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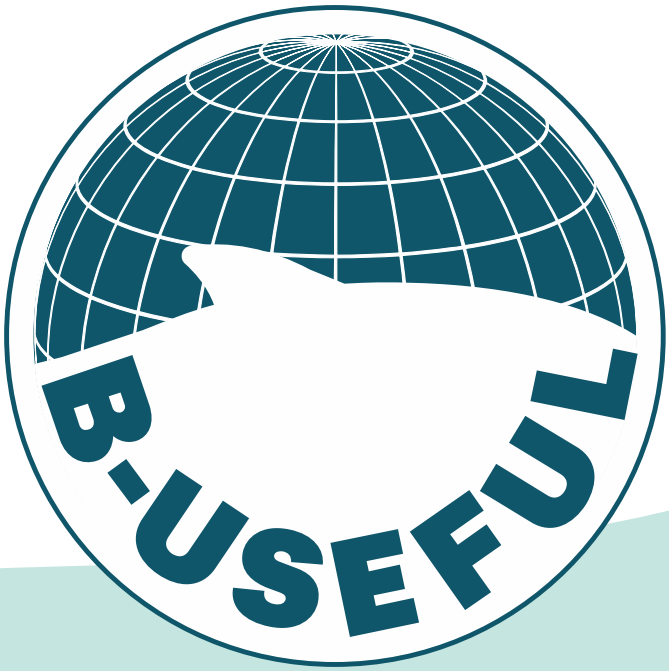

User-oriented Solutions for Improved Monitoring and Management of Biodiversity and Ecosystem services in vulnerable European Seas

Deliverable 6.2 Plan for adaptive management to support decision-making in response to end user and policy needs at the different levels

Deliverables

Ute Jacob, David Lusseau, Kåre Nielsen, Neil Maginnis, Eirini Glycki, Maria Teresa Spedicato, Murray Thompson, Martin Lindegren

Deliverable Title:	**Plan for adaptive management to support decision-making in response to end user and policy needs at the different levels**
Work package:	**6 – Decision support and outreach**
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Lead responsible for the report: Ute Jacob, AWI
ute.jacob@hifmb.de

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PP:	Restricted to other programme participants (including the Commission Services)
RE:	Restricted to a group specified by the consortium (including the Commission Services)
CO:	Confidential, only for partners of the consortium (including the Commission Services)

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1. The role of this deliverable

This deliverable provides a plan for B-USEFUL how to support decision-making tailored to current end user and policy needs broadly associated with the EU Green Deal, the EU Biodiversity Strategy 2030 and the Nature Restoration Law. More specifically, it outlines a roadmap and time line for the project how to best ensure impacts by facilitating uptake of project outcomes within existing management and conservation frameworks for ecosystem-based management (EBM) and marine spatial planning (MSP) at the regional, European and international level (Figure 1). It also serves to identify potential missing pathways or pipelines for effective uptake of project outcomes in existing advice and policy frameworks, as well as suggest alternative ways to bridge these gaps, preferably through coordinated actions and activities involving other EU funded projects on marine biodiversity.

