



EMODnet



European Marine
Observation and
Data Network

EMODnet Thematic Lot n°2 – Seabed Habitats

EASME/EMFF/2018/1.3.1.8/Lot2/SI2.810241

Start date of the project: 25/09/2019 - (24 months)

EMODnet Phase III – Final Report

Reporting Period: 25/09/2019 – 24/09/2021



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Executive summary

This two-year contract for the continuation of phase 3 started on September 25, 2019, with a total budget of €552,000. The contract brought together a consortium of ten organisations (8 partners, 2 subs-contractors) that assembled a complimentary set of specialists in benthic ecology, geology, spatial habitat modelling, data collation and management, web delivery, oceanography and marine policy.

During the 2-year contract, despite the COVID-19 crisis that made everything more difficult, we managed to maintain activities and services, and achieve our objectives.

- A new version of the broadscale seabed habitat map, named EUSeaMap 2021, was released in September 2021. New, more detailed, substrate data was incorporated, and EUSeaMap was translated into new classifications, namely EUNIS 2019, HELCOM HUB and the revised classification of Mediterranean habitat types. Further details on this new version can be found in the [technical report](#).
- The collection of maps from survey and point data was substantially expanded. 199 datasets were collated in Europe, processed and made available on the [web portal](#).
- The collection of habitat maps and point data about habitats in Europe was used to produce several new products:
 - Distribution of point observations of three essential ocean variables in Europe: Live hard coral cover, Seagrass cover and macroalgal canopy cover, using the EMODnet Seabed Habitats collection of point data.
 - Coralligenous and other calcareous bioconcretions in the Mediterranean, created using the EMODnet Seabed Habitats library of habitat maps from surveys.
 - EUNIS habitats in the Northeast Atlantic, created using the EMODnet Seabed Habitats library of habitat maps from surveys, and used EUSeaMap to fill in the gaps, producing a continuous layer that uses the best available data in all areas.
 - Biogenic substrates in Europe: these are firm substrates formed by animals or plants on which other organisms can settle and shelter. Typical examples include mussel beds, coral reefs and *Posidonia oceanica* meadows. It was created using the EMODnet Seabed Habitats library of habitat maps from surveys.
- The first phase of translating the EUNIS 2007 habitat maps from surveys into EUNIS 2019 classes is complete – many of the EUNIS habitat maps are now also available in the new version of the classification system.

1. Introduction

The thematic lot “Seabed Habitats” of EMODnet was created in 2009, at a time when datasets on the spatial distribution of seabed habitats were patchy, scattered and used habitat classifications that were different from one country to another, hence could not be combined. However, the need for knowledge of seabed habitats spatial distribution within and across European Regions was starting to emerge with initiatives such as the MSFD. Therefore, within the framework of ur-EMODnet (2009-2012), EMODnet Seabed Habitats was commissioned to demonstrate the potential of predictive mapping to provide seabed habitats maps over extensive areas, which was performed by producing prototypes in four trial basins (Greater North Sea, Celtic Seas, Baltic, Western Mediterranean), this predictive model is commonly known as “EUSeaMap”. In EMODnet Phase 2, EUSeaMap coverage was extended to all European regions, leading to the first full-coverage pan-European habitat map¹. In the first two years of phase 3 (May 2017-2019), the spatial resolution of EUSeaMap was improved²; simultaneously, EMODnet Seabed Habitats started to collate and make available online new types of data about ground truthing surveys, habitat survey maps and individual habitat modelled maps.

After a 4-month gap in activity during which the web portal and helpdesk service had continued, uninterrupted operation, a new two-year contract for the continuation of phase 3 started the 25th of September 2019, with a total budget of €552,000 (compared to €1.4M for the first two years of phase 3). The new contract brought together a consortium of ten organisations (8 partners, 2 subs-contractors) that assembled a complimentary set of specialists in benthic ecology, geology, spatial habitat modelling, data collation and management, web delivery, oceanography and marine policy, from a variety of organisations – government, agencies, research institutes, and private companies:

- the French National Institute for Ocean Science (**Ifremer**, France, lead partner),
- **JNCC** Support Co (UK, Technical Project Manager),
- the Centre of Marine Sciences (**CCMAR**, Portugal),
- the National Institute of Research and Development for Marine Geology and Geoecology (**GeoEcoMar**, Romania),
- the Geological Survey of Denmark and Greenland (**GEUS**, Denmark),
- the Institute of Oceanology, Bulgarian Academy of Science (**IO-BAS**, Bulgaria),
- the Italian National Institute for Environmental Protection and Research (**ISPRA**, Italy),
- the **Marine Institute** (Ireland),
- Norwegian Institute for Water Research (**NIVA**, Norway, subcontractor),
- the Finnish Environment Institute (**SYKE**, Finland, subcontractor).

Due to the reduced budget, the Project had a reduced scope. There was less focus on improving the flagship product EUSeaMap, and more focus on producing new composite products. The Project comprised six work packages, as summarised below.

¹ Populus et al, 2017. <https://doi.org/10.13155/49975>

² Vasquez et al, 2020. <https://doi.org/10.13155/74782>

Work package	Tasks (as per tender specification EASME/2019/OP/0003) addressed	Lead
WP1 – Improving the base layer of modelled habitats (EUSeaMap)	2 – Construct products from one or more data sources that provide users with information about the distribution of parameters in time and space	Ifremer
WP2 – Data collation	1 – Develop a common method of access to data held in repositories	ISPRA
WP3 – Building composite data products (points and polygons)	2 – Construct products from one or more data sources that provide users with information about the distribution of parameters in time and space	JNCC
WP4 – Portal	1 – Develop a common method of access to data held in repositories 3 – Develop procedures for machine-to-machine connections to data and data products 4 – Maintain and further develop a thematic web portal allowing users to find, visualise and download data and promote the data and data products of the portal 6 – Install a process to monitor performance and deal with user feedback 7 – Operate a help desk offering support to users	JNCC
WP5 – Communication and outreach	4 – Maintain and further develop a thematic web portal allowing users to find, visualise and download data and promote the data and data products of the portal 5 – Ensure the involvement of regional sea conventions	JNCC
WP6 – Coordination and formal reporting	Management of all tasks	Ifremer

The current document reports on the activity and results of the two-year period.

2. Update on the Tasks

Task 1: develop a common method of access to data held in repositories

- For seabed habitats data there are not typically national or international repositories from which to access data. Instead, EMODnet Seabed Habitat behaves as this repository, and continuously searches and build relationships with data providers to enable disparate sources of data to be compiled and standardized (through **WP2**) and published (through **WP4**).
- EMODnet Seabed Habitats is a repository for three sub-themes of data on seabed habitats:
 - **Habitat maps from surveys** (polygon files) – we have continued to acquire habitat maps from around Europe. In this phase we have published 78 new habitat maps. The work involved [several steps](#), including handling polygon overlap issues, translating to a standard classification system (if necessary), standardising the attribute table to the EMODnet Seabed Habitats data exchange format, carrying out a confidence assessment and writing metadata.
 - **Point observations of habitats from surveys** – we have continued to acquire point observations of habitats from around Europe. In this phase we have published 42,214 new data points using the [database schema](#) designed as part of the previous contract, an increase of 10%. This database schema is compatible with that of EurOBIS (the repository for marine species data in Europe.) For the present contract we have gone further and written a guidance document to help data providers to submit habitat data directly to EurOBIS. We have followed this process ourselves with a pilot dataset, and more is in the pipeline for the next phase of the project.
 - **Outputs of predictive habitat modelling** (raster files) – During the previous contract we noticed that there was an increasing amount of modelling outputs being produced in Europe, but nowhere to find them. Although not a requirement of the contract, we have continued to compile openly available modelling outputs for publication via EMODnet.
- Once the data and metadata in each theme were put into a standard format then it was possible to provide a common method of accessing them through OCG web services, through the interactive map, through the metadata catalogue and/or from the download page.

Task 2: construct products

- A new version of EUSeaMap, named EUSeaMap 2021, was developed in **WP1** so that the product 1) accounts for new seabed substrate data published by EMODnet Geology in 2021, and 2) may be published in three new classification systems: the new version of the marine section of EUNIS, the Baltic HELCOM HUB classification, and the revised classification of Mediterranean habitat types. Some issues identified in EUSeaMap 2019 were also fixed (see issue INT 05, section 4, table B). As before, it is also available in EUNIS version 2007-11 and MSFD benthic broad habitat types. It is accompanied by a confidence layer and the full suite of input layers, each accompanied by their own confidence layer. Further details on this new version can be found in the [technical report](#).
- **WP3** was devoted to the construction of new composite data products – that is products that are a composite of data from multiple sources, brought together to show the best available evidence on the extent and/or distribution of a particular habitat or set of habitats. In this phase we created the following new products: Biogenic substrate in Europe (polygons), Live hard coral cover in Europe (points), Seagrass cover in Europe (points), Macroalgal canopy cover in Europe (points), EUNIS v2007 habitats in the northeast Atlantic (polygons) and Coralligenous and other calcareous bioconcretions in the Mediterranean (polygons).

Task 3: develop procedures for machine-to-machine connections to data and data products

- All habitat maps, point observations and model outputs (compiled in **WP2**) and all data products produced by the project (in **WP1** and **WP3**) are freely available through our web map service. All vector layers produced by the project (except EUSeaMap due to its size) are also available via our web feature service and all raster layers are soon to be available via our web coverage service, pending the imminent upgrade of our GeoServer system.

Task 4: maintain and further develop a thematic web portal

- The online web portal with INSPIRE-compliant view, download and metadata services has been operational since day one of the project.
- Issues and potential improvements were continuously tracked and discussed within GitHub platform and were implemented in **WP4** when it was agreed to be necessary or beneficial. This included:
 - Ability search for a layer by name through the search bar at the top of the layer menu on the interactive map
 - New tools added to the map toolbar: 'go to lat/long', 'measure'
 - Clearer tool icons in the map toolbar and the layer-specific toolbars
 - Reorganisation of the layers on the download page to match the organisation of layers on the interactive map.
 - Ability to download habitat maps from a specified country (previously the user had to choose one or more individual maps, or download all maps in Europe).

Task 5: ensure the involvement of regional sea conventions

- Through **WP5** we have been in contact with all RSCs. The outcomes of these conversations can be found in the report on stakeholder needs (D3.07). As well as enquiring about their needs for habitat data products, we also discussed ways of collaborating and working together.
- HELCOM plans to utilize EUSeaMap for the spatial pressure and impact assessment for the next HELCOM 'State of the Baltic Sea' report. Since the recent update to the EUSeaMap broad-scale habitat map we have been in touch with HELCOM to arrange a meeting to show them how the map was constructed, its limitations and plans for improvement.
- We have been working closely with the leaders of the OSPAR assessment on the extent of physical damage to the seabed for the next quality status report to produce the most definitive map of seabed habitats in the northeast Atlantic.
- We have created a harmonised data product on the extent of coralligenous and other bioconcretions in the Mediterranean with the aim of supporting RAC/SPA's activities.
- The Black Sea Commission Permanent Secretary have not progressed their activities on habitat mapping and classification and were not in a position yet to discuss specific data products needs or data collation activities.

Task 6: install a process to monitor performance and deal with user feedback

- This task is operated routinely

Task 7: operate a help desk offering support to users

- This task is operated routinely

3. Work Package updates

Status of the Milestones and Deliverables listed in the workplan					
Milestone/Deliverable	WP	Dissemination level	Date due	Status	Comments
D1.01: Modified substrate data product including data not possible to include in EMODnet Geology product, but which would improve the broad-scale seabed habitat map for Europe (EUSeaMap) [dependent on new product from Geology]	WP1	Public	24/08/2021	Delivered	
D1.02: Modified substrate data product including biogenic substrate to allow new EUNIS classification	WP1	Public	24/05/2021	Delivered	
D1.03: Confidence layer for modified substrate data product [dependent on 1.01, 1.02]	WP1	Public	24/08/2021	Delivered	
D1.04: EUSeaMap in EUNIS and MSFD broad habitat classifications, updated with new substrate data, with metadata	WP1	Public	24/09/2021	Delivered	
D1.05: Confidence maps for updated EUSeaMap in EUNIS and MSFD classifications, with metadata	WP1	Public	24/09/2021	Delivered (EUNIS 07 , MSFD)	
D1.06: Method for classifying EUSeaMap according to the new version of EUNIS [dependent on new EUNIS being publishing]	WP1	Public	24/12/2020	Delivered	
D1.07: EUSeaMap classified according to the new version of EUNIS [dependent on new EUNIS being publishing], with metadata	WP1	Public	24/09/2021	Delivered	

D1.08: Confidence maps for EUSeaMap in new EUNIS classification, with metadata [dependent on 1.07]	WP1	Public	24/09/2021	Delivered	
D1.09: Review of stakeholder needs and feasibility of classifying EUSeaMap to regional classifications, such as HUB	WP1	Public	24/03/2020	Delivered	
D1.10: Method for classifying EUSeaMap according to regional classifications [dependent on D1.09]	WP1	Public	24/05/2020	Delivered	
D1.11: EUSeaMap classified according to regional classifications, and metadata [dependent on D1.09]	WP1	Public	24/09/2020	Delivered	EUSeaMap is now classified according to HELCOM HUB (Baltic) and the Mediterranean classification
D1.12: Confidence maps for EUSeaMap classified according to regional classifications, with metadata [dependent on D1.09]	WP1	Public	24/09/2021	Delivered	
D1.13a: Technical report describing the updates to EUSeaMap 2019	WP1	Public	24/03/2020	Delivered	
D1.13b: Technical report describing the updates to EUSeaMap 2021	WP1	Public	24/09/2021	Delivered	
D1.14: Well-documented R code and ArcGIS models used to construct EUSeaMap	WP1	Public	24/09/2021	Delivered	
D1.15: Report describing ways in which EUSeaMap may be improved if funds become available	WP1	Public	24/11/2020	Delivered	
D2.01: An expanded library of maps of communities, biocoenoses, biotopes and habitats for all of Europe, ingested and converted to a standard	WP2	Public	24/08/2021	Delivered	

format, with metadata for every map					
D2.02: An expanded collation of point records of communities, biocoenoses, biotopes and habitats for all of Europe, ingested and converted to a standard format, with metadata for every dataset	WP2	Public	24/08/2021	Delivered	
D2.03: Templates for habitat map data exchange formats and for metadata	WP2	Public	24/11/2019	Delivered	
D2.04: Tool for consortium members to quality-check their habitat maps before submission to the WP lead	WP2	Within consortium	24/02/2020	Delivered	
D2.05: Document detailing the quality-control procedure for habitat point data and maps	WP2	Within consortium	24/03/2020	Delivered	
D2.06: Meeting(s) with EMODnet Biology on coordinating the ingestion of species and habitat data from the same samples	WP2	Within consortium	24/01/2020	Delivered	
D2.07: Minutes and actions from meeting(s) with EMODnet Biology	WP2	Within consortium		Delivered	
D2.08: Guidelines for submitting habitat point data to OBIS	WP2	Public	24/04/2020	Delivered	
D2.09: List of point datasets, maps and models available via machine-to-machine connections	WP2	Within consortium	Updated regularly	Delivered	
D2.10: Evidence of use of the EMODnet Ingestion and safe-keeping of marine data facility for ingesting data points, maps and models from third parties	WP2	Public	24/09/2021	Delivered	The link points to the Ingestion submissions page, filtered according to the 'seabed habitats' theme.

D2.11: Progress log for the ingestion of point data, maps and models	WP2	Within consortium	Updated regularly	Delivered	
D2.12: Log of failed data requests	WP2	Within consortium	Updated regularly	Delivered	
D3.01: A combined, harmonized data product showing the best evidence for extent and distribution of the Essential Ocean Variable "Live hard coral cover" in Europe, with metadata	WP3	Public	24/08/2021	Delivered	
D3.02: A combined, harmonized data product showing the best evidence for extent and distribution of the Essential Ocean Variable "Seagrass cover" in Europe, with metadata	WP3	Public	24/08/2021	Delivered	
D3.03: A combined, harmonized data product showing the best evidence for extent and distribution of the Essential Ocean Variable "Macroalgal canopy coral cover" in Europe, with metadata	WP3	Public	24/08/2021	Delivered	
D3.04: Report detailing the construction of the three Essential Ocean Variable data products	WP3	Public	24/08/2021	Delivered	
D3.05: A combined, harmonized data product showing the best evidence for the extent of biogenic substrate in Europe, with metadata	WP3	Public	24/04/2021	Delivered	
D3.06: Report detailing the construction of the biogenic habitat data product	WP3	Public	24/05/2021	Delivered	
D3.07: A review of stakeholder needs for combined, harmonized	WP3	Within consortium	24/03/2020	Delivered	

data products for seabed habitats in Europe					
D3.08: Combined, harmonized data products showing the best evidence for extent and distribution of habitats defined in other classifications and lists in Europe, with metadata, depending on stakeholder needs	WP3	Public	24/08/2021	Delivered	
D3.09: Report detailing the construction of the data products defined by stakeholder needs	WP3	Public	24/09/2021	Delivered	
D3.10: Pilot maps and points translated to the new version of EUNIS (created as part of a pilot project)	WP3	Public	24/03/2021	Delivered	
D3.11: Report describing the process of translating marine habitat data to the new version of EUNIS	WP3	Public	24/09/2021	Delayed	This and the work that it describes was delayed due to the issues described in INT 04.
D4.01: A digital map with panning and zooming facilities allowing users to view data, data products and metadata	WP4	Public	24/10/2019	Delivered	
D4.02: Facilities for downloading data, metadata and data products	WP4	Public	24/10/2019	Delivered	
D4.03: A process to enable harvesting and filtering of point habitat information stored in OBIS/ EMODnet Biology, using machine-to-machine connections	WP4	Within consortium	24/06/2021	Delivered	
D4.04: Seamless display of habitat points stored locally and those accessed via machine-to-machine connections (predominantly from OBIS/ EMODnet Biology)	WP4	Public	24/08/2021	Delayed	Delayed due to upstream delays in non-EMODnet procedures required to get full UK dataset into OBIS. The harvest is however scheduled for autumn 2021 so the delay is not infinite.

