism)

Specific challenges were highlighted by DS including:

- Data fragmentation and format
- Informal knowledge rarely being documented systematically**,** making integration with scientific data difficult
- Limited capacity and resources hindering regular collection, verification, and integration of diverse knowledge sources into a single, accessible evidence base for management
- Sustaining long-term participation
- Ensuring participation from less-represented groups e.g. fishers, tourism operators, remote island communities
- Access to technology/internet in remote islands
- Translating knowledge into actual management decisions.

Access and Experience

Q14- Is access and experience a challenge at your demonstration site (e.g. due to distance offshore meaning very few people have direct access or experience of the area)? Are there any existing actions to enhance access and experience (e.g. through Virtual Reality)?

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Across the DS different challenges exist relating to access and experience, this reflects differences in designations, the size and diversity of the area, distance to shore, and access challenges associated with islands including transportation and internet access.

Examples of initiatives to enhance access and experience include:

- Boat tours and thematic trips (e.g. "Fishing and Wine")
- National and international events: sailing competitions, swimming marathons, diving, music and cultural festivals
- Tourist infrastructure development
- Public port access
- Use of VR headsets and immersive cubes
- Events which take place on land and at sea

Adaptive Capacity

Q 15- Are there specific challenges relating to stakeholders or communities' capacity to respond to changes within the demonstration site e.g., relating to climate change, change in ocean economies, or changing ecosystem structure or function, or due to measures within the MPA. Would any Ocean Literacy measures support this adaptive capacity?

Adaptive capacity varied across DS. Where measures are less developed, predicting adaptive capacity was not possible. DS highlighted that the fisheries industry would be affected by changes within the DS ecosystem structure and function, but their capacity to respond is not primarily limited by OL. At other DS, financial implications of measures could reduce adaptive capacity, particularly for fisheries. It was highlighted that measures under discussion could impact maritime traffic with potential implications for passenger services and the capacity to transport goods to/from Islands. OL could play a role in building public support for measures.

Specific future challenges were highlighted by DS including:

- Climate change impacts: heatwaves, floods, coastal erosion
- Transitions in the blue economy
- Shifts in ecosystem structure and function
- Insufficient green infrastructure
- Reluctance to changing behaviours and adapting to the changes

OL was perceived as a key enabler of adaptive capacity by some DS; it was highlighted that it is a challenge to ensure actions reach the relevant stakeholder groups and is tied to practical adaptation actions (not just awareness).

Opportunities for OL and other measures to enhance adaptive capacity include:

- Targeted communication and training – clear, locally tailored information to help local communities understand changes and their role in adaptation

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- Local dialogue and co-planning platforms – regular spaces for stakeholders to discuss and co-create solutions build trust and shared responsibility
- Pilot or demonstration projects – visible, practical examples help people see benefits and encourage participation
- Citizen science and community monitoring – direct involvement in data collection strengthens ownership and engagement
- Economic incentives for sustainable practices – supporting environmentally responsible local businesses encourages adaptation
- Supporting local leadership and bottom-up initiatives – change is more effective when led or endorsed by trusted community figures

Trust and Transparency

Q16- Are there any existing challenges relating to trust and transparency? Are there any specific examples you have used to increase trust, or barriers (e.g. legacy issues) to ensure by-in to the MPA designation, monitoring and management measures?

DS identified a number of challenges impacting trust and transparency, including:

- Challenges associated with historical mistrust
- Awareness of the potential gains and losses of any action before it is implemented

DS highlighted that trust and transparency has been enhanced where:

- Staff are local, and opportunities exist to build relationships
- Participatory approaches have been used
- There has been clear communication in decision-making processes
- There was clear communication of the objectives and outcomes
- There were opportunities for feedback sessions on the results of activities

Resources

Q 17- Are there specific tools or resources that you feel are missing to enhance Ocean Literacy and marine management in your demonstration site?

Highlighted tools and resources include:

- Structured stakeholder engagement toolkits tailored for island/archipelago context
- Translation into local languages
- Capacity building/ OL education programmes for all stakeholders (not just educational programmes for school children)
- Longterm funding/resources
- Data integration platforms where stakeholder-gathered knowledge (local/traditional, citizen science) is formally incorporated into MPA management decisions

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