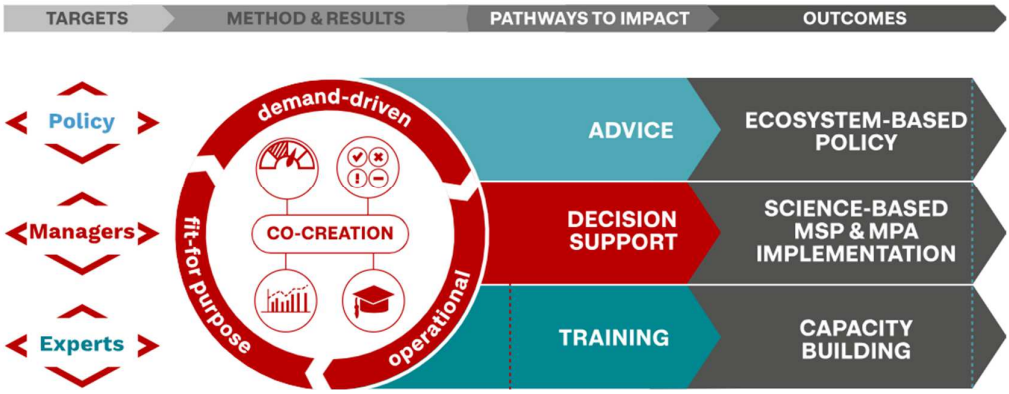

Figure 1. Conceptual figure illustrating the three primary pathways to impact of B-USEFUL. This deliverable aims to identify and describe existing frameworks and pipelines for uptake and use in science advice and decision-making (i.e., pathway 1 and 2).

In terms of structure and content the deliverable first summarizes the key end-user needs from WP1, specifically focusing on aspect relevant for the direct uptake and use of knowledge, data, indicators and decision-support tools (DST) developed within B-USEFUL (WP2-6). Subsequently, we identify and describe the existing channels and pipelines for uptake in various decision-making bodies and frameworks, such as those currently available within the *International Council for the Exploration of the Sea* (ICES), as well as the regional commissions and conventions dedicated to the protection of the Marine Environment of the North-East Atlantic (OSPAR), the Baltic Sea (HELCOM) and the Mediterranean Sea (GFCM). We also identify channels for uptake of B-USEFUL outcomes within policy making, such as ways in which to engage with the EU DGs, as well as international frameworks, including The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the World Ocean Assessment (WOA) and The International Union for Conservation of Nature (IUCN). Finally, we synthesis the findings into a roadmap and timeline for uptake of B-USEFUL products within decision and policy making to ensure impact both in the short and long term.

Contributors

Ute Jacob, David Lusseau, Kåre Nielsen, Neil Maginnis, Eirini Glycki, Maria Teresa Spedicato, Murray Thompson, Martin Lindegren (2024) - *B-USEFUL. Plan for adaptive management to support decision-making in response to end user and policy needs at the different levels.* Technical University of Denmark.

Acronyms and abbreviations

ACOM: Advisory Committee

ADGEO: Advice Drafting Group for the EO

CFP: Common Fisheries Policy

DST: decision-support tool

EBM: ecosystem-based management

EO: Ecosystem Overviews

GFCM: General Fisheries Commission for the Mediterranean

HELCOM: The Baltic Marine Environment Protection Commission (Helsinki Commission)

ICES: International Council for the Exploration of the Sea

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

IUCN: The International Union for Conservation of Nature

MSFD: EU Marine Strategy Framework Directive

MSP: marine spatial planning

OSPAR: Convention for the Protection of the Marine Environment of the North-East Atlantic

WOA: World Ocean Assessment (UN)

WP: Work package

ICG-COBAM: The Intersessional Correspondence Group on the Coordination of Biodiversity Assessment and Monitoring

SSBD: Science Service for Biodiversity

2. Summary of end-user and policy needs

2.1 Approach

As part of a broader end-user forum developed under WP1, task 1.2 has elicited views of end-users on priority needs for marine biodiversity information in Europe. This was carried out as a mixed method approach, which included the use of a serious game, workshops with end-users, a survey, in dept interviews and desk studies. Through these approaches, information was obtained from a broad variety of representatives involved in biodiversity governance. These included representatives involved in policy making, public administration on national and local levels, biodiversity research, marine industries and environmental NGOs, and participants in regional marine conventions. Detailed outcomes of this work will be reported in the forthcoming Deliverable 1.2. To provide a background on these end-user and policy needs, a few key messages are provided below as overall context for this report.