D4.05: Seamless display of habitat maps stored locally and those accessed via machine-to-machine connections	WP4	Public	24/11/2020	Delivered	
D4.06: Seamless display of other map layers on portal accessed using machine-to-machine connections	WP4	Public	24/09/2020	Delivered	
D4.07: Feature enabling ability to track usage	WP4	Public	24/10/2019	Delivered	
D4.08: Feature enabling live operation of help desk 9-5, MonFri	WP4	Public	24/10/2019	Delivered	
D4.09: User questions and answers on the portal and through RSS so they can be listed on the central EMODnet portal	WP4	Public	24/08/2020	Delivered	Agreed with CINEA that there's no need to publish live Q&R. A FAQ was published instead
D4.10: New map layers to portal	WP4	Public	Upload 24/02/2020 Upload 24/08/2020 Upload 24/02/2021 Upload 24/08/2021	Delivered Delivered Delivered Delivered	
D4.11: Contribution to EMODnet Technical Working Group	WP4	EU	09/2019 04/2020 11/2020 1 st meeting 2021 2 nd meeting 2021	Delivered Delivered Delivered Delivered Delivered	
D4.12: Minutes & actions from Technical Working Group	WP4	Within consortium	Within 1 month of each meeting	Delivered	
D4.13: Planned technical improvements	WP4	Public	24/09/2021	Delivered	
D4.14: Ad hoc technical improvements based on user feedback	WP4	Public	24/09/2021	Delivered	

D4.15: Ad hoc changes to website and visual	WP4	Public	24/09/2021	Delivered	
D4.16: A new URL under the "europa.eu" domain, if requested by the Commission services	WP4	Public	When requested	Cancelled	
D5.01: Evidence of efforts to ensure maximum coherence with data delivery to and from regional sea conventions and ICES	WP5	Within consortium, EU	24/09/2021	Delivered	We had meetings with RSCs (see section 7), the conclusions of which are in report D3.07. Additionally, we met ICES data managers to discuss metadata in ICES Geonetwork
D5.02: Evidence of efforts to coordinate with CMEMS	WP5	Within consortium, EU	24/09/2021	Delivered	We organised a meeting in Toulouse with CMEMS (8/10/2020, see section 7) during which we mainly discussed the way EMODnet Seabed Habitats could contribute to the MSFD portfolio that Copernicus created with EMODnet Chemistry.
D5.03: Evidence of collaboration with EMODnet biology to coordinate the ingestion of species and habitat point data from the same samples	WP5	Within consortium, EU	24/09/2021	Delivered	Report D2.08 is the evidence. Meetings are also listed in section 7
D5.04: Widespread promotion of guidelines for submitting habitat point data to OBIS	WP5	Public	24/09/2021	Delivered	Promoted via the EMODnet Newsletter published in August 2021 , Twitter, and the OBIS manual
D5.06: New use cases on the website	WP5	Public	24/09/2021	Delivered	19 use cases have been published online
D5.07: A prominent summary of the data and data products available on the website	WP5	Public	24/09/2020	Delivered	
D5.08: Sustained online presence: news stories, tweets, etc.	WP5	Public	24/09/2021	Delivered	

D5.09: Presentations and posters at conferences and cross-cutting meetings	WP5	Public	24/09/2021	Delivered	Presentations and posters are listed in section 7
D5.10: Promotion of products via ESRI story maps	WP5	Public	24/09/2021	Delivered	
D5.11: Record of all promotion and outreach activities	WP5	Within consortium, EU	Updated regularly	Delivered	Delivered in quarterly reports and in the present document, section 8
D6.01: Project management plan and project initiation document	WP6	Within consortium	24/10/2021	Delivered	
D6.02: Project quality management plan and project audit document	WP6	Within consortium	24/10/2021	Delivered	
D6.03: Consortium Agreement	WP6	Within consortium	24/10/2021	Delivered	
D6.04: Participation in EMODnet Steering Committee meetings	WP6	EU	09/2019 04/2020 11/2020 1 st meeting 2021 2 nd meeting 2021	Delivered Delivered Delivered Delivered Delivered	
D6.05: Minutes & actions from Steering Committee meetings	WP6	Within consortium	Within 1 month of each meeting	Delivered	
D6.06: Progress meeting 1 – WP leads	WP6	Within consortium	24/03/2020	Delivered	
D6.07: Minutes & actions from progress meeting 1	WP6	Within consortium	Within 1 month of each meeting	Delivered	
D6.08: Progress meeting 2 – whole consortium	WP6	Within consortium	24/03/2021	Delivered	

D6.09: Minutes & actions from progress meeting 2	WP6	Within consortium	Within 1 month of each meeting	Delivered	
D6.10: Quarterly progress reports to EASME, DG MARE and EMODnet Secretariat by 15th of the month.	WP6	EU	15/10/2019 15/01/2020 15/04/2020 15/07/2020 15/10/2020 15/01/2021 15/04/2021 15/07/2021	Delivered Delivered Delivered Delivered Delivered Delivered Delivered Delivered	
D6.11: Interim report	WP6	EU	24/09/2020	Delivered	
D6.12: Submission of the invoice for the interim payment	WP6	EU	24/09/2020	Delivered	
D6.13: Final report	WP6	EU	24/09/2021	Delivered	
D6.14: Submission of the invoice for the final payment	WP6	EU	24/09/2021	Delivered	

WP1 – Improving the base layer of modelled habitats (EUSeaMap)

Task 2 – Construct products from one or more data sources that provide users with information about the distribution of parameters in time and space

This workpackage was dedicated to improving the product that has been the flagship of EMODnet Seabed habitats since its creation, in 2010: EUSeaMap. The new version of EUSeaMap is named 'EUSeaMap 2021', which supersedes the previous version, EUSeaMap 2019.

Objective 1.01 Use the latest seabed substrate data to update the base layer of modelled habitats for all sea basins in Europe (EUSeaMap) &

One of the main objectives of the WP was to update EUSeaMap with the most recent data on seabed substrate. The seabed substrate used as input to EUSeaMap is the result of combining multiple datasets at multiple resolutions into a single dataset that contains the highest resolution available at each location. Of these input datasets, those produced by EMODnet Geology are by far the main source. All along the contract time period we regularly met with EMODnet Geology to make sure that their outputs would be in a suitable form for EUSeaMap. EMODnet Geology provided us with a copy of their products in early July 2021, i.e. more than two months ahead of the official publication.



Objective 1.02 Update the classification of the base layer of modelled habitats for all sea basins in Europe (EUSeaMap) using the new version of the EUNIS classification system

An important expected improvement was to translate EUSeaMap into the new version of the marine section of the European habitat classification EUNIS. This was subject to the condition that the new version would be published within a timeframe compatible with the contract, which was the case, as it was published in January 2020 under the name 'EUNIS 2019'. The first task comprised crosswalking the new version of EUNIS with the EUSeaMap broad habitat types, which was done in early 2021 (D1.06).

EUNIS 2019 puts biogenic substrates on the same footing as other, grain-size-based substrate types. Therefore, an important new feature of EUSeaMap 2021 was to include biogenic substrates into the seabed substrate input dataset. The data source that we used was the product D3.05 that we developed as part of WP3 (see objective 3.02 below). We combined the polygons of this biogenic substrate product with the grain-size-based substrate data product.

Objective 1.03 Add alternative regional classifications to parts of the base layer of modelled habitats (EUSeaMap), if stakeholders require it

Another task regarding classification was to evaluate, in concertation with stakeholders, the appropriateness of translating EUSeaMap into existing known regional classifications, namely the Baltic HELCOM HUB and the Mediterranean Classification of habitat types, which was recently revised. WP3 having a similar objective (collecting stakeholder's needs for data products) we organised joint WP1/WP3 meetings with stakeholders. No specific requirements were made on the translation into the revised classification of Mediterranean habitats, the new EUNIS being almost identical to that classification. At the meeting with HELCOM, we agreed that an assessment of how well the new EUNIS matches HELCOM HUB should be carried out, and that EUSeaMap would be translated into the HUB classification in case of unsuitable match. The conclusion of the assessment was that EUNIS 2019 and HELCOM HUB match well. Despite this conclusion suggesting that the translation of EUSeaMap into HELCOM HUB was not crucial, despite the lack of expressed interest for the translation into the Mediterranean classification, as this was not a huge effort and arguing that perhaps interest would come with time, we decided to develop approaches to translate EUSeaMap into HELCOM HUB and the Mediterranean habitat classification. The approaches are reported in D1.10.

EUSeaMap as a result of objectives 1.01, 1.02 and 1.03

EUSeaMap was achieved and made available at the end of September 2021 in the form of a polygon dataset, of which the attribute table is composed of one column per habitat descriptor, including the seabed substrate habitat descriptor (D1.01, D1.02), and per habitat classification, i.e. the usual habitat classifications EUNIS 2007-2011 and the MSFD Benthic Broad Habitat Types (D1.04) as well as the new ones, EUNIS 2019 (D1.07) and regional classifications (D1.11).

EUSeaMap comes along with a series of confidence raster datasets, where each cell value is the confidence (1=low, 2=moderate, 3=high) in the EUSeaMap habitat type or in the habitat descriptor class. The confidence was assessed using the method that we developed in 2019. We make available one confidence raster dataset for each classification used, EUNIS 2007-2011 and Benthic Broad Habitat Types (D1.05) as well as new ones, EUNIS 2019 (D1.08) and regional classifications (D1.12). We also make available one confidence raster dataset for each habitat descriptor, including seabed substrate (D1.03).

Objective 1.04 Publish methods and code so that others may use the same methods to create a base layer of modelled habitats

All the updates to EUSeaMap made in the version 2021 are summarised in a technical report (D1.13b). In 2020, a first technical report described the updates made for version 2019 (D1.13a).

EUSeaMap was produced using tools mainly based on R software and its package 'Raster'. The R scripts and the user guide are made available via GitHub platform (D1.14).

Objective 1.05 Record all potential improvements to the base layer of modelled habitats that may be possible, so that they may be undertaken in future if resources are available

In January 2021, we published a report (D1.15) with the aim of identifying areas where EUSeaMap can make progress, and also where it cannot. We also discussed what other types of spatially explicit complementary products on seabed habitats might be useful to stakeholders. Recommendations for follow-up actions by the EU were also made.

WP2 – Data collation

Task 1 – Develop a common method of access to data held in repositories

Objective 2.01 Grow the library of habitat maps & Objective 2.02 Grow the collection of point records of habitats available on the EMODnet Seabed Habitats portal

According to the Annex 2 of the proposal that we submitted in 2019, 64 map/point datasets were expected to be made available via the EMODnet Seabed Habitats portal by the end of the contract (D2.01, D2.02). This figure was not exact, as some of the Annex 2 datasets listed were "set of maps" and/or "set of point data", i.e. not single datasets. As a result, the actual number of datasets was not 64 but 97.

We managed to collate 95% of these datasets, with 5 originally listed datasets missing (referenced in the proposal as 'Ifremer11', 'Ifremer12', 'IO-BAS02', 'ISPRA10' and one of the 4 maps that compose the set of maps 'JNCC01'). The inability to provide these 5 datasets is beyond our control. When the proposal was written, in May 2019, the datasets did not yet exist, but their authors had planned to develop them according to a schedule compatible with ours. Unfortunately, due to COVID-19, the datasets were not developed. To our knowledge, the authors are still intending to develop them, so it is likely that they will be made available to EMODnet Seabed Habitats in the coming months.

In addition to these 97 datasets, during the 2-year contract we identified 106 datasets as good candidates for ingestion into EMODnet Seabed Habitats. We were able to collate, process and upload 84 of these datasets.

The table below describes the progress of the WP in terms of total number of identified / requested/ processed datasets. For a detailed description of the current status of each identified / listed dataset, please refer to Annex 2 (section 11).

Datasets	Total number	Resolved	Pending	Request abandoned
Indicated in the proposal	97	95%	5%	0%
Supplemental	106	80%	4%	16%

In addition to the habitat maps and point datasets, the consortium continued an activity that began in the previous contract to grow the collection of predictive habitat modelling outputs around Europe with the addition of 15 models under the 'Modelled maps of specific habitats' layer group on the interactive map. A further 43 potential models have been identified for ingestion in the next phase of the project.

Additionally, during the whole project phase, standard data structures for the data collation and standardization were updated and improved both by solving specific issues encountered during the massive use of the developed tools and by including in the various files all the modification requests suggested by the project partners (D2.03, D2.04).

However, the development of tools useful to the automation of the QA/QC data process is an ongoing process: based on the experience gained during the last two years, important further developments for most of the tools have become apparent, which will become the foundation for new refinement of these tools to be finalized during the first months of the new project phase.

In our continuous search for new sources of data we have attempted to find uses for the EMODnet Ingestion portal, and our proposal included an intention to make use of this tool seeing as though the Seabed Habitats consortium was not represented in the previous phase of EMODnet Ingestion (D2.10). Since submitting the proposal for this project, the Seabed Habitats consortium is now officially represented in the EMODnet Ingestion consortium, and therefore is able to report its ingestion activities through the EMODnet Ingestion reporting.

Objective 2.03 Work to streamline the process for archiving and publishing point data on seabed habitats and species

Finally, the planned action for the identification of all the vocabularies, and procedures for storing and sharing classified habitat data within the Darwin (Event) Core EMoF data schema have been finalized in close collaboration with OBIS technical staff and EMODnet Biology (D2.06, D2.07). Thanks to specific meeting occurred during the second project year, it was possible to finalise the related pending deliverables, in particular the standard guidelines for submitting habitat data into OBIS (D2.08).

Objective 2.04 Access habitat maps and points using machine-to-machine connections, where possible, to avoid duplicating data and metadata on the web

Within the consortium we maintained a log of data sources available by machine-to-machine connections (i.e. web map services, web features services or web coverage services) (D2.09). This was then used in WP4 to determine which would be suitable for connecting to directly, and which would be better to download and store locally.

Objective 2.05 Record progress in data collation to enable reporting, and to learn from challenges in accessing third party data

Within the consortium we maintained a log that combined data requests and data processing progress, which helped to track progress of the collation and publication of the data (D2.11, D2.12).

WP3 – Building composite data products (points and polygons)

Task 2 – Construct products from one or more data sources that provide users with information about the distribution of parameters in time and space

Objective 3.01 Combine and harmonise collection of habitat maps and points into single layers showing the extent and distribution of habitats of European, regional and international interest

The growing collection of habitat maps and point data about habitats in Europe (WP2) presents an opportunity to start answering important questions about the current state of knowledge on the extent and distribution of priority marine habitats. As such we used these collations to produce several new products:

1. Distribution of three essential ocean variables in Europe: Live hard coral cover, Seagrass cover and macroalgal canopy cover, using the EMODnet Seabed Habitats collection of point data (D3.01, D3.02, D3.03). These new products have added value to the existing polygon-only products, which tend to be more limited in distribution.
2. Coralligenous and other calcareous bioconcretions in the Mediterranean (D3.08). The requirement for this product came out of our review of stakeholder needs for new data products (D3.07), which concluded that it would be a valuable product for RAC/SPA. It was created using the EMODnet Seabed Habitats library of habitat maps from surveys.
3. EUNIS habitats in the Northeast Atlantic (D3.08). The requirement for this product came out of our review of stakeholder needs for new data products (D3.07), which concluded that it would be a valuable product for OSPAR's assessment of the extent of physical damage to seabed habitats (BH3). Owing to OSPAR's requirement for this product after the deadline for this contract, it is still undergoing its finishing touches. It was created using the EMODnet Seabed Habitats library of habitat maps from surveys, and used EUSeaMap to fill in the gaps, producing a continuous layer that uses the best available data in all areas.

Objective 3.02 Combine and harmonise collection of habitat maps and points into a layer of biogenic substrate that may be used to classify the base layer of modelled habitats (EUSeaMap) according to the new version of EUNIS

The 2019 version of the EUNIS habitat classification system introduced an additional 'biogenic' substrate type at level 2 of the classification hierarchy. Traditionally, EUSeaMap used the EMODnet Geology seabed substrate data product (with some minor modifications) as the source of seabed substrate data (as described in Objective 1.01). However, this does not include a class for biogenic substrate. Therefore, we used the same library of habitat maps from surveys used in the previous objective to compile a data product that shows the best available evidence for the extent of biogenic substrates in Europe (D3.05). This was inserted into the grain-size-based substrate layer and used as the new source of seabed substrate data for EUSeaMap, as described in Objective 1.02.



Objective 3.03 Publish methods used to create combined, harmonised data products

For each new composite data product, we have produced a detailed, yet concise report describing the method of production, the data sources, the rationale behind the creation of the product and some discussion about limitations and future improvements (D3.04, D3.06, D3.09).

Objective 3.04 Begin to translate the collection of habitat maps and points into the new version of EUNIS

The 2019 version of the EUNIS habitat classification system was published in 2020, which allowed us some time to begin the translation of the >500 habitat maps from survey that are classified to previous versions of the EUNIS habitat classification system (primarily version 2007-11). As described in the technical proposal, this would be carried out in two phases: first, we would translate all those with a straightforward relationship between the old class and the new class in a pilot region: the Atlantic; second, we would address the more complex relationships, although we stated that the second phase may not be possible in this phase. Indeed, there was not enough time to carry out phase two. Part of the reason for this was that the translation table provided with the official publication of EUNIS 2019 was not adequate and so much effort was needed to prepare the translation table before we could begin the straightforward translation of the habitat maps. However, phase one has now been completed and has resulted in 249 EUNIS 2007-11 habitat maps now containing EUNIS 2019 habitat classes (D3.10). The methods, results and discussion of what is required in phase two will be found in a report (D3.11), which has been delayed, as explained in the table above.

WP4 – Portal

Task 1 – Develop a common method of access to data held in repositories

Task 3 – Develop procedures for machine-to-machine connections to data and data products

Task 4 – Maintain and further develop a thematic web portal allowing users to find, visualise and download data and promote the data and data products of the portal

Task 6 – Install a process to monitor performance and deal with user feedback

Task 7 – Operate a help desk offering support to users

Objective 4.01 Maintain and further develop the content and functionality of the existing Seabed Habitats web portal so as to allow users to search for data and data products, to view them and to download them

The online web portal with INSPIRE-compliant view, download and metadata services have been operational since day one of the project (D4.01, D4.02). Issues and potential improvements were continuously tracked and discussed within GitHub platform and were implemented when it was agreed to be necessary or beneficial (D4.13, D4.14). This included:

- Ability search for a layer by name through the search bar at the top of the layer menu on the interactive map
- New tools added to the map toolbar: 'go to lat/long', 'measure'
- Clearer tool icons in the map toolbar and the layer-specific toolbars



- Reorganisation of the layers on the download page to match the organisation of layers on the interactive map.
- Ability to download habitat maps from a specified country (previously the user had to choose one or more individual maps, or download all maps in Europe).

Developments to the interactive map were carried out through a small subcontract with exeGesIS SDM in conjunction with in-house staff. Developments to the download page and the rest of the website were carried out through a small subcontract with CarbonSix Digital in conjunction with in-house staff. In addition, the metadata catalogue is hosted by the International Council of the Seas (ICES), using GeoNetwork platform. In this phase of the project, they have created a new section of the catalogue specifically for EMODnet Seabed Habitats so that it is easy to view only metadata that is relevant to seabed habitats.

The content of the portal was updated at six-monthly intervals during the course of the project, with the addition of new data and data products that were collated (WP2) or created (WP1, WP3) (D4.09).

Objective 4.02 Provide a common method of access to data and data products via the web portal, whether they be held locally or accessed remotely via machine-to-machine connections

Points

Following the success of objective 2.03 to streamline the process of getting point records of habitats into the EurOBIS database (which is used by EMODnet Biology for species observations), the next step was to be able to extract the records with habitats attributed to them (D4.03). This has been made possible by encouraging people to use one of only a small set of terms from online controlled vocabularies to define the habitat classification system. The database manager at EurOBIS has a list of such terms, which are assigned a 'habitats' tag. These records are produced when a user selects 'Habitat' in the EMODnet Biology Data Download Toolbox. The final step was for the EMODnet Seabed Habitats web portal to access these habitat records (D4.04) directly, and present them to users alongside records that are hosted in a separate locally-stored database. This deliverable has been delayed, due to there being insufficient data in EurOBIS that is not already in the local database to require this approach. Furthermore, since beginning the project we learnt about the plan to combine all EMODnet portals into one, meaning that it would be an unwise use of resources to devote a lot of time to further developments of the EMODnet Seabed Habitats portal.