2.2 Taking an ecosystem approach to biodiversity information and advice

End-users recommend taking an integrated approach to biodiversity indicators, and to address biodiversity within an ecosystem approach. This is consistent with the EU's policy commitment to an ecosystem approach, as stated in key policies of relevance for marine biodiversity management in Europe, including the MSFD, the MSPD and the CFP. As biodiversity is a complex phenomenon, different and complementary indicators are needed to inform management decisions. Strategic clusters of indicators should be identified regionally and locally. There is a particular need for indicators that can be informative in the context of climate change. There is also a need for indicators that give insight in the cumulative impacts from different environmental stressors. In general, there is a further to define thresholds for marine biodiversity indicators, that is, to define indicator levels that are acceptable or not acceptable. This is consistent with the Commission Decision (EC 2017), which set requirements for developing thresholds for indicators of marine biodiversity. Some end-users highlighted a need for information about uncertainty relating to assessment of biodiversity indicators. Taken together, threshold and uncertainty are important preconditions for using indicator information in actionable advice. Several stakeholders also emphasized a need for harmonizing biodiversity indicators and reporting periods. This would increase opportunities for regional biodiversity assessments. However, stakeholders are also aware of challenges and drawbacks with standardization, for instance linked to particulates of local data collection approaches, and the characteristics of ecosystems and habitats.

2.3 Science – policy interface

In addition to indicator needs, the stakeholder identified a recurring gap between scientific knowledge and decision-making in the context of marine biodiversity. Notably, participants

noted that policy decisions are often made without making full use of available scientific data, due to a lack of awareness, political considerations or failure to clearly define objectives. Poor alignment between research and an actionable legal frameworks appears as a major obstacle for effective biodiversity management. Translating scientific information into actionable policy advice remains a challenge. Participants stressed the importance of creating a clear bridge between research and policy to ensure that biodiversity concepts are understood and applied in the same way in all regions. Furthermore, cooperation between countries on biodiversity research is seen as essential. However, disagreements among scientists on the interpretation of data and limitations in the practical application of research findings can impede progress. Participants highlight the need for projects, like those funded through the Horizon program, to prioritize data gathering and sharing. This would facilitate a more unified approach to understanding and protecting biodiversity. Addressing these issues requires promoting stronger interdisciplinary approaches, integrating both scientific and local knowledge and improving communication between sectors.

In summary, B-USEFUL is ideally placed to have a key role in addressing the challenges identified above by: (i) facilitating further cooperation about biodiversity data, and to ensuring general availability and interoperability; (ii) initiate cooperation on harmonization of biodiversity indicators, on identifying thresholds, and on the representation on uncertainty; (iii) develop standardized and benchmarked and provision of advice on marine biodiversity and provide information on tradeoffs between measures to support marine biodiversity and performance of economic marine sectors.

3. Assessment of existing pipelines for decision-making and policy

In this section we identify and describe the existing channels and pipelines for uptake of B-USEFUL products (i.e., knowledge, models, indicators and DST) in various decision-making bodies and frameworks, such as those currently available within ICES (3.1), as well as the regional commissions and conventions dedicated to the protection of the Marine Environment of the North-East Atlantic (OSPAR), the Baltic Sea (HELCOM) and the Mediterranean Sea (GFCM). We also identify channels for uptake of B-USEFUL outcomes within policy making, such as ways in which to engage with the EU DGs, as well as international frameworks, including the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the World Ocean Assessment (WOA) and The International Union for Conservation of Nature (IUCN).

3.1 Decision-making and science advice within ICES

ICES is an intergovernmental marine science organization including members from over 700 marine institutes in 20 member countries that aims to advance and share scientific understanding of marine ecosystems and the services they provide, as well as use this

knowledge to generate state-of-the-art advice for meeting conservation, management, and sustainability goals. ICES assessment products are built upon request from ICES advice requestors, and are used to support Ecosystem Based Management (EBM) and governance for the marine ecosystem. The ICES Ecosystem Overviews (EO) advice is one of the key mechanisms for ICES to deliver the evidence base in support of EBM. The objective of the EO is to distil ecosystem complexity into digestible information useful to decision-makers. The EO are part of the recurrent advice in the Administrative Agreement signed between the EU and ICES and have been developed through open consultations with both advice requestors and ICES observers. The EO have a broad target audience ranging from policy makers to experts to the informed public. Based on stakeholder views and suggestions the ICES EO have established a pipeline process for the future incorporation of new knowledge, such as information on the status and trends in multiple aspects of biodiversity, as well as the key human activities and impacts. Candidate products that have the potential to meet the requirements related to quality, accessibility, transparency and reproducibility, are consider by the ICES Advisory committee for inclusion to the EO through the pipeline process (ICES 2019, WKEO3; ICES 2021, WKTRANSPARENT).