Polygons

The expanding 'Composite data products' section of the interactive map now hosts several external products that are provided directly by machine-to-machine connections, including *Important marine habitats in Norway* (from Geonorge) and *Vulnerable Marine Ecosystems* (from ICES). To the user, there is no difference in the way they view these layers on the interactive map (D4.05). We have also sourced many additional supporting layers from remote sources and presented them on the interactive (D4.06), such as *MSFD subregions* (from EEA) and *Marine Ecosystems of the World* (from VLIZ).

Rasters

Several of the Modelled maps of specific habitats are also sourced directly from external sources, such as several in the Norwegian Sea (Atlantic Ocean) layer group. These are always indicated with "(external source: [name of source])" in the layer name, in case the link to the layer breaks, which is the risk when sourcing data in this way.



Objective 4.03 Ensure methodological and visual consistency with the rest of the EMODnet portals according to guidance provided by the EMODnet Secretariat and discussions at the EMODnet Steering Committee meetings

We are active and attentive members of the EMODnet Technical Working group, having attended all meetings and addressing JIRA tickets in a timely manner (D4.11, D4.12).

Objective 4.04 Operate a help desk offering support to users and respond to feedback from users

At the beginning of the project we implemented a live chat helpdesk between 9:00 and 17:00 Monday to Friday using the free software, Tawk.to. Eventually it was agreed that this should no longer operate. We continue to monitor contact via our Contact Us page and respond to questions and feedback promptly (D4.08).

We have elaborated the page offering advice on using the EMODnet Seabed Habitats web services, including a tutorial on how to access the web feature services using R.

WP5 – Communication and outreach

Task 4 – Maintain and further develop a thematic web portal allowing users to find, visualise and download data and promote the data and data products of the portal

Task 5 – Ensure the involvement of regional sea conventions

Objective 5.01 Ensure the involvement of Regional Sea Conventions so that their needs are met through the activities of the project, and to make use of their networks to increase the volume of data and data products available

Whilst the planned meetings with Regional Sea Convention (RSC) secretariats could not take place in person due to COVID-19 travel restrictions, we held remote conference meetings and/or exchanged emails with all RSCs. We described in detail the outcomes of conversations we had with RSCs in the report on stakeholder needs (D3.07). As well as enquiring about their needs for habitat data products, we also discussed ways of collaborating and working together.

HELCOM invited us to attend the meeting of their Expert Network on Benthic Habitats (EN-BENTHIC) to discuss more technical details about product creation and joint data collation activities. We attended this meeting in November 2020 and made a presentation about EMODnet. It was also an opportunity to gather feedback on requirement for habitat mapping products in the future and discuss synergies in data collation. We assessed the compatibility between HELCOM Underwater Biotores habitat classification system and produced a report on our proposed approach to classifying EUSeaMap to this classification system for the first time, as described in Objective 1.03.

RAC/SPA provided a contact detail of a member of staff that will be dedicated to liaise with us on data products and data collation for the Mediterranean. As mentioned under WP3 we agreed we will support RAC/SPA's activities with the creation of a harmonised data products on the extent of coralligenous and other bioconcretions in the Mediterranean.

From our conversation with the Black Sea Commission Permanent Secretary we learnt that their activities on habitat mapping and classification have not progressed. The Secretariat provided comprehensive information



about the need for habitat classification reviews and habitat mapping in the Black Sea, but we were not in a position yet to discuss specific data products needs or data collation activities.

One of the EMODnet Seabed Habitats partners, JNCC, is OSPAR's task leader for the compilation of point and polygon data on OSPAR threatened and/or declining habitats. This has placed the project in a perfect position to ensure a harmonised approach to collating and publishing data on these habitats. As part of the latest data call to OSPAR contracting parties for this data product, the EMODnet Seabed Habitats partners were introduced as people who could assist in the collection and formatting of data. JNCC were approached and provided assistance on formatting the data. As described in WP3 we are now working on the finishing touches of a new data product for OSPAR on the extent of EUNIS habitats in the Northeast Atlantic.

Another aspect of D5.01 is to ensure consistency with ICES data delivery. Ifremer and Marine Institute attended as members the ICES Working Group on Marine Habitat Mapping (WGMHM) annual meeting in 2020 and JNCC attended in 2021. The meetings focused on supporting the ICES/NAFO Working Group on Deep-water Ecology (WGDEC) in the identification of Vulnerable Marine Ecosystems (VMEs) in the Atlantic. In 2020 the focus was on delineation of the physical VME Indicator Elements (e.g. seamounts, canyons). Important discussions were on the appropriateness of using VME element maps for the provision of management advice. In 2021 the focus was on assessing the quality of existing predictive habitat models to determine their suitability for use in providing management advice. The conclusions were interesting and a point made in section 10 (recommendation for the EU) is based on them.

As part of deliverable D5.02, in February 2020 we had a teleconference with the Head of Mercator Ocean's Operations & Services Department to liaise on Copernicus Marine Service (CMEMS) activities and to introduce how we use CMEMS-derived products (physical oceanography climatologies) in EUSeaMap. In April we presented use of CMEMS products in EUSeaMap at the EMODnet-CMEMS coordination meeting. Furthermore in June 2020 we attended the EMODnet-CMEMS thematic workshops on coastal issues which brought together EMODnet, CMEMS, inter-DG representation and the EEA to discuss marine data and data products and information on Coastal behavior. Capabilities and emerging areas for collaboration across EMODnet themes and between EMODnet and CMEMS, were also discussed. We presented the EMODnet Seabed Habitats project and we identified potential areas of collaboration in the medium term. This includes a collaboration opportunity involving EMODnet Physics, EMODnet Geology and CMEMS (and others) on coastal sediment dynamics and effect of colonising communities on sediment movement. We also met at CMEMS' headquarters in October 2020 to further discuss what had been discussed in February 2020, and agreed that CMEMS would include EUSeaMap 2019 in their MSFD portfolio.

Project partners Ifremer and JNCC attended the October 2020 Copernicus user uptake workshop on Earth Observation (EO) and discussed potential use of the latest EO products from the new Sentinel satellites to improve light at the seabed estimates for EUSeaMap modelling. As part of the workshop we also presented the use of EO data in habitat modelling, which publicised EUSeaMap and EMODnet Seabed Habitats products and services to a different audience.

Objective 5.02 Use existing infrastructures to publish habitat data and associated products to a greater number of people

The approach and guidance document developed in objective 2.03 for publishing point data to EurOBIS was developed in conjunction with VLIZ, the leaders of EMODnet Biology and EurOBIS (D5.03). We jointly developed a communication plan for promoting the new guidance, and have also added a section to the OBIS manual about it. This will ensure that whatever route a data submitter takes (whether via OBIS, EurOBIS or EMODnet) they will hopefully find our guidance document (D5.04).

We have collaborated with other EMODnet lots and Copernicus Marine to publish a joint marine catalogue for the Baltic Sea to support European Member States with the implementation of the MSFD.

Objective 5.03 Promote EMODnet and the Seabed Habitats web portal so that stakeholders can benefit from it, and to increase the volume of data and data products available

We developed an internal communication plan (D5.05), which was partly superseded by the centralised plan of the EMODnet Secretariat. We created a web page that summarises the available data products as well as the quantity of habitat maps from surveys, models of specific habitats and point data available on the portal (D5.07). On this page there is also a 'story map', which brings these maps to life (D5.10). We have contributed news stories to the EMODnet News Digest as well as our own website (D5.08). We have presented posters and presentations at conferences as detailed below (D5.09).

WP6 – Coordination and formal reporting

The EMODnet Seabed Habitats consortium was composed of eight partners and two subcontractors. Of the partners, three were WP leaders. The Project Coordinator (from Ifremer) was assisted by a Technical Project Manager (from the JNCC). This staff coordinated the scientific and technical work of the consortium in accordance with the description of work and WPs and carries out the management of the project. The management structure was established as described below.

- The Project Steering Group, chaired by the Project Coordinator, was made up of one person from each partner organisation. The Project Steering Group provided strategic guidance for the project and ensured the project was managed correctly. The Project Steering Group was responsible for financial decisions, for agreeing remediation actions to resolve any project issues and for taking decisions on priorities. It met annually. At these meetings the progress of WPs was presented and discussed.
- The Project Management Team, chaired by the Technical Project Manager, implemented the scientific and technical activities necessary to achieve the project objectives. The Project Management Team comprised the three WP leaders. It met every 3 months and was responsible for operational decision making.

During the contract, the Project Management Team met six times and the Project Steering Group met four times (see section 7). All the meetings were web conferences. We had planned to have a face-to-face meeting of the Project Management Team in London, and another one of the Project Steering Group in Ostend, but these meetings were replaced by web conferences due to the COVID-19 crisis.

The Project Coordinator and the Technical Project Manager attended all the EMODnet Steering Committee and the Technical Working group meetings.

4. Identified issues: status and actions taken

A. Priority issue(s) identified and communicated by CINEA/ DG MARE/ SECRETARIAT				
Priority issue	Status (Pending/ Resolved)	Action(s) taken / remaining actions planned	Date due	Date resolved
Letter from EASME (ref. Ares(2019)7151776) - EMODnet websites - compliance with applicable data protection rules	Resolved	EMODnet Seabed Habitats is now compliant with all the requirements. The reply for all thematic portals was coordinated by the EMODnet Secretariat, to which was sent (09/12/2019) an updated checklist (annex 1), an update on the action plan that was submitted on 04/08/2019, and a record of processing of personal data		
JIRA issue EMODNET-33, then EM-88. EASME - Action on Web Services MetadataUrl and DataUrl fields Recap of task: for every layer in GeoServer, make it so that the data url points to a predefined download link.	Resolved	We had hundreds of these layers We developed the workflow needed to automate most of this task. We ran this script to complete most of the layers. Then we through the remaining layers and made manual changes where possible, in liaison with distant hosts.		
Email from CINEA on 24/2/2020: 'Brexit: as you know, the UK has officially left the EU. Please review the content of your portal and make sure that it is reflecting that fact. We expect that the impact on the portal will be minimum. Alessandro (Human Activities) has kindly provided us with documentation he received on that subject. The documents are provided here for support if needed. Please report on compliance in the next report. Note that we have not yet received any feedback about UK servers now that we are in the transition period.	Resolved	We reviewed the content of the website, in terms of text, figures and maps and determined that no changes were necessary to reflect the fact that the UK has left the EU.		
BREACH vulnerability issue (JIRA issue EMODnet-35)	Resolved	We clarified with the EMODNet Secretariat Technical Coordinator that we		

		were already compliant hence this was not an issue for our portal.		
Email from EMODnet Secretariat on 12/08/2020: Urgent GDPR requirement from SC&DIGIT Judgment invalidating the EU-US Privacy Shield – the way forward. the EU Secretariat General and DIGIT are requesting EMODnet portals to either terminate, or inventorise (using an excel File) any processing agreements involving transfer of personal data to non-EU/EEA	Resolved	<p>We disabled the tawk.to service. As a result, there is no longer live chat services on EMODnet Seabed Habitats portal</p>		
JIRA EM-80 - Seabed Habitats to report on status or plans to support INSPIRE Compliant CSW	Resolved	<p>We use the ICES GeoNetwork instance. We worked with ICES data team to rectify INSPIRE extension and advertised port issues on the CSW service of the ICES Geonetwork.</p> <p>As a side-task relating to work on this issue, Seabed Habitats has moved to a sub-portal for easier data management and harvesting by EMODnet Central.</p>		
JIRA EM-93 - GDPR Compliance for Seabed Habitats JIRA EM-107 Seabed Habitats - Removal of Brexit content disclaimer	In review	<p>JNCC digital and data solutions teams have made requested changes to the website to resolve the issue.</p> <p>Remaining action is for secretariat to review that the changes are acceptable.</p>		
JIRA EM-132 - Seabed Habitats to report on number and volume of downloaded data and data products by 6th of January	Resolved			
JIRA EM-146 - Seabed Habitats Quality of Service Monitoring	In progress	<p>The metric behind response time was queried by JNCC, as it appeared to relate to last-by response rather than first-byte response. This has been agreed by the secretariat, and amendments have now been made to the code for response time in subsequent reporting periods.</p> <p>Progress on the self-healing GeoServer was delayed, as described in the previous report. It was ready to go live in August when it was hit by an apache flaw. Due to significant data uploads in the intervening period, a further switch will be</p>		

		dependent on a sync check of data holdings between the two infrastructures. Likely 1 month away.		
JIRA EM-181 - Some links on Seabed Habitats Product catalogue are broken	Resolved	Two metadata records were “unpublished”, likely as a result of the Geonetwork subportal move.		
JIRA EM-215 - Seabed Habitats - Banner for Promotion EMODnet Online Survey 2021	Resolved			
JIRA EM-238 - Seabed Habitats - Update of Data Protection Notices	Resolved			
JIRA EM-248 - Seabed Habitats - Banner UPDATE - deadline extension	Resolved			
JIRA EM-288 - Failing: EMODnet Sea Bed Habitats (CSW)	Resolved			
JIRA EM-292 - Expected downtime of EMODnet Seabed Habitats web mapper (upgrades)	Resolved			
JIRA EM-312 - Failing: EMODnet Sea Bed Habitats Geoserver (WMS/WFS/WCS) web services	Resolved			
JIRA EM-318 - Content Inventory Seabed Habitats	Resolved			
JIRA EM-324 - Seabed Habitats infrastructure switch - Expected downtime Seabed Habitats geoserver and web mapper	In progress	Initial infrastructure switch reverted due to apache flaw identified. Due to significant data uploads in the intervening period, a further switch will be dependent on a sync check of data holdings between the two infrastructures. Likely 1 month away.		
JIRA EM-325 - Failing: EMODnet Seabed Habitats GeoNetwork (CSW) Web Services	Resolved			

B. Issues / challenges identified by the thematic assembly group itself

Priority issue / challenge	Status (Pending/ Resolved)	Action(s) taken / remaining actions planned	Date due	Date resolved
COVID-19: Tasks taking longer For some partners, everything takes longer due to slow network speeds or having to take additional time off to look after children	Resolved	More days allocated to these tasks		
COVID-19: Inability to perform some tasks Some partners cannot process data due to inability to access their enterprise network (i.e., they do not have the technology for that)	Resolved	Data processing were postponed in some cases. As a result, we were not able to meet all the objectives we had set internally for the first year. Unprocessed data were dealt with and made available in the second year.		
EMODnet indicators	In progress	We voiced some concern over the new indicators to be used, mainly surrounding area calculations for sea basins and having a streamlined and consistent approach across all lots.		
Hosting the ICES VME database on our mapper and GeoServer as a cascaded WMS layer.	In progress	We tried to cascade the VME database to their servers but encountered issues, specifically a CORS error. This occurred because the EMODnet Seabed Habitats website has SSL encryption enabled, whereas the ICES website does not, meaning it cannot be pulled through to our servers. JNCC contacted ICES, who in turn asked how we implemented SSL across our services and websites. JNCC provided general advice on how we have done it within EMODnet and JNCC internally.		
INT 01 - Personal data processing issue: due to UK leaving the EU the 1st of January 2021 and JNCC processing personal data, EMODnet Seabed Habitats would no longer have been compliant with the contractual clauses stating that no personal data can be processes outside the EU	Resolved	Responsibility for processing the emails from users was transferred from JNCC over to Ifremer. The server has been relocated in Europe The server logs from both the website and the GeoServer have been deleted as they contain IP addresses The server logs for both website and GeoServer have been configured not to record log IP addresses going forward		

		The download capture form has also been configured not to record IP addresses		
INT 02 - Deliverable D4.09 (corresponding to a tender requirement - Section 2.1.3.8. User feedback): User questions and answers on the portal and through RSS so they can be listed on the central EMODnet portal	Resolved	EASME agreed that EMODnet Seabed Habitats would publish an FAQ online instead of an exhaustive list of questions and answers, which are otherwise regularly reported in the progress reports		
INT 03 – COVID-19, back to full lockdown confinement in the UK, with school closed Everything takes longer due to slow network speeds or having to take additional time off to look after children	Resolved	More days allocated to these task		
INT 04 Issues with the EUNIS 2019 translation table	Resolved	Deliverable 3.10 (pilot translation of EUNIS maps) was relying on the official EUNIS 2019 official translation table published on the EEA website. We found that the table is incomplete and it has serious issues and errors, and that it was published on the EEA website without a guidance manual or a report. In the Atlantic alone, for example, the spreadsheet consists of 980 rows, 293 of these needed manual checks and corrections (where possible). Specific issues included: whole sections of the classification missing, logical rules not followed, incorrect or missing codes. JNCC has corrected the simpler issues, but for other more complex ones, external input or agreement is required. We contacted the EEA and proposed how to solve these more complex issues, but it will take some time before a decision is made. Fixing these issues costed a lot of unplanned effort, and caused a delay of several months in the delivery of D3.10.		
INT 05 unexpected additional work for next EUSeaMap due to data gaps in version 2018 of the EMODnet	Resolved	As mentioned in our tender proposal, in order to reduce costs for the development of EUSeaMap 2021 we		

bathymetry DTM (pixels with nodata alongshore, leading to significant loss of habitat spatial distribution).	<p>had not planned to re-run the biological zone layers but to use the version developed as part of the previous contract, in 2019. A substantial issue with that version, due to a data gaps in the EMODnet Bathymetry DTM 2018, was found out. In some places covering sometimes significant areas, the DTM presents gaps (i.e. pixels with no data) alongshore, as a result our biological zone layers also do. This gap represents a total area of approximately 32 500 km² in the Atlantic.</p> <p>We made the decision to fix the issue and use the latest version of the EMODnet Bathymetry DTM (version 2019, which does not present that issue) to fill the gaps. In order to minimise the risk of delays in the provision of EUSeaMap we deployed unplanned resources (2 men.months)</p>	
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5. Allocation of project resources

Information on the allocation of project resources	
Categories	Resource usage ³ (%)
Making data and metadata interoperable and available	44
Preparing data products	24
Preparing web-pages, viewing or search facilities	9
Managing user feedback	1
Project management	17
Outreach and communication activities	4
Others	0

³ Percentage allocation of the total amount awarded.

6. User feedback (Contact us form, online chat & other communication means)

Overview of user feedback and/or requests received in this quarter							
Date	Organisation	Type of user feedback (e.g. technical, case study, etc.) and short description of the feedback received	Means of contact	Response time	Status of user query: resolved/pending	Measures taken to resolve the query	Status: if not (yet) resolved/pending, explain reason why and expected timeline
30/10/2019	University of Venice	Data enquiry - Is it possible to download the posidonia oceanica layer?	Email	30 mins	resolved	Data sent, and data made available	resolved
14/11/2019	University of St. Andrews	Data enquiry - I'd like to download the full kinetic energy at the seabed due to waves in the Atlantic. The download link appears, but nothing is checked in the downloads page.	Contact Form	30 mins	resolved	Data sent separately and file uploaded to GeoServer	resolved
15/11/2019	Marche polytechnica university	Data enquiry - I can't find any shapefiles when I download EUSeaMap 2019	Contact Form	20 mins	resolved	Instructions given	resolved
19/11/2019	European Comission	Technical - Do you have any statistics to show the % cover shifts in EUNIS habitats from the two latest versions of EUSeaMap? It would be useful, moving forward, if this could be included in the final reports released alongside the product.	Contact Form	18 hours	resolved	Agreed statistics would be given in the next technical report	resolved
05/12/2019	University of Toyko	General - What is the oldest and newest dataset? Are there any datasets that are new from this year? How often do you update your data? What's the spatial resolution of your data?	Contact Form	2 hours	resolved	Range of dataset dates given	resolved

20/12/2019	EMODnet Geology	Technical - The high resolution sediment maps of the Danish waters were sent again to EMODNet Geology. They acknowledge that these maps were not included in the last (2018) version. They will include them in the new version.	Email	3 days	resolved	Agreed that data would be included moving forward	resolved
03/01/2020	Not disclosed	Data enquiry - I am trying to access some climatology data from EMODnet Physics and I can't seem to access the data.	Live Chat	3 hours	resolved	Forwarded enquiry to physics lot	resolved
09/01/2020	Atlantic Resource Consultants (ARC) Marine	Data enquiry - Is there any way to discern between the broad-scale habitats on the mapper? The key has too many similar colours.	Live Chat	1 minute	resolved	Advised the user to click on the mapper to display attributes in that area	resolved
10/01/2020	Not disclosed	General - I received the layer from the author and I'm working on it. Do you perhaps know which is the coordinate reference system of the map?	Live Chat	1 minute	resolved	Advised of the coordinate reference system	resolved
13/01/2020	Not disclosed	Technical - We need to know what GUI our habitat map has to submit data	Contact Form	13 mins	pending	Set up meeting to advise	resolved
23/01/2020	Grenoble Institute of Technology	General - Where can I access a world depth map?	Live Chat	1 minute	resolved	Provided options for Gebco Data and EMODnet bathymetry data	
23/01/2020	Aquaculture Stewardship Council	General - I cant download the Posidonia oceanica layer in the Med?	Email	1 hour	resolved	WMS links provided	resolved

24/01/2020	Ifremer	Use of the webGIS - I would need to know what the habitat is at a specific location. What is the data layer I should look at on the webGIS?	Live Chat	30 mins	resolved	Live guidance	resolved
27/01/2020	Ricardo (environmental consultants)	General - I would like to download a fine scale map but the link is taking me to every habitat map from survey classified to EUNIS.	Live Chat	1 minute	resolved	Advised to find the GUI of the habitat map, then to download the layer and filter by GUI after.	resolved
30/01/2020	Liverpool University	General - Do you have data on the percentage of substrate type in the Mediterranean?	Live Chat	1 minute	resolved	Advised we do not hold such data, but provided a link to EMODnet Geology	resolved
03/02/2020	Muséum National d'Histoire Naturelle (MNHN)	Technical - How do I narrow down the list of OSPAR Habitats in the Map viewer ?	Email	2 hours	resolved	Emailed guidance	resolved
10/02/2020	Not disclosed	General - What is the unit for kinetic energy at the seabed due to currents	Contact Form	2 days	resolved	Provided live assistance and linked to the metadata	resolved
20/02/2020	Not disclosed	General - how do I download the salinity data in Vancouver?	Contact Form	20 mins	resolved	Advised we do not hold such data and provided a link to EMODnet Physics	resolved

21/02/2020	Not disclosed	General - what year was the data collected for kinetic energy at the seabed due to currents	Live Chat	1 minute	resolved	Provided live assistance and linked to the metadata	resolved
25/02/2020	Bangor University	Technical - How do I access seabed substrate data for the celtic sea using your mapper?	Live Chat	1 minute	resolved	Provided a link to EUSeaMap	resolved
25/02/2020	Cornwall Wildlife Trust	Technical - The habitat maps are not loading onto the mapper properly. Is this issue occurring at your end?	Live Chat	1 minute	pending	Server was down, Jordan investigated	resolved
25/02/2020	Not disclosed	General - Do you have seagrass bed data in Studland Bay and Weymouth Bay, Dorset, UK?	Live Chat	1 minute	resolved	Provided a download link	resolved
02/03/2020	Not disclosed	General - Can I get all the information about plymouth sound and plymouth waterfront available	Live Chat	1 minute	resolved	Provided a multitude of links to download data	resolved
18/03/2020	Not disclosed	General - we are planning to use your substrate type map, but wanted to ensure to cite it properly in the report.	Live Chat	1 minute	resolved	Provided a link to the citation page	resolved
27/03/2020	Advisian	General - what units are the currents data recorded in?	Contact Form	3 hours	resolved	Provided a link to the metadata for further details	resolved
01/04/2020	Not disclosed	General - do you have any baselayers I can download from your portal?	Live Chat	1 minute	resolved	Advised we do not have this type of data.	resolved
01/04/2020	Bioconsult	General - do you have a .lyr file for EUSeaMap symbology?	Live Chat	1 minute	resolved	Provided a download link from GeoServer	resolved

08/04/2020	Not disclosed	General - Do you have seabed habitat data that I can download?	Live Chat	1 minute	resolved	Provided a download link to EUSeaMap	resolved
22/04/2020	Southampton University	Technical - how are the infralittoral and circalittoral biozones separated?	Live Chat	1 minute	resolved	Live guidance and provided a link to the technical report	resolved
27/04/2020	AWJ Marine	General - How do I load EUNIS & MSFD into QGIS.	Contact Form	25 hours	resolved	Provided a link to QGIS guidance	resolved
29/04/2020	AWJ Marine	General - Do you have a .sld file for the EUSeaMap EUNIS symbology?	Contact Form	10 mins	resolved	Attached the .sld file	resolved
04/05/2020	Emodnet Central	General - One of the diagrams on the Data Submission pages is not working	Live Chat	1 second	resolved	Re-uploaded the image	resolved
06/05/2020	The Rivers Trust	Technical - Is EUSeaMap available as a WFS?	Live Chat	1 second	resolved	Links provided	resolved
18/05/2020	Karteco	General - Are the MEDISEH layers available to download?	Query sent to Secretariat	4 days	resolved	Made the layers available to download and resent the link	resolved
20/05/2020	Not disclosed	General - Do you have QGIS data in the north sea?	Live Chat	1 day	resolved	Sent a link to EUSeaMap	resolved
25/05/2020	Clearwater Fine Foods	General - Do you have a .lyr file for the EUNIS Symbology?	Email	1 day	resolved	Attached the .sld file	resolved
25/05/2020	Not disclosed	Technical - I'm having problems with the WMS raster legend. I've downloaded the files but don't know how to use them on QGIS.	Live Chat	1 day	pending	Emailed to ask which layers they are	resolved

						having problems with	
26/05/2020	French Natural History Museum	General - Do you have homogenised datasets available on seabed habitats available to download?	Contact Form	1 day	resolved	Emailed with a download link to EUSeaMap and enquired whether there were any other data needed	resolved
28/05/2020	Not disclosed	Technical - I'm having issues displaying the legend for the substrate data I downloaded	Live Chat	1 second	resolved	Provided live assistance	resolved
01/06/2020	BP	General - I would like to understand the biotopes and predominant species on the seabed around Hornsea. If at all possible, I am also interested in the water column.	Contact Form	2 hours	resolved	Emailed with a link to mapper with some layers turned on	resolved
04/06/2020	Not disclosed	Technical - The download links from the mapper to the download page aren't working.	Live Chat	1 second	resolved	Provided live assistance	resolved
10/06/2020	Not disclosed	Technical - I don't know how to download the bathymetry data for the Med.	Live Chat	1 second	resolved	Provided live assistance	resolved
11/06/2020	Not disclosed	General - A download link doesn't seem to appear when I select the OSPAR data to download	Live Chat	2 hours	resolved	Emailed with the correct link	resolved
12/06/2020	Not disclosed	Technical - I've downloaded your polygon data which is in WGS84, but how do I calculate the area?	Live Chat	1 second	resolved	Provided live assistance	resolved
22/06/2020	Not disclosed	Technical - How do I download the bathymetry data for the Med basin?	Live Chat	1 second	resolved	Provided live assistance	resolved
23/06/2020	Not disclosed	Technical - Do you have any data on current direction in Moray Firth?	Live Chat	1 second	resolved	We do not hold that data	resolved

25/06/2020	AVS Dev (Acoustic Visual System Development) UK	Technical - I am trying to download habitat maps for Atlantic and Celtic Seas but they are not being downloaded. The result returns a gdb for habitats in the West of Spain.	Contact Form	1 minute	resolved	Reassured that the download links are correct and offered to send data separately if unable to still access.	resolved
07/07/2020	EMODnet Central	Technical - the WFS server is not working	Email	1 hour	resolved	Assistance provided	resolved
16/07/2020	Blue Marine Foundation	Technical - what is the best data source for depth to seabed that I can combine with EUSeaMap?	Live Chat	1 second	resolved	Provided live assistance	resolved
16/07/2020	Swansea University	Technical - Is the EOVS seagrass data available for download?	Email	1 second	resolved	Link to download sent	resolved
20/07/2020	National meteorological, seismic, sea and atmospheric organization of Portugal (IPMA)	General - Do you have any seabed habitat data around Portugal?	Live Chat	1 second	resolved	Live assistance provided	resolved
21/07/2020	Not disclosed	Technical - I have downloaded EUSeaMap 2019 but cannot access the data	Live Chat	20 minutes	resolved	Emailed ways to access the feature classes in the GeoDatabase	resolved
22/07/2020	Blue Marine Foundation	Technical - Can you please tell me how wave classes were identified	Live Chat	1 second	resolved	Emailed link to technical report	resolved

23/07/2020	National meteorological, seismic, sea and atmospheric organization of Portugal (IPMA)	Technical - What are the values surrounding EUSeaMap confidence and how were they assigned?	Live Chat	1 second	resolved	Live assistance provided	resolved
22/09/2020	Swansea University	Technical - What units are the attributes min and max depth recorded under?	Email	1 day	Resolved	Replied via email	Resolved
24/09/2020	OSPAR	Technical - Can we please keep the naming convention of the OSPAR WMS and WFS layers and just replace the dataset each year?	Email	1 day	Resolved	Replied via email	Resolved
07/10/2020	EMODnet Central	Technical - The map viewer is broken, it does not allow you to accept cookies and therefore the mapper doesn't work	Email	1 day	Resolved	Replied via email	Resolved
03/11/2020	VLIZ	General - Is it possible to get EUSeaMap and MSFD classes in a raster format?	Email	1 hour	Resolved	Replied via email	Resolved
04/11/2020	Bioconsult	General - I have some BH3 data I am preparing for OSPAR. Please could you point me to the correct contact.	Contact Form	10 minutes	Resolved	Replied via email	Resolved
24/11/2020	Department for Housing, Ireland	General - Update given on the progress of Irish data for the EUNIS OSPAR data call.	Email	30 minutes	Resolved	Replied via email	Resolved
07/12/2020	IBER-BAS, Bulgaria	General - Submission of three EUNIS maps to the EMODnet portal	Email	30 minutes	Resolved	Replied via email	Resolved

17/12/2020	HCMR	Technical - New GUI's needed for Greek habitat maps. Some assistance also required for confidence.	Contact Form	1 hour	Resolved	Replied via email	Resolved
27/01/2021	OFB (French Office for Biodiversity), France	General - Would like to know the source of the map that is the Natura 2000 site Belle ile en mer, in France	Email	1 hour	resolved	Replied via email	
04/02/2021	Ifremer, France	Technical - Has some observation data of Ostrea Edulis and would like it to be integrated into OSPAR shapefile on threatened and endangered habitats. We have suggested that he submits the dataset to SEANOE, an Ifremer tool for data publication that is linked to EMODnet data ingestion. So the data will be sent to data ingestion. We have provided them with the OSPAR shapefile template for them to submit the data to SEANOE in a format compliant with OSPAR's format	Email	1 day	resolved	Multiple emails/calls	
19/02/2021	EEA	General - Need for EMODnet portal to make Habitats directive datasets more visible/ easier to find. Following this comment the map viewer was reorganised and the names of the groups of layers were standardised (Habitats directive – xxx, instead of Annex I or Article 17)	Meeting	1 week	resolved	Reorganisation of the map viewer	resolved
08/03/2021	JNCC international team/Ramsar Convention – UK National Focal Point	Technical - Use of EMODnet Seabed Habitats seagrass EOVS in Marine/coastal habitat extents for the UK Ramsar National Report	Email	1 day	resolved	Replied via email	Resolved but needs to be considered in the next update of EOVS layers
19/03/2021	Ifremer, France	Technical - As part of project CENOPAC are going to assess the impact of fisheries on natural resources in the East Channel. Asked what is the best data available on habitats in the study area	Email	1 day	resolved	Replied via email	

19/03/2021	SAR (Marine standards Management Service), France	Technical - The SAR is in charge of creating marine data standards in France. Sent a survey on marine habitat classifications (questions such as which classifications are important to consider, and why)	Email	1 day	resolved	Replied the survey via email	
26/03/2021	Rijkswaterstaat, the Ministry of Infrastructure and Water Management (RWS) in The Netherlands	Technical - Need for EUSeaMap in shapefile format. Available for download in Geodatabase format only.	Email	3 days	resolved	Sent in Shapefile format	
06/04/2021	EMODnet Biology, via EMODNET Central portal	General - They are releasing soon a data product on EMODnet-Biology that makes use of some of your data. Couldn't find our preferred citation on our website. Ask how they should cite EMODnet Seabed Habitats Their product is developed by Tom Webb (Sheffield University) next Thursday 2021-04-08, but you can already see the methods and some examples on GitHub. This products links biological occurrences (with numerical abundances) of benthic species to their seabed habitats. Link GitHub: https://github.com/EMODnet/EMODnet-Biology-Benthic-Habitats-Occurrences-Traits	Email	2h	resolved	Replied via email	
10/05/2021	Blue Marine Foundation	General - where are the quantitative datasets used to determine energy classes in EUSeaMap 2019?	Email	1 day	resolved	Replied via email	
10/05/2021	Graduate School of the Environment	general - I want to convert the kdPAR data into photic depth. I am trying to understand the growth range of a species of seaweed.	Email	1 day	resolved	Replied via email	
13/05/2021	Natural England	- cannot access a dataset (page not found)	Email	1h	resolved	Replied via email	

17/05/2021	University of Genova	general - Would like to know how many of the level of detail maps have videos?	Email, via secretariat	1 day	resolved	Replied via email	
10/06/2021	Ifremer, MSFD Service, France	general - Would need to intersect EUSeaMap and MSFD areas in France. Did not work with QGIS	Email	1 day	resolved	Replied via email	
08/07/2021	Bangor University	General - which environmental variables are available to download for a habitat suitability model on sugar kelp	Email	1 day	resolved	Replied via email	resolved
16/07/2021	Cefas	Technical - I'm looking to obtain Annex I reef data for the North Sea. Please could you point me to the best data sources?	Email	1 day	resolved	Replied via email	resolved
17/08/2021	IEO	general - concerns about the accuracy of some of the EMODNET maps for Spanish waters in certain areas, especially in relationship with the sediment type and with the rock. Since these maps are going to be key for the future assesment of benthic habitat in the frame of the Marine Strategy Framework Directive, we are slightly worry and we were wondering if will possible to contribute with new data (raw or analysed) to the EMODNEt as well as what will be the best way to do that. Also, we wondering if will be possible to be more link to the process of generation of these maps as well as to better understand what data were used to produced them and how (if possible) will be the way to updated them with better and new data.	Email	2 hours	resolved	Replied via email	resolved
13/09/2021	Instituut voor Landbouw- en Visserijonderzoek (ILV)	Technical - Would it be possible to send me the layer of EUSeaMap 2019 Broad-scale Predictive Habitat map- MSFD benthic broad habitat types?	Email	3 days	resolved	Replied via email	resolved
24/09/2021	Not disclosed	Technical - WMS link no longer working	Contact Form	1 day	resolved	Replied via email	resolved

23/09/2021	Not disclosed	Technical - Unable to download kinetic energy due to currents in the Mediterranean	Contact Form	1 day	resolved	Replied via email	resolved
06/10/2012	Basque Climate Change Center	technical - I am working with some layers that I have downloaded from your (EMODNet) 'Seabed Habitats' database and I find some issues in the Seabed substrate layers. (...) I will appreciate if you can send me the original data of the seabed substrate layers (not the downloaded from EMODNet).	Email, via secretariat	1 day	resolved	replied via email	resolved

7. Meetings/events held/attended & planned

*Project Management Team meetings: The Project Management Team comprises WP leaders, i.e. Ifremer, ISPRA, JNCC, and meets every 3 months. Chaired by the Technical Project Manager (Helen Lillis until 30/04/2020, then Eleonora Manca, JNCC). Its task is to implement the scientific and technical activities

**Project meetings: All partners. Occurs every 6 months. Chaired by the Project coordinator (from Ifremer)

***Project Office meeting The Project Office comprises the coordinator (from Ifremer) and the Technical Project Manager (from JNCC)

A. Meetings/events organised and attended					
Date	Location	Type event (internal or external meeting, training/workshop)	Indicate if a ppt was given (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
16-17/10/2019	Dingle, Co. Kerry, Ireland	Seminar		A	Annual seminar of the Irish National Seabed Mapping. 100+ participants. Poster - Title: "Marine habitats of importance in Kerry" presented at the Annual seminar of the Irish National Seabed Mapping Programme, Dingle, Co. Kerry, Ireland. Link to event details: https://www.infomar.ie/sites/default/files/2019-10/INFOMAR_2019_Seminar_Agenda_0.pdf
24/10/2019	Videoconf	Meeting (internal)		O	First Project Management Team meeting*
14/11/2019	Videoconf	Meeting (internal)		O	First project meeting**
16/12/2019	Videoconf	Meeting (internal)		O	2nd Project Management Team meeting*
30/01/2020	Paris	Seminar	yes	A	Oral Presentation - An overview of EMODnet Seabed Habitats - Seminar on Habitats, Museum of Natural History, Paris, France, 30-31/01/2020 Seminar that gathered French habitat specialists, both from land and marine realm.