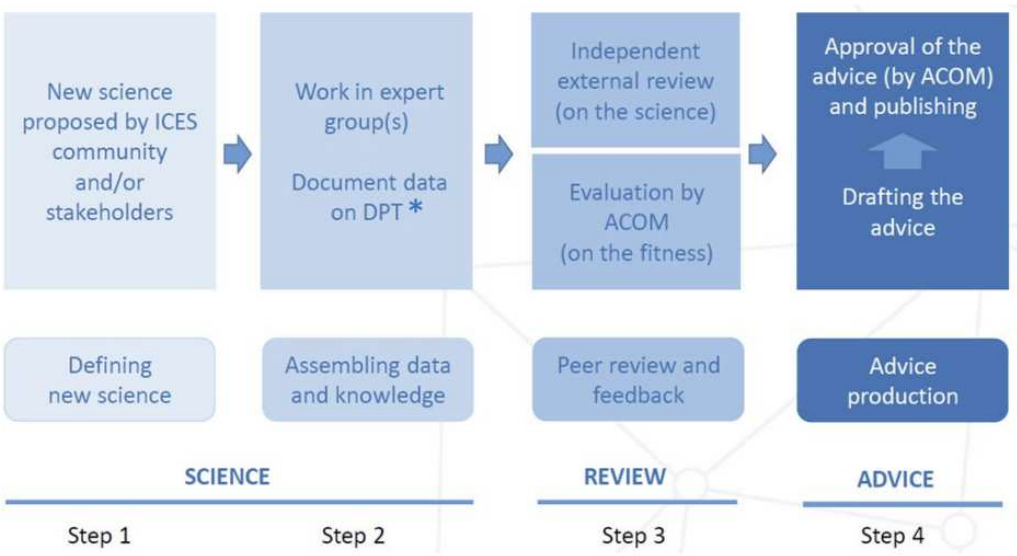

Figure 2. Pipeline process for inclusion of new science in the ICES Ecosystem Overviews (ICES 2023, ICES Ecosystem Overviews Technical Guidelines).

The development of the B-USEFUL products and DST is supported by the ICES Secretariat with the objective of maximizing their relevance to the EO pipeline requirements for inclusion to the EO. The project's outputs cover areas that will enhance the current state of the EO, such as assessments and tools related to the status of biodiversity in EU seas and oceans. B-USEFUL products will be presented in the relevant regional ICES working groups within the Integrated Ecosystem Assessments Steering Group (IEASG) after coordination with the IEASG chair and the chairs of the relevant working groups. B-USEFUL products will then be assessed by the experts and taken through the EO pipeline process (Figure 2).

More specifically, the EO pipeline process is initiated by an ICES Working Group with a proposal of knowledge, assessment, and/or trends product to be included in the EO. The proposal is enhanced through two steps: the inclusion of data and assessments at the ICES Data Profiling Tool and the independent review of the content. Following these steps, the proposal is taken to the ICES Secretariat and Advisory Committee (ACOM) that assess the relevance. An iterative feedback loop is then initiated among ACOM, Secretariat and the Working Group. The final proposal goes through the Advice Drafting Group for the EO (ADGEO) that will formulate the advice product to be included in the EO (Figure 2). As an example, a new section in the Greater North Sea EO, "Physical seabed disturbance and Physical Loss", was included through the pipeline process. The proposal for this section was created by the ICES Working Group on Fisheries Benthic Impact and Trade-offs (WGFBIT) and the pipeline process spanned through one year with the final step of the advice creation in ADGECO in spring 2024. Other pipeline products include the "Social and economic Context" of the EO. ADGEO takes place twice a year, spring and autumn, and once the B-USEFUL proposal is submitted the process will follow a relevant timeline that will be established by the ICES Secretariat and ACOM. By leveraging this existing ICES policy advice structure B-USEFUL aims to provide a direct impact into the evidence base that informs decision-makers and society about the state and trends of the EU seas and help clarify trade-offs between management options.

In addition to the EO, ICES has recently received increasing requests from advice recipients to create more visual representations of our scientific advice. This trend aligns with broader shifts in content consumption, where visual elements are becoming increasingly important for effective communication and decision-making support. ICES has already taken significant steps in this direction with the development of the adviceXplorer tool, which provides interactive visualizations of fishing opportunities advice. This tool has demonstrated the value of visual content in making complex scientific information more accessible and understandable to a wide range of stakeholders. Building on this development, ICES is currently developing a new application for Fisheries Overviews (FO). This tool aims to present comprehensive information about fisheries in a visually engaging and interactive format, enhancing the ability of decision-makers to grasp key trends and patterns quickly. A similar tool for the Ecosystem Overviews is planned and this provides the opportuntiy for B-Useful's DST to influence and inform an ICES advice product, subject to passing through the pipeline process. To maximise the possibility of synergies between the DST and ICES' EOs, the DST will be developed as an application developed utilising modules. This modular approach allows components to considered individually when considering the suitability for inclusion in the ICES EOs which may ease or accelerate any integration. In summary, the potential integration of the DST, or components thereof, into ICES EOs could result in valuable outcomes including: providing decision-makers with a more comprehensive view of marine ecosystems by combining biodiversity data with existing fisheries and ecosystem information; and increasing the visibility and use of B-USEFUL outputs among policy-makers, marine managers, and other stakeholders.

3.2 Decision-making and science advice within regional conventions

OSPAR: The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) is the mechanism by which 15 Governments & the EU cooperate to protect the marine environment of the North-East Atlantic. OSPAR is guided by the ecosystem approach to an integrated management of human activities in the marine environment. Contained within the OSPAR Convention are a series of Annexes, the first three focus on eliminating various sources of pollution to the marine environment, with the final two focused on assessing the quality of the marine environment and protection and conservation of marine ecosystems and their biological diversity. Consequyently, the two latter appendices are of primary relevance for uptake of B-USEFUL knowledge and outputs.

OSPAR Quality Status Reports occur roughly every decade, sandwiched by Intermediate Assessments. These reports contain the latest assessments of establish and candidate indicators. OSPAR is currently at an early stage in the Quality Status Report assessment cycle where new biodiversity indicators and developments to existing ones can be proposed and developed by B-USEFUL in time for the OSPAR Intermediate Assessment 2028. More specifically, the process for indicator development and uptake first needs to be proposed to The Intersessional Correspondence Group on the Coordination of Biodiversity Assessment and Monitoring (ICG-COBAM) which has quarterly meetings and which members of B-USEFUL actively participate on a routine basis. If ICG-COBAM support the work, and this can include amendments, it can be presented to The OSPAR Biodiversity Committee which meet annually, with meetings scheduled in 2025, 2026 and 2027 that could be targeted by B-USEFUL. If it is not supported, B-USEFUL will garner more international consensus within ICES Working Groups (WGBIODOV) and/or via publication in high impact journals. With broad international consensus, indicators stand a much better chance of being adopted by OSPAR.