					200 participants (scientists, policy makers) Sessions were on typology, mapping and data dissemination
06/02/2020	Esposende, Portugal	Conference	yes	A	Oral Presentation - Marine Habitat Mapping - International conference on Marine Information Systems, Esposende, Portugal
24/02/2020	Videoconf	Meeting (internal)		O	Project Office meeting*** - Discussed on technical report, Annual EMODnet report, First portal update, Website developments, Consortium agreement, Management meeting in London, Jamboree, Next EUSeaMap update, EMODnet Ingestion, upcoming events, meeting with CMEMS
28/02/2020	Videoconf	Meeting (external)		O	Meeting with CMEMS - Organised by JNCC - Partners attending: JNCC, Ifremer - Discuss ways to highlight and link to EMODnet products on CMEMS data services (e.g. seabed habitat maps JNCC). - Briefly discussed on how CMEMS products could be more appropriate to Seabed Habitat mapping/modelling (Products at seabottom, Better resolution) and about publishing EMODnet Seabed Habitats' products on CMEMS website Agreed on a face-to-face meeting
03/03/2020	Copenhagen	Conference	yes	A	Oral Presentation - Broad-scale benthic habitat maps. A prerequisite for Maritime Spatial Planning - EcoMar Project final conference, Copenhagen, Denmark, 03/03/2020 EcoMar Project final conference, Copenhagen, Denmark 70 participants

13/03/2020	Videoconf	Meeting (external)		A	Thematic coordinator meeting - Organised by DG MARE - Partners attending: Ifremer - DG Mare convened thematic coordinators to inform them of an important decision for the future of EMODnet. - The DG MARE has decided that in the next phase, all EMODnet data and data products will have to be findable, visible and downloadable through a unique access point, the central portal. Individual thematic groups will maintain their servers and web services, but not their websites. This decision will take effect in the next phase, that will not start before the end of the current one (24/09/2021 in our case)
20/03/2020	Videoconf	Meeting (external)		A	EMODnet bathymetry technical presentation - Organised by DG MARE - Partners attending: Ifremer, JNCC - EMODnet Bathymetry to present an overview of features/technology specific to the thematic portal
27/03/2020	Videoconf	Meeting (internal)		A	3rd Project Management Team meeting* - Was supposed to be a 2-day face-to-face meeting in London. Replaced by a one-day videoconf due to COVID-19 crisis
28/04/2020	Videoconf	Meeting (internal)		O	WP2 meeting - Organised by ISPRA - Partners attending: All Partners - to discuss about the work already done, any issue in data preparation and check processes and the future step - Upcoming
21-22/04/2020	Videoconf	Meeting (external)		A	12th EMODnet Steering Committee Meeting

23- 24/04/2020	Videoconf	Meeting (external)		A	7th EMODnet Technical Working Group Meeting
04- 08/05/2020	Videoconf	Meeting (external)		A	ICES working group on marine habitat mapping - Organised by ICES - Partners attending: JNCC, Ifremer - WGDEC (Working Group on Deep-water Ecology) has asked WGMHM for help with another important component of their work. NAFO and ICES are adopting VME Elements for predicting the areas where VMEs are likely to occur. Elements are topographical, hydro-physical or geological features. WGMHM has offered the help of WGMHM in the delineation of these Elements for WGDEC this year - 1) VME elements are defined without clear rule-sets for their consistent calculation, 2) for investigating where VME habitats are likely to occur WGMHM does not recommend the use of VME elements without further refinement, 3) it is recommended that geostatistical modelling techniques are used instead Report: 10.17895/ices.pub.6034
27/05/2020	Videoconf	Meeting (internal)		O	2nd project meeting**
05/06/2020	Videoconf	Meeting (external)		A	EMODnet Seabed Habitats portal technical presentation - Organised by DG MARE - Partners attending: Ifremer, JNCC - EMODnet Seabed Habitats presented an overview of features/technology specific to the thematic portal - EMODnet Seabed Habitats presented the data and products, and how to find, visualize and download Seabed Habitats data and metadata through the central portal-

					Provided some thoughts on main functionalities required in the new central portal to allow users to easily discover, visualise and access habitat data
15/06/2020	Videoconf	Workshop		A	EMODnet biology WP4 products Workshop - Organised by Emodnet Biology - Partners attending: JNCC - One of the deliverables of EMODnet Biology WP4 work package is a workshop, focusing on populating our Atlas of Marine Life - Supporting a piece of work started by EMODnet Biology aimed at using species and habitat occurrences to improve both our products - Scoping a method/iterative process to make use of both lots data
15/06/2020	Videoconf	Meeting (external)	yes	O	HELCOM and EMODnet Seabed Habitats collaboration - Organised by SYKE - Partners attending: SYKE, Ifremer, JNCC - EMODnet Seabed Habitats objectives for data collation and creation of new products; HELCOM's approach data collation and the need for regional-scale habitat products. Ways to work together on data collation and making data available. Whether there are products that EMODnet could produce/collaborate on that would be useful to HELCOM. Five participants, 3 from EMODnet Seabed Habitats, 2 from HELCOM Secretariat.
16/06/2020	Videoconf	Workshop		A	EMODnet-CMEMS Thematic Workshop on Coastal Issue - Organised by co-organizers EMODnet, CMEMS/MO <i>i</i> , DG MARE and DG DEFIS - Partners attending: JNCC - A technical

					meeting with EMODnet, CMEMS, inter-DG representation and the EEA to discuss marine data and data products and information on Coastal behaviour. Objectives include assessing existing capabilities and emerging areas for collaboration across EMODnet themes and between EMODnet and CMEMS, with a regional focus. - Identified some complementarities and interoperability of both initiatives for coastal behaviour information as well as some areas for collaboration between EMODnet and CMEMS in the coastal area - These will be discussed in more detail - Some opportunities for collaboration across different EMODnet themes were also discussed.
19/06/2020	Videoconf	Meeting (external)		A	EMODnet biology technical presentation - Organised by DG MARE - Partners attending: Ifremer - EMODnet Biology to present an overview of features/technology specific to the thematic portal
23/06/2020	Videoconf	Meeting (external)		A	Update on indicators - Organised by EMODnet Secretariat - Partners attending: Ifremer, JNCC - Secretariat to update thematic lots on new indicators - Excel file largely revised
25/06/2020	Videoconf	Meeting (external)	yes	A	Oral Presentation at an external project meeting. Title: EUNIS and EUSeaMap broad scale seabed habitat map. Project: Lanfest Gap analysis of U.S. marine biodiversity protection: Scoping a framework for marine stewardship. The presentation was part of an interactive series of scoping discussions focusing on case studies that approach marine biodiversity from

					<p>either a conservation planning or biodiversity monitoring lens. It was presented to a working group of experts from around the world, charged with developing a data-based framework for quantifying marine biodiversity, and assessing spatial gaps in its protection, in US waters.</p> <p>Link: https://www.lenfestocean.org/en/news-and-publications/fact-sheet/expert-teams-marine-biodiversity-dialogues</p>
01/07/2020	Videoconf	Meeting (internal)		O	4th Project Management Team meeting*
03/07/2020	Videoconf	Meeting (external)		A	<p>EMODnet human activities technical presentation - Organised by DG MARE - Partners attending: Ifremer - EMODnet human activities to present an overview of features/technology specific to the thematic portal</p>
13/07/2020	Videoconf	Meeting (external)		O	<p>EMODnet biology and EMODnet Seabed habitats OBIS collaboration and outreach - Organised by Emodnet Biology - Partners attending: JNCC - Catch up with EMODnet biology coordinator and WP-lead on coordinating outreach activities and working together for ingestion of data into EurOBIS - Agreement of joint outreach activities catch up on progress with EurOBIS ingestion. Coordination of future work, synergies and improved way of working together</p>
17/09/2020	Videoconf	Meeting (external)		A	<p>Update on indicators - Organised by EMODnet Secretariat - Partners attending:</p>

					Ifremer, JNCC - Secretariat to update thematic lots on new indicators
22/09/2020	Videoconf	webinar		A	Webinar - EMODnet: A decade of achievements connecting marine data to knowledge - Organised by EMODnet Secretariat
23-24/09/2020	Videoconf	Meeting (external)		A	A partner in both EMODnet Geology and Seabed Habitats attended EMODnet Geology Progress meeting There were about 100 participants, and the new substrate map was the main issue that concern the Habitat Lot. Also, the coastal zone and seabed morphology. WP3 1K resolution Seabed substrate map will be produced in early 2021, and the final product will be finished in summer 2021. Multiscale dataset will also be produced.
08/10/2020	Toulouse, France	Meeting (external)		O	Meeting with Head of Mercator Ocean's Operations & Services Department - Organised by Ifremer and CMEMS - Partners attending: Ifremer We have agreed that CMEMS would include EUSeaMap 2019 in their MSFD portfolio, which is a portfolio that Dominique has initiated with EMODnet Chemistry
09/10/2020	Videoconf	Workshop		A	EMODnet biology Transatlantic data products workshop - Organised by Emодnet biology - Partners attending: JNCC - EMODnet biology Transatlantic data products workshop - how can we applying US/Canadian data to the product workflows

14/10/2020	Videoconf	Workshop	Presentation	A	Oral Presentation at Copernicus user uptake workshop ‘Using Earth Observation for Water Quality Monitoring’ – Presentation title: Using Earth Observation for Seabed habitat mapping - The workshop is funded by ‘Copernicus User Uptake’ funds to deliver collaborative projects and events which are aimed at increasing the use of Copernicus satellite data for environmental applications. EMODnet Seabed habitats is going to participate from the perspective of end users and give a presentation on the first day.
09-10/11/2020	Videoconf	Meeting (external)		A	13th EMODnet Steering Committee Meeting
12-13/11/2020	Videoconf	Meeting (external)		A	8th EMODnet Technical Working Group Meeting
11-13/11/2020	Videoconf	HELCOM Secretariat	Presentation	A	4th meeting of the HELCOM Expert network on Benthic Habitats EMODnet Seabed habitats has been invited to present and ask comments from regional experts in HELCOM EN-benthic expert group on our planned work - and future work
23/11/2020	Videoconf	Meeting (internal)		O	5th Project Management Team meeting*
24-26/11/2020	Videoconf	Conference	Presentation Poster Book of abstracts	A	MeriGéo: French Marine GIS and remote sensing conference (occurs every 2 years). Oral Presentation (jointly with EMODnet Bathymetry). Title: “Synergies between EMODnet Seabed Habitat et EMODnet Bathymetry”.

					Poster. Title: "A European web portal to access spatial data on benthic habitats: EMODnet Seabed Habitats".
10/12/2020	Videoconf	Meeting (internal)		O	3rd project meeting**
10/12/2020	Videoconf	Meeting (external)		A	Meeting EASME / DG-MARE / VLIZ / EMODnet Seabed Habitats, organised by EASME - technical solution to GDPR and contractual issues on data protection at the end of the Brexit transition A technical solution was proposed by EASME and agreed by EMODnet Seabed Habitats
10/12/2020	Videoconf	Webinar		A	JNCC Science Talks Series. A representative from EMODnet Secretariat presented a history of EMODnet initiative and its future, and take question from the audience. ESH achievement was also highlighted.
01/2021	Videoconf	Meetings (internal)		O	WP2 one-to-one meetings As part of WP2 (data collation), a series of one-to-one meetings were organised by ISPRA (WP leader) in order for each partner to update on their inputs and plans until the end of the contract
14/01/2021	Videoconf	Meeting (external)		O	Meeting with ICES JNCC meeting ICES data managers to discuss metadata in ICES GeoDatenetwork
27/01/2021	Videoconf	Workshop		A	Workshop Organised by the Consortium for contract EASME/EMFF/2018/1.3.1.1/SI2.814068. Stakeholder workshop to discuss how best to

					seize the opportunities offered by the implementation of the existing policy framework to support the application of Ecosystem Based assessment in Marine Spatial Planning in the Black Sea.
02/02/2021	Videoconf	Meeting (external)		O (co-organisation EMODnet Geology and Seabed Habitats)	<p>Meeting with EMODnet Geology</p> <p>Cross thematic meeting to ensure that Geology's product "seabed substrate" early delivery to Seabed Habitats suits our needs (this product is a key input to EUSeaMap)</p>
02-05/02/2021	Videoconf	Workshop		A	<p>Workshop</p> <p>Organised by ICES - Workshop on the Use of Predictive Habitat Models in ICES Advice (WKPHM) - A workshop to produce an ICES advice to model deep sea habitats by predictive modelling techniques</p>
19/02/2021	Videoconf	Meeting (external)	Yes – presentation of and how we disseminate data that is related to Nature Directive	A	<p>Meeting with EEA and DG/MARE</p> <p>Organised by DG/MARE and EEA</p> <p>Meeting Between EMODnet and EEA. Objective: see how reporting under the Nature Directive could be brought together with data processed and disseminated through EMODnet to enhance EMODnet's support to the biodiversity strategy.</p> <p>We presented the data that we make available that is related to the Nature directives (e.g. the Habitats Directive Annex I individual maps from survey). The EEA presented the datasets from Article 17, Habitats Directive 92/43/EEC reporting that they update every 5-year, of</p>

					which we already made available the datasets related to the conservation status of habitat types. We currently make available the previous version and we will publish the latest one using the WFS made available by the EEA
14/03/2021	Videoconf	Meeting (internal)		O	6th Project Management Team meeting*
14/03/2021	Videoconf	Meeting (internal)		O	Project office meeting*** - Discussed deliverable progress and EUSeaMap issues
24/03/2021	Videoconf	Meeting (external)		O	Meeting with OSPAR Habitat mapping for OSPAR BH3 Extent of Physical damage to predominant and special habitats. A meeting with colleagues working on the OSPAR BH3 assessment. Discuss progress made with the creation of the habitat map and timeline.
04/2021	Videoconf	Meeting (internal)		O	WP2 one-to-one meetings As part of WP2 (data collation), a series of internal one-to-one meetings were organised by ISPRA (WP leader) in order for each partner to update on their inputs and plans until the end of the contract
19/04/2021	Videoconf	Meeting (external)		A	14th EMODnet Steering committee
20-21/04/2021	Videoconf	Meeting (external)		A	9th EMODnet Technical Working Group
20/04/2021	Videoconf	Meeting (internal)		O	WP3 meeting Internal technical meeting to discuss how to update the habitat EOY layers
05/05/2021	Videoconf	Conference		A	GEOHAB conference. Main habitat mapping conference.

21/05/2021	Videoconf	Meeting (internal)		O	Project office meeting*** - Discussed deliverable progress and EUSeaMap issues
11/06/2021	Videoconf	Meeting (external)		A	EMODnet Open Conference 2021 – Rehearsal and technical guidelines for speakers
14-16/06/21	Videoconf	Conference	Yes. 2 presentations 1) Main achievements in the last 5 years 2) Breakout “EMODnet for EU Green Deal” - key messages	A	EMODnet Conference
15/06/21	Videoconf	Meeting (external)		A	EMODnet Conference breakout discussion: pre-meeting
15/06/2021	Videoconf	Workshop		O	EMODnet Conference breakout discussion. Helen Lillis from Seabed Habitats lot was lead rapporteur
16/06/2021	Videoconf	Meeting (external)	Yes: best practices as part of EUSeaMap	A	EMODnet Jamboree Special Sessions “Ocean Data Best Practices” dialogue
17/06/2021	Videoconf	Meeting (internal)		O	4th Partner progress meeting**
17/06/2021	Videoconf	Meeting (internal)		O	Partner next phase meeting (as part of EMODnet Jamboree)
18/06/2021	Videoconf	Meeting (external)		O	Cross-thematic session with EMODnet Biology (as part of EMODnet Jamboree)
18/06/2021	Videoconf	Meeting (external)		O	Cross-thematic session with EMODnet Geology (as part of EMODnet Jamboree)
18/06/2021	Videoconf	Meeting (external)		A	EMODnet Jamboree Special Sessions “Citizen science” dialogue
18/06/2021	Videoconf	Meeting (external)		A	EC European Ocean Observation event

26/06-05/07/2021	Albena, Bulgaria	Conference	Yes: Todorova et al: how EUSeaMap 2019 was used in the assessment of the spatial extent of benthic broad habitats types adversely affected by anthropogenic pressures under D6C5 in 2019.	A	Conference XXIth International Multidisciplinary Scientific GeoConference Surveying, Geology and Mining, Ecology and Management – SGEM 2021, 26 June - 5 July, 2021.
07/07/2021	Videoconf	Meeting (external)		O	Meeting with Tehran Convention to discuss how to engage with Caspian Sea data holders.
12/07/2021	Videoconf	Meeting (external)		A	Meeting with Mission Atlantic and One Ocean Hub projects Mission Atlantic and One Ocean Hub projects have created the first draft of a South Atlantic broad-scale habitat map. This meeting is to present and discuss these outputs.
8-9/09/2021	Videoconf	Meeting (external)		A	15th EMODnet Steering committee
9-10/09/2021	Videoconf	Meeting (external)		A	10th EMODnet Technical Working Group
SUM				O	Total # of meetings organised = 28
SUM				A	Total # of meetings attended = 44

8. Communication assets

A. Communication assets				
Date	Communication material	Short description (of the material, title, ...) and/or link to the asset	Main results	Name of event at which material was disseminated (if applicable)
16-17/10/2019	Poster	Annual seminar of the Irish National Seabed Mapping Programme	Promote EMODnet Seabed Habitats Activities	INFOMAR Seminar, Dingle, Co. Kerry
20/11/2019	News item	Phase three extended through to 2021	Promote EMODnet Seabed Habitats Activities	Website
31/10/2020	Abstract submission for oral presentation (accepted)	French Marine GIS and remote sensing conference, occurs every 2 years. Abstract accepted	Promote EMODnet Seabed Habitats Activities, Products and Portal	MerlGéo, Bordeaux
31/10/2020	Abstract submission for poster (accepted)	French Marine GIS and remote sensing conference, occurs every 2 years. Abstract accepted	Promote EMODnet Seabed Habitats Activities, Products and Portal	MerlGéo, Bordeaux
30/01/2020	Oral presentation	Ifremer - An overview of EMODnet Seabed Habitats	Promote EMODnet Seabed Habitats Activities, Products and Portal	Seminar on Habitats, Museum of Natural History, Paris, France
06/02/2020	Oral presentation	CCMAR - Marine Habitat Mapping	Promote EMODnet Seabed Habitats Activities, Products and Portal	International conference on Marine Information Systems, Esposende, Portugal
21/02/2020	EMODnet Data and data product portfolio	JNCC - Coordination EMODnet Secretariat	Promote EMODnet Seabed Habitats Products	
24/02/2020	EMODnet Seabed Habitat Factsheet	JNCC - Coordination EMODnet Secretariat	Promote EMODnet Seabed Habitats Products	
03/03/2020	Oral Presentation	GEUS - Broad-scale benthic habitat maps. A prerequisite for Maritime Spatial Planning	Promote EMODnet Seabed Habitats Activities and Products	EcoMar Project final conference, Copenhagen, Denmark