HELCOM: The Helsinki Commission (Baltic Marine Environment Protection Commission, HELCOM) governs the Helsinki Convention, a 1974 initiative from Baltic Sea coastal countries as part of the UNEP Regional Seas Programme initiative. As such, it commits contracting parties to protect the Baltic Sea from pollution and to take measures to conserve habitat, biodiversity and the sustainable use of marine resources. HELCOM has established a set of indicators (https://indicators.helcom.fi) to inform this commitment which captures what the Commission perceives to be important indicators of pressures, habitat state, and biodiversity. It produces a State of the Baltic Sea holistic assessment (HOLAS) every 6 years and the current iteration (HOLAS IV) extends from 2024 to 2029. This will include indicator related developments which will take place from Q4 2024 to Q4 2026 during which time B-USEFUL will be able to feed in the work of the Working Group on Biodiversity and its Expert Groups through project partners that are already members of HELCOM working groups.

GFCM: The General Fisheries Commission for the Mediterranean (GFCM) is a regional fisheries management organization that plays a key role in fisheries governance, with the authority to make binding recommendations for fisheries conservation and management in the Mediterranean. In 2021, the GFCM launched the 2030 Strategy that contributes to the objectives of the United Nations Decade of Ocean Science for Sustainable Development

(2021–2030) and to the post-2020 Global Biodiversity Framework of the Convention on Biological Diversity. The strategy is supported by an action plan with detailed activities and objectives, including the protection and consservation of biodiversity. In the GFCM, there is a formal advice process (Figure 3) which is pipelined through the Working Groups for Stock Assessment (WGSAs) and other specific Working Groups, like the one on the Vulnerable Marine Ecosystems and Essential Fish Habitats (VME-EFH). The outcomes of the Working Groups are discussed and endorsed at sub-regional level, by the Sub Regional Committees (SRCs) of the Western, Central, Adriatic and Eastern Mediterranean. Here additional knowlkedge and insights provided by B-USEFUL can be presented and adopted, e.g., proposing complementary scientific supports to reach the overall objectives. The results of the SRCs are then presented at the Scientific Advisory Committee on Fisheries (SAC) for discussion and endorsement before the final approval by the GFCM General Commission Annual Meeting. Usually WGSAs, SRCs and SAC meet once per year leaving several opportunities for uptake of B-USEFUL products. The decisions of the SAC and GFCM Commission work as feedback to the WGs when relevant.

Figure 3. The GFCM pipeline for uptake of knowledge and information.

To ensure uptake the results of B-USEFUL can be streamlined for the SRCs (i.e., Western, Central, Adriatic and the Eastern Mediterranean). As an example, the results of biodiversity modelling at Sub-Regional level in B-USEFUL WP3 can suite well into the spatial framework of the GFCM. The estimation of indicators at this spatial scale associated with identification of hot and cold areas and the ongoing risk analysis can be considered useful inputs to assist spatial management purposes relevant for the GFCM and beyond.

3.3 Decision-making and policy within regional and international frameworks

IPBES: IPBES is an independent intergovernmental body that aims to strengthen the science-policy interface for biodiversity and ecosystem services for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development. The rolling work programme up to 2030 of IPBES aims to advance the achievement of this overall aim and objective. More specifically, the policy framework for the 2030 work programme corresponds to the 2030 Agenda for Sustainable Development, including the Sustainable Development Goals, the biodiversity-related conventions and other biodiversity and ecosystem service processes. The IPBES 2030 work programme is demand-driven, based on requests received from relevant bodies under multilateral environmental agreements and Governments and inputs and suggestions received from other stakeholders. It is expected to inform all stakeholders in the implementation of their activities to support the achievement of the post-

2020 global biodiversity framework and the 2050 Vision for Biodiversity, as well as other work under multilateral environmental agreements related to biodiversity.

The work and products of B-USEFUL can directly feed into the work of IPBES by: (i) providing a better understanding of the importance of marine biodiversity in achieving the 2030 Agenda for Sustainable Development; (ii) identifying the underlying causes of biodiversity loss and determinants of transformative change and options for achieving the 2050 Vision for Biodiversity. Such input can be facilitated by members of the B-USEFUL consortium that are engaged in their respective national forum (e.g., Germany and Denmark). Furthermore, B-USEFUL will co-coordinate an upcoming Cluster Event together with BioAgora where one of the joint outputs produced will be a joint guidanace document to inform experts of the 2nd Global Assessment on most pressing challenges for marine biodiversity.

IUCN: The International Union for Conservation of Nature (IUCN) is an international organisation regrouping varied member parties such as nations and civil society interest groups established in 1948. Most of its work is carried out in seven commissions (Environmental, Economic and Social Policy; Education & Communication; Environmental Law; Climate CRISIS; Ecosystem Management; Species Survival Commission and the World Commision on Protected Areas) supported by volunteer expert groups who are recruited by peers (chairs of the groups) and a secretariat present in a HQ and eight regional offices. The World Conservation Congress (general assembly of members) convenes every four years to review its strategy and define its work programme with the next Congress due October 2025. The organization is best known for its authorative Red List published by its Species Survival Commission which represents the work of hundreds of experts volunteering their time in specialist groups to assess the conservation status of species based on the best available science and a strict assessment protocol which applies to all species. IUCN takes a species-level approach to biodiversity and the model prediction from B-USEFUL will be useful to feed in species-level assessment of change in distribution with climate change particularly. More specifically, the biodiversity insight develop in B-USEFUL can also feed in the regular process of the Ocean and coasts theme which concentrates on providing the best available data, information and advice for MPA designation.

WOA: The World Ocean Assessment (WOA) is an Assessment of assessments established in 2009 by the United Nations General Assembly with the role to provide an integrated view of the global state of the ocean. This Regular Process for Global Reporting and Assessment of the State of the Marine Environment falls under the remit of the Division of Ocean Affairs and the Law of the Sea. The third cycle is ongoing (2021-2025). As an “assessment of assessments” its role is to synthesise and integrate findings from the different regions of the world to reflect a global overview of the state of the oceans. As such, results from B-USEFUL can be incorporated in WOA IV (2026-2030) as part of the chapter on changes to biodiversity status.

SSBD: Formulating adequate responses to pressing challenges at the science-policy interface requires effective and legitimate knowledge brokering. The development of a fair and functional Science Service for Biodiversity (SSBD) will facilitate the orchestration of processes and initiatives at the Science-Policy Interface at the European level. The Marine

Demonstration Case (DC) developed within BioAgora is currently piloting and testing the different functions and mechanisms of the SSBD to set up a dynamic, inclusive and functional Service for marine biodiversity in close collaboration with B-USEFUL. The overall goal is to bridge the gap between knowledge generation and its application by translating and disseminating scientific results into actionable knowledge to ratchet up the implementation of the EU Biodiversity Strategy for 2030 and the Nature restoration Law. The Science Service has three overarching functions: (i) creating and supporting active thematic networks; (ii) transforming the processes within and between science and policy; (iii) answering requests. These three key activities ensure close involvment of B-USEFUL to the contribution & support of the implementation of existing policy frameworks around biodiversity, including the EU BDS2030, the MSFD, the Marine Action Plan, the Nature Restoration Law, Farm2Fork, the Kunming-Montreal Global Biodiversity Framework, and upcoming versions of them.

4. Summary and timeline for uptake of B-USEFUL products

In the previous section we have reviewed and identified existing and potential pipelines for uptake of B-USEFUL products (e.g., indicators, models, DST and improved process knowledge) within established framework for decision-support and policy making at the regional, European and international level. Below we summarize the identified pathways through a schematic figure and time lines outlining interactions with individual members and stakeholder through the B-USEFUL end-user forum, as well as direct links channeled through ICES (including the online DST and EO documents), BioAgora and a broad set of regional and international bodies.