05/03/2020	Report	JNCC - Contribution to EMODnet Annual Report 2019	Promote EMODnet Seabed Habitats Activities	
17-19/03/2020	Oral presentation	French Marine GIS and remote sensing conference, occurs every 2 years, around 150 participants	Promote EMODnet Seabed Habitats Activities, Products and Portal	MerlGéo, Bordeaux
17-19/03/2020	Poster	French Marine GIS and remote sensing conference, occurs every 2 years, around 150 participants	Promote EMODnet Seabed Habitats Activities, Products and Portal	MerlGéo, Bordeaux
19-25/02/2020	Oral Presentation	Eurofleets+ is funded under EU Horizon 2020 'Integrating Activity for Advanced Communities' with respect to Environmental and Earth Sciences - Research Vessels. MI is the coordinator of Eurofleets+, which held its first floating university on hydrographic surveying and seabed mapping in University College Cork and onboard the MI's RV Celtic Voyager in Cork Harbour. The material delivered has been developed by the INFOMAR programme as an MSC module on Seabed Mapping	Promote EMODnet Seabed Habitats Activities and Products	EUROFLEETS+ Floating University, University College Cork, Ireland.
23-24 April 2020	Oral Presentation	The study objective is to evaluate the environmental status of seabed habitats in the Bulgarian Black Sea using Commission Decision (EU) 2017/848 assessment framework.	Promote EMODnet Seabed Habitats Activities, Products and Portal	Presented at On-line Seminar 23-24 April 2020 : "International Seminar of Ecology – 2020", IBER-BAS
06/05/2020	News item on ESH portal	A webpage providing a prominent summary of the data and data products	Promote EMODnet Seabed Habitats Products	
12/06/2020	Report	JNCC- Contribution to EMODnet Annual Report 2019	Promote EMODnet Seabed Habitats Products	

25/06/2020	Oral presentation	The overarching goal of this project is to establish and implement a coherent, evidence-based framework for evaluating the status of marine habitat and biodiversity protection within the US Exclusive Economic Zone. The project is sponsored by the Lenfest Ocean Program and the National Marine Sanctuary Foundation.	Promote EMODnet Seabed Habitats Activities, Products and Portal	Lanfest Gap analysis of U.S. marine biodiversity protection: Scoping a framework for marine stewardship - Remote teleconference (part of interactive series of scoping discussion for the project)
14/07/2020	Story Map	A story map which will be available on the ESH website describing data available through the portal and how users can access it	Promote EMODnet Seabed Habitats Products	
14/07/2020	News item on ESH portal	Promoting the publication of the Story map	Promote EMODnet Seabed Habitats Activities	
15/07/2020	Report	EUSeaMap 2019 Technical report release and publication on ESH and on ARCHIMER	Inform users on methodologies and updates in EUSeaMap 2019	
August 2020 and ongoing	Report	All 12 quarterly reports to the EU from all ESH phases published on ESH website	Promote EMODnet Seabed Habitats Activities and Products	
05/08/2020	News item on ESH portal	EMODnet Online survey Promoting the 2020 online Survey on EMODnet	Promote the survey to the users of ESH portal	
05/08/2020	EMODnet homepage updated with the banner on EMODnet Online survey	Promoting the 2020 online Survey on EMODnet	Promote the survey to the users of ESH portal	
15/08/2020	Video	Contribution to the 10 years of EMODnet in 10 minutes - JNCC and Ifremer recoded short videos that were edited for the short documentary film that captures the EMODnet story over the last 10 years.	Contribute to the EMODnet 10 years event and publicity material	Link

21/08/2020	News item on ESH portal	Discover the EU Atlas of the Seas powered by EMODnet - Promoting the newly launched European Atlas of the Seas and how ESH contributes to it	Promoting ESH contribution to the Atlas of the Seas	
22/09/2020	Tweet	Celebrating 10 years of EMODnet	Promote EMODnet Seabed Habitats Activities	
05/10/2020	News item on ESH portal	Celebrating 10 years of EMODnet	Promote EMODnet Seabed Habitats Activities	
10/10/2020	Newsletter	JNCC Science Bulletin is an online monthly bulletin published by JNCC and aimed at informing JNCC stakeholders and clients of achievements and activities . The October bulletin will feature 10 years of EMODnet and key achievement of EMODnet Seabed Habitats in the past 10 years - the bulletin is promoted on all JNCC's social media channels (Twitter, Facebook and LinkedIn).	Promote EMODnet Seabed Habitats Activities	JNCC Science Bulletin/online
13/10/2020	Tweet	A series of tweets linked to the participation of ESH on of Copernicus users uptake workshop on the use Earth Observation for water quality monitoring (#JNCC_EO4water) Ifremer/Seabed Habitats presented using #EO products in seabed habitat mapping @EMODnet @CopernicusEU tagged	Promote EMODnet Seabed Habitats Activities	
14/10/2020	Oral presentation	The workshop is funded by 'Copernicus User Uptake' funds to deliver collaborative projects and events which are aimed at increasing the use of Copernicus satellite data for environmental applications. EMODnet Seabed habitats is going to participate from the	Promote EMODnet Seabed Habitats Activities, Products and Portal	Using Earth Observation for Water Quality Monitoring (Copernicus user uptake workshop)

		perspective of end users and give a presentation on the first day.		
November 2020	News item on ESH website	A news item on the participation of ESH to Copernicus users uptake seminars on the use Earth Observation for water quality monitoring with links to presentation by ESH and webinar recording	Promotion of links with Copernicus project and how the two initiatives benefit each other	
November 2020	Report	Stakeholder review report published on ESH website and ARCHIMER	Inform users and stakeholder of plan for ESH products creation	
November 2020	News item on ESH portal	Addition of new datasets to the portal	Inform users and stakeholder of plan for ESH products creation	
24-26/11/2020	Oral presentation	French Marine GIS and remote sensing conference, occurs every 2 years, around 150 participants. Due to COVID-19 will be a webconf	Promote EMODnet Seabed Habitats Activities, Products and Portal	MerlGéo, webconference
24-26/11/2020	Poster	French Marine GIS and remote sensing conference, occurs every 2 years, around 150 participants. Due to COVID-19 will be a webconf	Promote EMODnet Seabed Habitats Activities, Products and Portal	MerlGéo, webconference
10/12/2020	Oral presentation and recorded webinar	The talk is advertised to JNCC partners and internally at JNCC as part of the JNCC Science talks series . If consent is given by the speaker the talk will be recorded and made available online as a webinar,. Kate Larkin from EMODnet Secretariat will present a history of EMODnet initiative and its future, and take question from the audience.	Promote EMODnet Seabed Habitats Activities, Products and Portal	JNCC Science Talks Series

		ESH achievement will also be highlighted.		
16/12/2020	CMEMS' MSFD catalogue	CMEMS has sent to DG-DEFI a first version of the MSFD catalogue, elaborated with EMODnet chemistry and Seabed Habitats. When achieved, the catalogue will gather in the same place CMEMS and EMODnet information that is of interest for the MSFD. The next step is CMEMS to contact the MSFD chairs of the technical or expert groups to refine the information that is useful for each MSFD descriptor.	Strengthening relationships with EMODnet and CMEMS and promote EMODnet Seabed Habitats Products	
Jan 2021	ESRI Story Map on ESH portal	2 story maps related to making habitat maps and using EUSeaMap for MSP	Provide access to resources on habitat mapping	
Jan 2021	ESRI Story Map on ESH portal	a story map with an example of using EUSeaMap for Marine spatial planning	Provide access to resources on habitat mapping and a use case for EUSeaMap	
Jan 2021	EMODnet Seabed Habitats Use cases on EMODnet central portal	All EMODnet Seabed Habitats Use cases so far reformatted, with added images to be published on EMODnet central portal	Provide access to the Seabed habitats use cases from the central portal	
21/02/2021	Elsavir Book Article	Review of article on EMODnet and the European Atlas of the Seas for a Book Chapter on "Marine data for society"	Section on seabed habitats reviewed	
March 2021	Newsletter	Item in the central portal's monthly digest about new	Promote EMODnet Seabed Habitats Products	EMODnet newsletter

		data products uploaded to the seabed habitats portal		
03/03/2021	EMODnet Annual Report	Contribution to EMODnet Annual Report 2020	Provision of key summary of 2020 updates for EMODnet Seabed Habitats and metrics for “EMODnet in Figures”	
09/03/2021	EMODnet Data and data product portfolio	Contribution to the annual update of the EMODnet Data and data product portfolio - Coordination EMODnet Secretariat	Promote EMODnet Seabed Habitats Products	
26/03/2021	News item on ESH portal	Invitation to EMODnet’s Open Conference 2021	Promote EMODnet’s Open Conference to habitat mapping community	
04/03/2021	Tweet	Invitation to EMODnet’s Open Conference 2021	Promote EMODnet’s Open Conference to habitat mapping community	
06/04/2021	Tweet	Invitation to EMODnet’s Open Conference 2021 and reminder of poster abstract submission deadline	Promote EMODnet’s Open Conference to habitat mapping community	
14/04/2021	News item on ESH portal	Addition of new datasets to the portal	Promote EMODnet Seabed Habitats Products	
14/04/2021	Tweet	Addition of new datasets to the ESH portal from the EMODnet central account	More traffic to the portal and promotion of the portal	
15/06/2021	News item on ESH portal	Collaboration between EMODnet and Copernicus Marine to publish an updated	Strengthening relationships with EMODnet and CMEMS	

		catalogue of data products to support users implementing MSFD	and promote EMODnet Seabed Habitats Products	
25/06/2021	News item on ESH portal	Promotional activities of ESH attendance to the Open Conference and Jamboree	Promote EMODnet Seabed Habitats Activities	
17/08/2021	New or updated web page on the ESH website	Publication of a new page on the EMODnet portal, detailing the submission guidelines for habitat data into OBIS	Wider awareness of guidance, hopefully leading to more standardised approach to recording habitat data in OBIS	
17/08/2021	News item on ESH website	PDF guide for submitting habitat data to into OBIS	Wider awareness of guidance, hopefully leading to more standardised approach to recording habitat data in OBIS	
17/08/2021	Reference to EMODnet Seabed Habitats in other materials	Article in EMODnet Newsletter regarding the new functionality to submit habitat data into OBIS	Wider awareness of guidance, hopefully leading to more standardised approach to recording habitat data in OBIS	
18/08/2021	Reference to EMODnet Seabed Habitats in other materials	Updated content to the OBIS manual to include guidance on submitting habitat data	Wider awareness of guidance, hopefully leading to more standardised approach to recording habitat data in OBIS	
18/08/2021	JNCC Tweet	Tweet promoting the publication of guidance for submitting habitat data into EurOBIS	Wider awareness of guidance, hopefully leading to more standardised approach to recording habitat data in OBIS	
19/08/2021	Personal LinkedIn Post	Post promoting the publication of guidance for submitting habitat data into EurOBIS	Wider awareness of guidance, hopefully leading to more standardised approach to recording habitat data in OBIS	
19/08/2021	EMODnet Central Tweet	Tweet promoting the publication of guidance for	Wider awareness of guidance, hopefully leading to more	

		submitting habitat data into EurOBIS	standardised approach to recording habitat data in OBIS	
19/08/2021	EurOBIS Tweet	Tweet promoting the publication of guidance for submitting habitat data into EurOBIS	Wider awareness of guidance, hopefully leading to more standardised approach to recording habitat data in OBIS	
23/09/2021	News item on ESH website	Release of the 2020 OSPAR T&D database	Wider awareness of the availability of a new data product so that it may be used by those who'd benefit from it.	

List of known publications using EMODnet data or data products

Date	Type and name of journal, conference, ...	Publication title	Author(s)	Organisation(s)
December 2019	Volume III-C/PCE Decree law- Diário da República n.º 250/2019, 1º Suplemento, Série I de 2019-12-30.	Portuguese Maritime Spatial Plan - Situation Plan		
January 2020	Ecological Indicators	Assessing marine ecosystem services richness and exposure to anthropogenic threats in small sea areas: A case study for the Lithuanian sea space DOI	Depellegrin et al	
January 2020	ETC/ICM Report	ETC/ICM Report 4/2019: Multiple pressures and their combined effects in Europe's seas Link		
January 2020	Journal "Biodiversity and Conservation"	Evaluating seabed habitat representativeness across a diverse set of marine protected areas on the Mid-Atlantic Ridge DOI	Milla-Figueras et al	
February 2020	Science of The Total Environment	Relative impacts of multiple human stressors in estuaries and coastal waters in the North Sea–Baltic Sea transition zone DOI	Andersen et al	
February 2020	Progress in Oceanography	Distribution and life history trait models indicate vulnerability of skates	Elliot et al	

		DOI		
March 2020	Ecological Modelling	Assessing natural capital value in marine ecosystems through an environmental accounting model: A case study in Southern Italy DOI		
March 2020	ICES Journal of Marine Science	Seasonality of spatial patterns of abundance, biomass, and biodiversity in a demersal community of the NW Mediterranean Sea DOI	Vilas et al	
April 2020	Ecologia Balkanica	First Implementation of Marine Strategy Framework Directive for Benthic Habitats Assessment in the Bulgarian Black Sea Link	Todorova et al	
May 2020	Journal of Applied Ecology	Extending full protection inside existing marine protected areas, or reducing fishing effort outside, can reconcile conservation DOI	Belharet et al	
June 2020	Environmental and Sustainability Indicators	Identifying ecosystem services research hotspots to illustrate the importance of site-specific research: An Atlantic coastal region case study DOI	Caro et al	
June 2020	EEA Report	Marine messages II Navigating the course towards clean, healthy and productive seas through		

		implementation of an ecosystem-based approach EEA Report No 17/2019 LINK		
June 2020	Dataset	Europe Seas habitats potentially affected by anchoring Link		
June 2020	Mediterranean Marine Science	The contribution of wind-wave energy at sea bottom to the modelling of rhodolith beds distribution in an off-shore continental shelf DOI	Agnesi et al	
July 2020	Ocean & Coastal Management	Evaluating differences in marine spatial data resolution and robustness: A North Sea case study DOI		
August 2020	Marine Policy	Strategies and trends of bottom trawl fisheries in the Mediterranean Sea DOI	De Angelis et al	
August 2020	NIVA-rapport	Supplementary material to ECOMAR: A data-driven framework for ecosystem-based Maritime Spatial Planning in Danish marine waters LINK	Andersen et al	
September 2020	Contract Report	Report on the marine environmental status (MSFD) in 2019. Chapter 2.2. Data analysis and interpretation of D1,6 Seabed habitats - macrozoobenthos. Contract N° 4-33-		

		25/10.09.2020 between the Bulgarian Ministry of Environment and Waters and the Institute of Oceanology - BAS		
September 2020	Nordic Blue Carbon Project final report	Blue Carbon - climate adaptation, CO2 uptake and requestration of carbon in Nordic blue forests DOI	Frigstad et al	
October 2020	Ecological Indicators	Detecting adverse effect on seabed integrity. Part 2: How much of seabed habitats are left in good environmental status by fisheries? DOI	Jac et al	
November 2020	Project Technical Report ENV6003066R	Technical report of Project "Valuing the Solent Marine Sites Habitats and Species: A Natural Capital Study of Benthic Ecosystem Services and how they Contribute to Water Quality Regulation" LINK	Watson et al	
November 2020	Ecological Modelling	Multi-scale interaction processes modulate the population response of a benthic species to global warming DOI		
November 2020	Regional Studies in Marine Science	Assessment of Romanian circalittoral soft bottom benthic habitats under Danube River influence DOI	Teaca et al	
November 2020	Environmental Monitoring and Assessment	Developing benthic monitoring programmes to support precise and	Nygard et al	

		representative status assessments: a case study from the Baltic Sea DOI		
November 2020	Frontiers in Marine Science	A Methodology and Tool for Mapping the Risk of Cumulative Effects on Benthic Habitats DOI	Quemmerais-Amice et al	
December 2020	ETC/ICM Report	ETC/ICM Report 3/2020: Spatial Analysis of Marine Protected Area Networks in Europe's Seas III Link		
January 2021	Ambio	Combined effects of human pressures on Europe's marine ecosystems DOI	Korpinen et al	
April 2021	Data Product	Tom J. Webb (2021) Benthic occurrences, habitat maps, and species traits. Integrated data products created under the European Marine Observation Data Network (EMODnet) Biology project (EASME/EMFF/2017/1.3.1.2/02/SI2.789013) Link		
June 2021	Annex to ICES Scientific Reports volume 3, issue 61	Assessing the physical disturbance on the seabed from fisheries in the Bulgarian Black Sea area with reference to benthic habitats status, in DOI	Valentina Todorova, Marina Panayotova, Valentina Doncheva, Ivelina Zlateva, annex to: <i>ICES. 2021. A series of two Workshops to develop a suite of management options to reduce the impacts of bottom fishing on seabed habitats and undertake analysis of the trade-offs between</i>	Institute of Oceanology – Bulgarian Academy of Sciences

			<i>overall benefit to seabed habitats and loss of fisheries revenue/contribution margin for these options (WKTRADE3). ICES Scientific Reports. 3:61. 100 pp</i>	
August 2021	Marine Policy	Spatial overlap between human activities and seabed habitats in European Seas: Insights into EMODnet's data for management purposes DOI	Solaun et al	
September 2021	Ecological indicators	Beyond connecting the dots: A multi-scale, multi-resolution approach to marine habitat mapping DOI	van der Reijden et al	

9. Monitoring indicators

Comments on the progress indicators in the excel template		
Progress indicator	Means of collecting figures	Comment
1. Current status and coverage of total available thematic data A) Volume and coverage of available data	PostgreSQL spatial queries against internal data	A good addition of habitat data, especially in previously underrepresented regions such as the Black Sea and Arctic. Percentage increase of 10% is good considering the initial large volume of point data extant in the database.
B) Usage of data since the start of the project phase	Raw GeoServer logs and download page log download from website	<p>High volume of point data downloads though tailing off towards the end of the phase, likely due to initial burst of activity and local holdings. Data not available for download in the previous phase (added at end of phase and view only until the beginning of this phase).</p> <p>Numbers of map visualisations, WMS requests and WFS requests are not comparable across reporting periods: WMS and map visualisations substantially higher this round due to tiled nature of services, WFS substantially lower as WFS in previous reporting was presented aggregated across all data/products, without the ability to split request by layer, which is now possible. Numbers from previous reporting period presented for transparency only.</p>
2. Current status and coverage of total number of data products A) Volume and coverage of available data products	Semi-manual for some layers, for EUSeaMap, coverage produced as a one of against internal reporting regions (see Q3 2021 report), for individual habitat maps from survey, bounding boxes intersected with	<p>Compared to the previous version, EUSeaMap 2021 has marginally been extended geographically. Main improvements lie in a better spatial detail and the declination into 3 new habitat classifications (namely EUNIS 2019, the revised Mediterranean classification, and HELCOM HUB for the Baltic Sea).</p> <p>For area coverage, where numbers are given without percent they represent number of datasets represented in the region.</p> <p>Core product EUSeaMap calculated against internal Seavox Regions geographic dataset (available on request) and GSHHS world coastline calculated in World Cylindrical Equal Area. Percentages capped at 100 (possible to exceed 100% in calculations due to differing coastlines).</p>

	reporting regions within PostgreSQL to produce count.	
B) Usage of data products since the start of the project phase	Raw GeoServer logs and download page log download from website	<p>A general increase in downloads of all products this phase, to a substantial degree, possibly due to gaining traction of the EMODnet initiative and better publication through both thematic lot and secretariat functionalities. Individual maps from surveys remain the most popular dataset, though high numbers are impacted by high numbers of datasets offered.</p> <p>Numbers of map visualisations, WMS requests and WFS requests are not comparable across reporting periods: WMS and map visualisations substantially higher this round due to tiled nature of services, WFS substantially lower as WFS in previous reporting was presented aggregated across all data/products, without the ability to split request by layer, which is now possible. Numbers from previous reporting period presented for transparency only.</p>
3. Organisations supplying/ approached to supply data and data products since the start of the project phase	Manual logging	Overall a good receipt of data from a number of bodies. Predominantly Government/public bodies, followed by academia with low representation from industry and NGOs. Access to Turkish data proves problematic.
4. Online 'Web' interfaces to access or view data	Manual	No major changes. The move to the new GeoServer infrastructure is still underway, but has been delayed due to unexpected security implications on the move to a live system. The state has since been reverted, and the issues resolved, however, the GeoServers now require a data resynchronisation post-final data upload. Once this large task is achieved the new infrastructure will once again be made live.
6. Statistics on information volunteered through download forms	Download form logs from Umbraco website	Around 60% of users providing some statistics (the portal does not enforce statistics collection to remain a truly open data portal), mainly around sector of use. Around 50% of users did not report a country or region, but from those that did, as expected a large proportion are European, which the largest country share the United Kingdom, followed by Italy, France, Spain, Ireland and Portugal. This ties closely with partners, suggesting that promotion of the site within partner countries is very effective.
7. Published use cases	Manual and information	Generally, the older use cases prove the most viewed, which is understandable, though a high proportion of viewership around Mediterranean and MPA use cases in

	provided by secretariat through Grafana	particular. A large number of use cases still remain to be published on the central portal, which will form part of the centralisation process.
9.1. Technical monitoring	Information provided by secretariat through Grafana	Response time remains acceptable, though towards the higher end, no action to be made unless flagged by central team. Uptime of site at 100%
9.2. Visual Harmonisation score	Provided by Trust-IT	A generally high score with some commenting on minor inconsistencies such as banner width, also present on other sites. Will follow secretariat's guidance on spending resource on conforming further whilst portal is retired.
10. Visibility & analytics for web pages	Information provided by secretariat through Grafana	Generally consistent pageviews across phase, with the most popular pages being those themed on data access, which is expected but welcome. Interactive map has a higher viewership than the homepage, suggesting that the interactive map now has a core base of repeat customers (e.g. through bookmarking), again showing success of the interactive map. A peak in Data Exchange Format viewership towards the end of the phase, which is to be expected due to increased supply of data at this time. Search metadata page shows marked decline and possible end of monitoring around October 2020, this is being investigated with central portal.
11. Visibility & analytics for web sections	Information provided by secretariat through Grafana	Marked decline around October 2020, suggests a change in infrastructure or monitoring statistic used, as usage remains relatively consistent both before and after.
12. Average visit duration for web pages	Information provided by secretariat through Grafana	Highest visit duration appears through documentation and interactive map, which is to be expected. However, marked decline in interactive map viewership duration at the last reporting period. Reasoning is unknown, as it remained consistent to this point. Low time spent on homepage suggests that users are finding the route that they need to pages rather than lingering.

The monitoring numbers reported as part of the progress monitoring of EMODnet performance are collected through Matomo. In some cases, numbers from other monitoring systems may also be reported (e.g. Awstats, Google Analytics). Each system uses different technical approaches and therefore has its strengths and shortcomings. Therefore, results are indicative and care should be taken with interpreting absolute numbers or comparing results from different tools. It is often more sensible to consider trends over time collected by the same monitoring tool.

10. Recommendations for follow-up actions by the EU

1 EUNIS classification system

The EU is invited to:

- Improve the visibility of the EUNIS 2019 update on the EEA website. The 2019 version of EUNIS is today available in the form of a spreadsheet only, on a web page that is not easy to find using search engines. The previous version is still the one that shows up on the interactive hierarchical viewer on the EEA website.
- Expediate the publication of a report for EUNIS 2019 that may e.g. describe how/why the recent changes were made, and provide an unequivocal definition of the regions, particularly the Arctic.
- Consider the creation of EUNIS regional working groups, the terms of reference of which would be to review and update the EUNIS classification at biotope levels, i.e. levels 4-6. This would be needed in all regions, with the highest urgency in the Black Sea, where there is no consensus. There are also substantial gaps in the Arctic section, which currently only comprises these biotopes from the Atlantic section that are acknowledged to occur in the Arctic. This was proposed nearly 10 years ago by Galparsoro et al (2012)⁴ and we still believe the lack of a sustainable update mechanism to be a large barrier to it being accepted and used more widely: “It was noted the need for a suitable review mechanism of ... proposed new habitats, establishing an effective and timely updating mechanism to accommodate new proposals. The development and revision of the classification requires the input from science and policy/managers, and it would be necessary to define the role of national governments as well as scientists in updating the classification to ensure continuity of classification versus the revision based on newly available data. In that sense, a clear mechanism/ timing in the process is also needed so that old versions of the classification could be related to new versions. For further development, the ETC-BD [European Topic Centre on Biological Diversity] should bring forward proposals as soon as possible, establishing an editorial group, a marine subcommittee or a more ad hoc process. Such reviews and development were found to be crucial to the adaptation of the EUNIS hierarchical habitat classification to the European biogeographic regions and to facilitate the mapping of harmonised biotope data across Europe” (Galparsoro et al, 2012).
- Together with EUNIS 2019, provide a shapefile delineating the Arctic boundaries.

2 A new generation of products

EUSeaMap can be improved on a regularly basis as new datasets on seabed substrate distribution are released, but the approach is not (and will never be) suitable for mapping spatial patterns of biological communities.

⁴ Galparsoro, I., Connor, D.W., Borja, A., Aish, A., Amorim, P., Bajjouk, T., Chambers, C., Coggan, R., Dirberg G., Ellwood, H., Evan, D., Goodin, K. L., Grehan, A., Haldin, J., Howell, K., Jenkins, C., Michez, N., Mo, G., Buhl-Mortensen, P., Pearce, B., Populus, J., Salomidi, M., Sánchez, F., Serrano, A., Shumchenia, E., Tempera, F., Vasquez, M.. 2012. Using EUNIS habitat classification for benthic mapping in European seas: Present concerns and future needs. *Mar Pollut Bull* 64(12):2630-8. <https://doi.org/10.1016/j.marpolbul.2012.10.010>

Therefore, we need to start thinking about a new generation of products to inform stakeholders, such as species distribution models (SDMs). SDMs have been proven to accurately predict the spatial distribution of some key habitat-forming species.

The prerequisite for a large, operational species distribution modelling (SDM) program in Europe is the availability of oceanographic data throughout Europe at the appropriate resolution for SDM. We would like to encourage initiatives of high resolution (e.g. 200-300m nearshore, 3-4km offshore) modelling of key environmental variable (e.g. wave- and current-induced energy, light availability, temperature, biogeochemical variables) done at a European scale.

11. Annex: Other documentation attached

Annex 1 - Portal handover details

The following technical characteristics of the portal mean that transfer to another party is a relatively simple process:

1. The current portal uses a fully open-source infrastructure (Apache, Umbraco, Angular, PostgreSQL (with PostGIS), GeoServer and OpenLayers). These are well-established, mainstream open-source tools, with an active developer community providing a high level of support. GeoServer and PostgreSQL are cloud-hosted on Amazon Web Services, along with an S3 bucket used for storage of Cloud-Optimised Geotifs. The infrastructure is built and configured using terraform and the transfer would be relatively simple to achieve by providing the terraform code and data to CINEA or another party.
2. In addition to using open-source tools to create many of our EMODnet Seabed Habitat products (GRASS, R, Python), JNCC use open-source tools to prepare habitat maps for upload to the portal (QGIS, Python, R), including the semi-automated tools developed for portal and data management. This will further ease the transition for another party to manage the portal, removing the need for proprietary GIS. The upload process is in the form of a "Bookdown" notebook, providing background context and comments to accompany the code, further increasing knowledge exchange to another party.
3. The metadata catalogue supporting the site is entirely hosted by the International Council for the Exploration of the Seas, so no transfer at all would be required to re-establish the metadata catalogue, user accounts information for access and management of metadata records would be transferred across and ICES notified of the change in custodianship.
4. The portal itself is also hosted using AWS, using a Windows operating system. Transfer could be initially achieved by account transfer.
5. The existing portal uses internationally-recognised interoperability standards for metadata and spatial data, which would facilitate a smooth transfer.

During the move to this open-source infrastructure, JNCC ensured that the Intellectual Property Rights (IPR) on any code behind the portal was transferrable, and as necessary re-wrote code where Background IPR was owned by a third party. The resulting Foreground IPR is owned by JNCC and will be freely available under the UK Open Government Licence and transferrable as required.

We assume that any staff time to make the transfer would fall outside the scope of this contract. However, we guarantee our cooperation for transition meetings; staff would be made available to CINEA as a priority for data and knowledge transfer, including staff from the website contractor.

Annex 2 - Status of primary data available to the project

In the table below, datasets with a reference number are those that were listed in the annex 2 of the consortium's proposal. The datasets referred to as "Supplemental" were not identified in the proposal.

Reference number (as per consortium's proposal, appendix 2)	Title	Area	Owner	Status (Pending / Resolved / Abandoned)	Reason for not supplying the dataset
MI01	Habitat map - single: Youghal EUNIS habitat map	local scale, Ireland	INFOMAR	Resolved	
MI02	Habitat map - single: Shannon EUNIS habitat map	local scale, Ireland	INFOMAR	Resolved	
MI03	Habitat map - single: Dungarvan EUNIS habitat map	local scale, Ireland	INFOMAR	Resolved	
MI04	Habitat map - single: Boyne EUNIS habitat map	local scale, Ireland	INFOMAR	Resolved	
MI05-1	Habitat map - set: Celtic Sea habitats (4 maps) - 1/4 East Celtic Sea EUNIS Marine Habitats	local scale, Ireland	INFOMAR	Resolved	
MI05-2	Habitat map - set: Celtic Sea habitats (4 maps) - 2/4 Wexford seabed classification map	local scale, Ireland	INFOMAR	Resolved	
MI05-3	Habitat map - set: Celtic Sea habitats (4 maps) - 3/4 South-East Celtic coast EUNIS Marine Habitats	local scale, Ireland	INFOMAR	Resolved	
MI05-4	Habitat map - set: Celtic Sea habitats (4 maps) - 4/4 West Celtic Sea EUNIS Marine Habitats	local scale, Ireland	INFOMAR	Resolved	
MI06	Point dataset: Celtic Sea Folk Sediment Classes	local scale, Ireland	Marine Institute	Resolved	
CCMAR01	Habitat map - single: Marine communities from the littoral of Cadiz	local scale, Spain	MAPAMA	Resolved	

CCMAR02	Habitat map - single: Marine communities from the littoral of Almeria	local scale, Spain	MAPAMA	Resolved	
CCMAR03	Habitat map - single: Marine communities from the littoral of La Gomera	local scale, Spain	MAPAMA	Resolved	
CCMAR04	Habitat map - single: Marine communities from the littoral of El Hierro	local scale, Spain	MAPAMA	Resolved	
CCMAR05	Habitat map - single: Marine communities from the littoral of Gran Canaria	local scale, Spain	MAPAMA	Resolved	
CCMAR06	Habitat map - single: Marine communities from the littoral of Lanzarote	local scale, Spain	MAPAMA	Resolved	
CCMAR07	Habitat map - single: Marine communities from the littoral of Fuerteventura	local scale, Spain	MAPAMA	Resolved	
CCMAR08	Point dataset: EUNIS habitat points from the PNSACV (South west coast of Portugal)_Trawl	local scale, Portugal	CCMAR	Resolved	
Ifremer01	Seabed Habitat (EUNIS) - FR3102002 'Banc des Flandres' (Cartham) - FR004001	local scale, France	OFB (French office for Biodiversity)	Resolved	
Ifremer02	Seabed Habitat (EUNIS) - Secteur d'étude du Parc Naturel Marin "Estuaires picaros et Mer d'Opale"- FR004003	local scale, France	OFB	Resolved	
Ifremer03	Habitat map - single: Seabed Habitat (EUNIS) - FR2502020 'Baie de Seine Orientale' (Cartham)	local scale, France	OFB	Resolved	
Ifremer04	Habitat map - single: Seabed Habitat (EUNIS) - FR2502021 'Baie de Seine Occidentale' (Cartham)	local scale, France	OFB	Resolved	
Ifremer05	Habitat map - single: Seabed Habitat (EUNIS) - FR2500085 'Récif et marais arrière-littoraux du Cap Levi à la point de SAIRE - Etat 1976-2012'	local scale, France	OFB	Resolved	

Ifremer06	Habitat map - single: Seabed Habitat (EUNIS) - Mission d'étude PNM golfe Normand Breton (Cartham)	local scale, France	OFB	Resolved	
Ifremer07	Habitat map - single: Seabed Habitat (EUNIS) - FR5300009 'Côte de Granit rose-Sept-Iles' (Cartham)	local scale, France	OFB	Resolved	
Ifremer08	Habitat map - single: Seabed Habitat (EUNIS) - FR5300066 'Baie de Saint- Brieuc Est' (Cartham)	local scale, France	OFB	Resolved	
Ifremer09	Habitat map - single: Seabed Habitat (EUNIS) - FR5300017 'Abers - Côte des légendes' (Cartham)	local scale, France	OFB	Resolved	
Ifremer10	Habitat map - single: Les abers (France)	local scale, France	Ifremer	Resolved	
Ifremer11	Habitat map - single: Trévignon (France)	local scale, France	Ifremer	Pending	The dataset does not yet exist, as the author could not develop it in the time available due to COVID-19 constraints.
Ifremer12	Habitat map - single: Rade de Brest (France)	local scale, France	Ifremer	Pending	The dataset does not yet exist, as the author could not develop it in the time available due to COVID-19 constraints.
GeoEcoMar01	Point dataset: L35-132A map sheet with 36-point data within circalittoral and offshore circalittoral soft bottom habitats	Romanian shelf (~ 300 km2)	NIRD GeoEcoMar	Resolved	
GeoEcoMar02	Point dataset: L35-132B map sheet with 25-point data within offshore circalittoral soft bottom habitats	Romanian shelf (~ 300 km2)	NIRD GeoEcoMar	Resolved	

GeoEcoMar03	Point dataset: L35-132C map sheet with 35-point data within offshore circalittoral soft bottom habitats	Romanian shelf (~ 300 km ²)	NIRD GeoEcoMar	Resolved	
GeoEcoMar04	Point dataset: L35-132D map sheet with 50-point data within offshore circalittoral soft bottom habitats	Romanian shelf (~ 300 km ²)	NIRD GeoEcoMar	Resolved	
GeoEcoMar05	Habitat map - set: L35-132 A,B,C,D polygon	Romanian shelf (~ 300 km ²)	NIRD GeoEcoMar	Resolved	
GeoEcoMar06	Point dataset: L35-144C map sheet with 30-point data within offshore circalittoral soft bottom habitats	Romanian shelf (~ 300 km ²)	NIRD GeoEcoMar	Resolved	
GeoEcoMar07	Point dataset: K35-12A map sheet with 26-point data within offshore circalittoral soft bottom habitats	Romanian shelf (~600 km ²)	NIRD GeoEcoMar	Resolved	
GeoEcoMar08	Habitat map - set: L35-144C and K35-12A polygon	Romanian shelf (~600 km ²)	NIRD GeoEcoMar	Resolved	
GeoEcoMar09	Point dataset: 35-point data in North Western part of the Black Sea (Romania and Ukraine) GEF Project, 2006	Romanian and Ukrainian shelf (~28,900 km ²)	NIRD GeoEcoMar	Resolved	
GeoEcoMar10	Point dataset: Core Programme, PN 18 16 03 01 - Investigation of benthic and pelagic habitats of the Romanian Black Sea coast	Romania	NIRD GeoEcoMar	Resolved	
GeoEcoMar11	Point dataset: 43-point data in Western and North Western part of the Black Sea (Bulgaria, Romania and Ukraine) POS363 Project - 2008	Western and North Western Black Sea (~33,280 km ²)	Alfred Wegener institute	Resolved	

GeoEcoMar12	Point dataset: 26-point data within EMBLAS 2 project in the Ukrainian and Georgian shelf of the Black Sea	North Western (Ukraine) and Eastern (Georgia) part of the Black Sea	UNDP	Resolved	
ISPRA01	Habitat map - single: Inventario e Cartografia delle preatrie di Posidonia oceanica nell'ambito del POR Puglia 2000 – 2006	Apulia Region - Italy	Apulia Region	Resolved	
ISPRA02	Habitat map - single: Rivisitazione di alcune praterie di Posidonia oceanica lungo le coste delle regioni Liguria - Toscana - Lazio - Basilicata - Puglia. Subste relativo a Toscana e Lazio	Latium and Tuscany Regions - Italy	MATTM	Resolved	
ISPRA03	Habitat map - single: CARTA BIONOMICA DEI FONDI MARINI - AMP Tavolara - Punta Coda Cavallo	N-E Sardinia	MATTM - Consorzio Gestione AMP	Resolved	
ISPRA04	Habitat map - single: Carte Bionomica AMP Tor Paterno	Latium Region - Italy	MATTM - Consorzio Gestione AMP	Resolved	
ISPRA05	Habitat map - single: Caratterizzazione bio-ecologica e bionomica dell'AMP Punta Campanella - Bionomica	Campania Region - Italy	Parthenope Un. Napoli	Resolved	
ISPRA06	Habitat map - single: Caratterizzazione bio-ecologica e bionomica del Parco Marino Sommerso di Gaiola	Campania Region - Italy	MATTM - Consorzio Gestione AMP	Resolved	
ISPRA07	Habitat map - single: Caratterizzazione bio-ecologica e bionomica del Parco Marino Sommerso di Baia - substrate	Campania Region - Italy	Parthenope Un. Napoli	Resolved	
ISPRA08	Habitat map - single: Studi di fattibilità per l'area marina protetta di Capri, 2000 - substrate	Campania Region - Italy	Parthenope Un. Napoli	Resolved	

ISPRA09	Habitat map - single: Caratterizzazione bio- ecologica e bionomica dell'AMP di Porto Cesareo	Apulia Region - Italy	MATTM - Consorzio Gestione AMP	Resolved	
ISPRA10	Habitat map - single: Caratterizzazione bio- ecologica e bionomica del'AMP di Capo Caccia	Sardinia Region - Italy	MATTM - Consorzio Gestione AMP	Pending	The dataset does not yet exist, as the author could not develop it in the time available due to COVID-19 constraints.
SYKE01	Point dataset: Estonian reef habitats 1 (Annex I of the Habitats Directive)	Estonia	Tartu Ülikooli Eesti Mereinstituut	Resolved	
SYKE02	Point dataset: Estonian reef habitats 2 (Annex I of the Habitats Directive)	Estonia	Tartu Ülikooli Eesti Mereinstituut	Resolved	
SYKE03	Point dataset: Estonian sandbank habitats 1 (Annex I of the Habitats Directive)	Estonia	Tartu Ülikooli Eesti Mereinstituut	Resolved	
SYKE04	Point dataset: Estonian sandbank habitats 2 (Annex I of the Habitats Directive)	Estonia	Tartu Ülikooli Eesti Mereinstituut	Resolved	
IO-BAS01	Point dataset: 69 point data	Bulgarian Black Sea coastal waters, 2018, WFD monitoring network	IO-BAS	Resolved	
IO-BAS02	Point dataset: 97-point data	Bulgarian Black Sea, 2019, MSFD monitoring network	IO-BAS	Pending	The dataset does not yet exist, as the author could not develop it in the time available due to COVID-19 constraints.
IO-BAS03	Point dataset: 21-point data	North- Western and Western Black Sea, 2019, ANEMONE project	ANEMONE Consortium	Resolved	