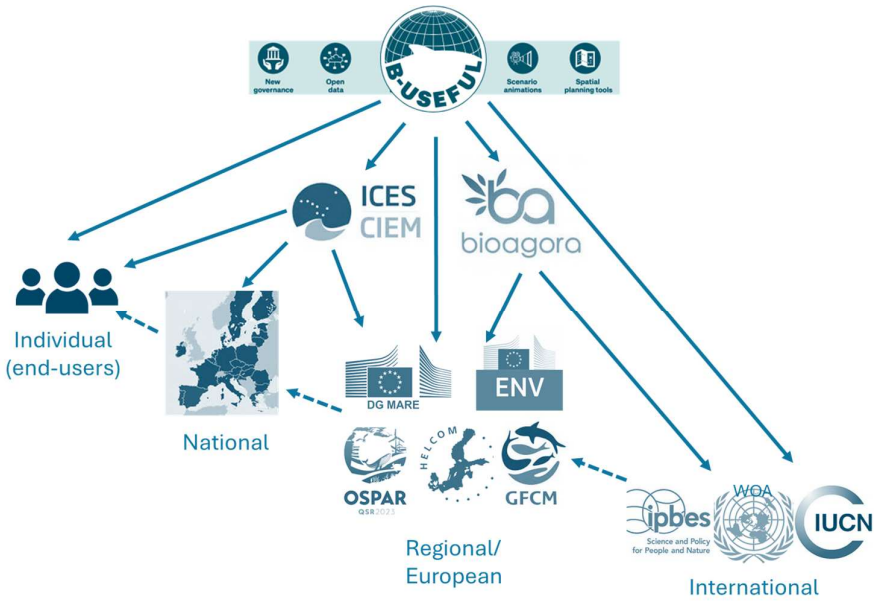

Figure 4. Schematic figure showing available and potential pipelines by which B-USEFUL outputs can be channeled into exisiting frameworks for decision-making and science advice for adaptive management and conservation across different levels. (Solid arrows potential direct links, while dashed arrows show indirect links between levels not directly attributable to B-USEFUL).

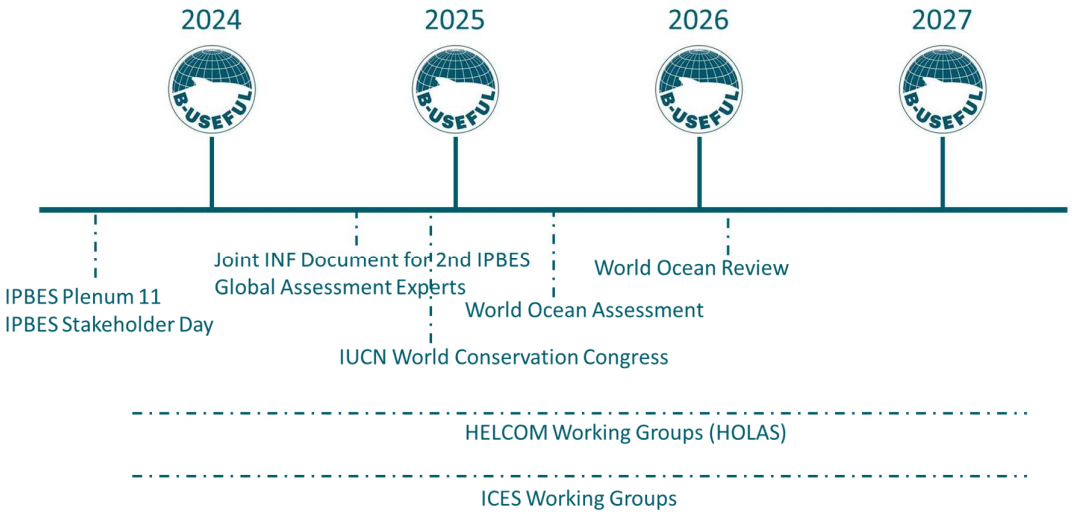

Figure 5. Time line of key interactions and engagements with exisiting assessment and advice frameworks for decision-making and policy across different levels.

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Version History

HISTORY OF CHANGES		
Version	**Publication date**	**Changes**
0.1	10.09.2024	Initial version
0.2	23.09.24	Ute Jacobs and Martin Lindegren (integrating comments from co-authors)
1.0	27.09.24	Final edits and approval by coordinator (Martin Lindegren)