JNCC01	Habitat map - set: 4 Habitats Directive Annex I composite data products, combining data from multiple resources	UK continental shelf	JNCC	3 Resolved, 1 pending	IPR and data sensitivity queries regarding the 4 th dataset (Mudflats) from the data originators. JNCC is working to resolve these and intends to deliver this map in the next phase.
JNCC02	Habitat map - set: ~7 Habitats Directive Annex I habitat maps in offshore UK SACs	UK continental shelf	JNCC	Resolved	
JNCC03	Habitat map - set: ~4 Habitats Directive Annex I habitat maps in Welsh SACs	Welsh inshore and offshore waters	Natural Resources Wales	Resolved	
JNCC04	Habitat map - set: ~10 Habitats Directive Annex I habitat maps in English SACs	English inshore waters	Natural England	Resolved	
JNCC05	Habitat map - set: ~6 Habitats Directive Annex I habitat maps in Scottish SACs	Scottish waters	Scottish Natural Heritage	Resolved	
JNCC06	Habitat map - set: 2 Habitats Directive Annex I habitat maps in SACs	UK	MALSF	Resolved	
JNCC07	Habitat map - single: Habitats Directive Annex I habitat map in English SAC	English waters	Defra	Resolved	
JNCC08	Habitat map - single: Habitats Directive Annex I habitat map from the "Points to Polygons 2" contract	Scottish waters	Scottish Natural Heritage	Resolved	
Supplemental	Habitat map - seagrass meadows	Greece	Archipelagos Institute	Abandoned	Our contact point at Archipelagos Institute is no longer working there and their

					colleagues did not reply to our requests
Supplemental	Habitat map - coralligenous	Greece	Archipelagos Institute	Abandoned	Our contact point at Archipelagos Institute is no longer working there and their colleagues did not reply to our requests
Supplemental	Habitat map- Hab Dir Annex I. Part of the North Sea	local scale, Denmark	Danish Nature Agency	Pending	The dataset was not received at an appropriate time to be processed in time.
Supplemental	Point dataset: 3613-point data	local scale, Germany	Germany-State Office for the Environment, Nature Conservation and Geology	Resolved	
Supplemental	Habitat Map: Habitat Dir Annex I. Germany-Macklenburg-Vorpommern.	local scale, Germany	Germany-State Office for the Environment, Nature Conservation and Geology	Resolved	
Supplemental	Habitat & Point data	local scale, Sweden	Swedish Agency for Marine & water Management	Pending	The dataset was not received at an appropriate time to be processed in time.
Supplemental	Habitat map - single: Caratterizzazione bio-ecologica e bionomica dell'AMP Punta Campanella - seagrass meadows	Campania Region - Italy	Parthenope Un. Napoli	Resolved	

Supplemental	Habitat map - single: Caratterizzazione bio-ecologica e bionomica del Parco Marino Sommerso di Baia - seagrass meadows	Campania Region - Italy	Parthenope Un. Napoli	Resolved	
Supplemental	Habitat map - single: Studi di fattibilità per l'area marina protetta di Capri, 2000 - seagrass meadows	Campania Region - Italy	Parthenope Un. Napoli	Resolved	
Supplemental	Habitat map Annex I Hab Dir. Western Pomerania	local scale, Poland	Polish General Directorate for Environmental Protection	Resolved	
Supplemental	Point dataset: North Sea Data from 2017. Five sets of sediment and biotop samples. 1/5	local scale, Denmark	Orbicon I WSP - NCC Denmark	Resolved	
Supplemental	Habitat map- Hab Dir Annex I. the North Sea and Skagerrak 2018. Four Datasets 1/4	local scale, Denmark	Danish Nature Agency	Resolved	
Supplemental	Habitat map- Hab Dir Annex I. The Kattegat/Frederikshavn area 2019	local scale, Denmark	BONUS project "EcoMAP"	Resolved	
Supplemental	Habitat maps- set: 6 updated Hab Dir Annex I habitats in Finland	local scale, Finland	Finnish Environment Institute / Metsähallitus	Pending	The dataset does not yet exist, as the author could not develop it in the time available due to COVID-19 constraints.
Supplemental	Any kind of available data-point data and maps	local scale, Turkey	Balıkesir University, Faculty of Arts and Science, Department of Biology-Turkey	Abandoned	No answer to several requests by email
Supplemental	Any kind of available data-point data and maps	local scale, Turkey	Department of Hydrobiology, Faculty of Fisheries, Ege University, 35100, Bornova - Izmir, TURKEY	Abandoned	No answer to several requests by email

Supplemental	Any kind of available data-point data and maps	local scale, Turkey	Institute of Marine Sciences and Technology, Dokuz Eylül University, Inciralti, İzmir, Turkey	Abandoned	No answer to several requests by email
Supplemental	Any kind of available data-point data and maps	local scale, Turkey	Çanakkale Onsekiz Mart University, Faculty of Science and Arts, Department of Biology, Çanakkale, Turkey	Abandoned	No answer to several requests by email
Supplemental	Any kind of available data-point data and maps	local scale, Turkey	Sinop University-Turkey	Abandoned	No answer to several requests by email
Supplemental	Any kind of available data-point data and maps	local scale, Turkey	Katip Celebi University Faculty of Fisheries	Abandoned	No answer to several requests by email
Supplemental	Any kind of available data-point data and maps	local scale, Turkey	KTU Faculty of Marine Science, Department of Fisheries, Trabzon	Abandoned	No answer to several requests by email
Supplemental	Any kind of available data-point data and maps	local scale, Turkey	Mersin University, Faculty of Arts and Science, Department of Biology	Abandoned	No answer to several requests by email
Supplemental	Any kind of available data-point data and maps	local scale, Turkey	Istanbul University-Turkey	Abandoned	No answer to several requests by email
Supplemental	1110 Soft Bottom habitats within the BG0000146 SCI Natura2000 area	local scale, Bulgaria	Institute of Biodiversity and Ecosystem Research at the Bulgarian Academy of Sciences - Bulgaria	Resolved	

Supplemental	Any kind of available data-point data and maps	local scale, Bulgaria	Institute of Fishery Resources (IFR), Varna, Bulgaria	Abandoned	No answer to several requests by email
Supplemental	Seabed Habitat (Habitat Directive) - FR3102002 'Banc des Flandres' (Cartham) - FR004002	local scale, France	OFB	Resolved	
Supplemental	Seabed Habitat (Habitat Directive) - Secteur d'étude du Parc Naturel Marin "Estuaires picards et Mer d'Opale" - FR004004	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR2502020 'Baie de Seine Orientale' (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR2502021 'Baie de Seine Occidentale' (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR2500085 'Récif et marais arrière-littoraux du Cap Levi à la point de SAIRE - Etat 1976-2012'	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR5300017 "Abers - Côte des légendes" (Compilation of maps)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - set: Seabed Habitat (Habitat Directive) - Mission d'étude PNM golfe Normand Breton (France)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR5300009 'Côte de Granit rose-Sept-Iles' (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR5300066 'Baie	local scale, France	OFB	Resolved	

	deSaint-Brieuc Est' (Cartham)				
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR5300017 'Abers - Côte des Légendes' (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (EUNIS) - FR5300033 'Iles Houat Hoedic' (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR5300033 'Iles Houat Hoedic' (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Habitats Directive Annex I habitat map in Lithuania (Distribution of reefs defined based on Mytilus distribution)	local scale, Estonia	Klaipeda University	Abandoned	No answer to several requests by email to the owner
Supplemental	Any kind of available data - habitat models will be available for - probability of occurrence of key benthic species/groups: charophytes, filamentous algae, Fucus, Furcellaria, vascular plants excl. Zostera, infaunal bivalves, Mytilus, Zostera; macrobenthic biodiversity: species richness of macroinvertebrates, species richness of macrophytes	local scale, Lithuania	Estonian Marine Institute, University of Tartu	Pending	Habitat models are still under creation.
Supplemental	Phytobenthic occurrence in WFD 2015 monitoring (15 points)	local scale, Bulgaria	IO-BAS	Resolved	
Supplemental	Phytobenthic occurrence in WFD	local scale, Bulgaria	IO-BAS	Resolved	
Supplemental	Any kind of point data from EMBLAS project and national monitoring data	local scale, Georgia	NEA	Pending	Data sharing via EMODnet is under negotiation with the

					Ministry of the Environment
Supplemental	Habitat map: HELCOM HUB level 5 maps modelled based on benthic observation data and environmental variables	local scale, Estonia	Estonian Marine Institute, University of Tartu	Pending	The dataset was not received at an appropriate time to be processed in time.
Supplemental	Habitat maps of the Protected Area of northern Karpathos and Saria (GR4210003) (December 2020)	local scale, Greece	HCMR	Resolved	
Supplemental	Habitat maps of the Protected Area of northern Karpathos and Saria (GR4210003) (Cymodocea distribution)	local scale, Greece	HCMR	Resolved	
Supplemental	Habitat map - n/a: ~7 Habitats Directive Annex I habitat maps in offshore UK SACs		JNCC	Resolved	
Supplemental	Habitat map - North Norfolk Sandbanks and Saturn Reef CEND 22/13 Annex I Reef survey	Local scale, English waters	JNCC	Resolved	
Supplemental	Point dataset: Norwegian Laminaria hyperborea kelp forest occurrences	local scale, Norway	NIVA	Resolved	
Supplemental	Point dataset: Norwegian Saccharina latissima kelp forest occurrences	local scale, Norway	NIVA	Resolved	
Supplemental	Habitat map- Hab Dir Annex I. the North Sea and Skagerrak 2018. Four Datasets 2/4	local scale, Denmark	Danish Nature Agency	Resolved	
Supplemental	Habitat map- Hab Dir Annex I. the North Sea and Skagerrak 2018. Four Datasets 3/4	local scale, Denmark	Danish Nature Agency	Resolved	
Supplemental	Habitat map- Hab Dir Annex I. the North Sea and	local scale, Denmark	Danish Nature Agency	Resolved	

	Skagerrak 2018. Four Datasets 4/4				
Supplemental	Point dataset: North Sea Data from 2017. Five sets of sediment and biotop samples. 2/5	local scale, Denmark	Orbicon I WSP - NCC Denmark	Resolved	
Supplemental	Point dataset: North Sea Data from 2017. Five sets of sediment and biotop samples. 3/5	local scale, Denmark	Orbicon I WSP - NCC Denmark	Resolved	
Supplemental	Point dataset: North Sea Data from 2017. Five sets of sediment and biotop samples. 4/5	local scale, Denmark	Orbicon I WSP - NCC Denmark	Resolved	
Supplemental	Point dataset: North Sea Data from 2017. Five sets of sediment and biotop samples. 5/5	local scale, Denmark	State Dept. Of Agriculture, Environment and Rural Areas	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR5202010 'Plateau du Four' (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR5202013 'Plateau rocheux de l'Ile d'Yeu' (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR5300023 'Archipel des Glénan' (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR5300031 'Ile de Groix' (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR5300049 'Dunes et Côtes de Trévignon' (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - set: Seabed Habitat (Habitat Directive) - FR5302008 'Roches de Penmarc'h' (Compilation of maps)	local scale, France	Ifremer	Resolved	

Supplemental	Habitat map - set: Seabed Habitat (Habitat Directive) - FR5300015 'Baie de Morlaix' (Compilation of maps)	local scale, France	Ifremer	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR5402012 'Plateau de Rochebonne' (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Habitats marins de la zone d'étude du projet de Parc naturel marin de l'Estuaire de la Gironde et des Pertuis charentais (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Occurrence of habitat types according to Annex I Habitat Directive	local scale, Germany	Germany-State Office for the Environment, Nature Conservation and Geology	Resolved	
Supplemental	Habitat map Annex I Hab Dir. Gulf of Gdansk	local scale, Poland	Polish General Directorate for Environmental Protection	Resolved	
Supplemental	Natura point dataset	local scale, Ireland		Resolved	
Supplemental	Infomar point dataset 1	local scale, Ireland		Resolved	
Supplemental	1170 Reefs within the BG0000146 Gradina-Zlatna Ribka Natura2000 area	local scale, Bulgaria	Institute of Biodiversity and Ecosystem Research at the Bulgarian Academy of Sciences - Bulgaria	Resolved	
Supplemental	Zoostera sp. seagrass beds within the BG0000146 SCI Natura2000 area	local scale, Bulgaria	Institute of Biodiversity and Ecosystem Research at the Bulgarian Academy of Sciences - Bulgaria	Resolved	

Supplemental	Any kind of available data-point data and maps	local scale, Turkey	Akdeniz University Dumlupinar, Campus Antalya, TURKEY	Abandoned	No answer to several requests by email
Supplemental	Any kind of available data-point data and maps	local scale, Ukraine	IBSS, Odessa, UKRAINE	Abandoned	No answer to several requests by email
Supplemental	Any kind of available data-point data and maps	local scale, Georgia	Georgian Marine Ecology and Fisheries Research Institute (MEFRI), Batumi, Georgia	Abandoned	No answer to several requests by email
Supplemental	Habitat map - single: Seabed Habitat (EUNIS) - FR7200775 - Domaine d'Abbadia et corniche basque (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (EUNIS) - FR7200776 - Falaises de Saint-Jean-de-Luz à Biarritz (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (EUNIS) - FR7200812 - Portion du littoral sableux de la côte aquitaine (état 2010-2012) (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (EUNIS) - FR7200813 - Côte Basque rocheuse et extension au large (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (EUNIS) - Zone d'étude de la mission de création du Parc naturel marin du Bassin d'Arcachon (Cartham)	local scale, France	OFB	Resolved	

Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR7200775 - Domaine d'Abbadia et corniche basque (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR7200776 - Falaises de Saint-Jean-de- Luz à Biarritz (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR7200812 - Portion du littoral sableux de la côte aquitaine (état 2010-2012) (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - FR7200813 - Côte Basque rocheuse et extension au large (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Habitat map - single: Seabed Habitat (Habitat Directive) - Zone d'étude de la mission de création du Parc naturel marin du Bassin d'Arcachon (Cartham)	local scale, France	OFB	Resolved	
Supplemental	Point dataset: EUNIS habitat points from the PNSACV (South west coast of Portugal)_ROV	local scale, Portugal	CCMAR	Resolved	
Supplemental	Point dataset: EUNIS habitat points from the PNSACV (South west coast of Portugal)_Dive	local scale, Portugal	CCMAR	Resolved	
Supplemental	Point dataset: Distribution of the OSPAR habitats found during the MeshAtlantic surveys in the Southern coast of Portugal	local scale, Portugal	CCMAR	Resolved	
Supplemental	Habitat map - single: Caratterizzazione bio- ecologica e bionomica dell'AMP di Porto Cesareo (EUNIS)	local scale, Apulia region	MATTM - Consorzio Gestione AMP	Resolved	
Supplemental	Infomar point dataset 2	local scale, Ireland	Infomar	Resolved	

Supplemental	Infomar point dataset 3	local scale, Ireland	Infomar	Resolved	
Supplemental	Infomar point dataset 4	local scale, Ireland	Infomar	Resolved	
Supplemental	Infomar point dataset 5	local scale, Ireland	Infomar	Resolved	
Supplemental	External WMS: Nature types and biotopes in Saltstraumen	local scale, Norway	NGU	Resolved	
Supplemental	External WMS: Biotopes in the Barents Sea	local scale, Norway	NGU	Resolved	
Supplemental	External WMS: Biotopes in Troms II /Nordland VII	local scale, Norway	NGU	Resolved	
Supplemental	External WMS: Biotopes in Nordland VI	local scale, Norway	NGU	Resolved	
Supplemental	External WMS: Biotopes in mid-Norwegian shelf	local scale, Norway	NGU	Resolved	

12. List of abbreviations and acronyms

BH3	OSPAR common indicator 'Extent of Physical Damage to Predominant and Special Habitats'
CCMAR	Centre of Marine Sciences (Centro de Ciências do Mar, Portugal), a partner
CINEA	European Climate, Infrastructure and Environment Executive Agency. Replaced EASME the 1 st of April, 2021. Contracting Authority.
CMEMS	Copernicus Marine Environment Monitoring Service
DIGIT	Directorate-General for Informatics
EASME	Executive Agency for Small and Medium-sized Enterprises. Became CINEA the 1 st of April, 2021. Contracting Authority.
EEA	European Environmental Agency
EO	Earth Observation
ESH	EMODnet Seabed Habitats
ETC/BD	European Topic Centre on Biological Diversity
ETC/ICM	European Topic Centre on Inland, Coastal and Marine Waters
EUNIS	European Nature Information System; The datasets consists of information on Species, Habitat types and Sites for terrestrial, freshwater and marine realm; in the current document, the term is (abusively) used to refer specifically to the marine section of the EUNIS habitat classification system
EU	European Union
EurOBIS	European node of the Ocean Biogeographic Information System
EUSeaMap	The broad-scale physical habitat map produced by the Consortium
GeoEcoMar	National Research and Development Institute for Marine Geology and Geoecology (Romania), a partner
GeoServer	The open source server that we use for sharing geospatial data
GEUS	Geological survey of Denmark and Greenland, a partner
GIS	Geographic Information System

HELCOM	Helsinki Commission
HELCOM HUB	Helsinki Commission Underwater Biotope and Habitat Classification System
ICES	International Council for the Exploration of the Sea
Ifremer	French Research Institute for Exploitation of the Sea (Institut français de recherche pour l'exploitation de la mer), a partner
INSPIRE	Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community
IO-BAS	Institute of Oceanography – Bulgarian Academy of Sciences, a partner
IPR	Intellectual Property Rights
ISPRA	Italian National Institute for Environmental Protection and Research (Istituto Superiore per la Protezione e la Ricerca Ambientale), a partner
IUCN	International Union for Conservation of Nature
JIRA	Software used within the framework of EMODnet for issue tracking
JNCC	Joint Nature Conservation Committee (UK), a partner
MI	Marine Institute (Ireland), a partner
MPA	Marine Protected Area
MSFD	Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)
NAFO	Norwest Atlantic Fisheries Organization
NIVA	Norwegian Institute for Water Research, a subcontractor
OBIS	Ocean Biogeographic Information System
OFB	French Office for Biodiversity
OGC	Open Geospatial Consortium
OSPAR	Oslo Paris Convention
QA	Quality Assessment
QC	Quality Control

RAC/SPA	Regional Activity Centre for Specially Protected Areas
RSC	Regional Sea Convention/Commission
SDM	Spatial Data Management
SYKE	Finnish Environment Institute, a subcontractor
UK	United Kingdom
ur-EMODnet	the Preparatory action for EMODnet (2009-2012), aka EMODnet phase 1
VLIZ	Flanders Marine Institute
WFS	Web Feature Service
VME	Vulnerable Marine Ecosystem
WMS	Web Map Service
WP	Work Package