



EMODnet Thematic Lot n° V – Biology

CINEA/EMFAF/2022/3.5.2/SI2.895681

Start date of the project: 10/05/2023 (24 months)

Centralisation Phase

Quarterly Progress Report (QR31)

Reporting Period: 01/10/2024 – 31/12/2024



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1. Highlights in this quarter

Task 1: Maintain and improve a common method of access to data held in repositories

During the reporting period, the last data harvest of 2024 was carried out, bringing a total of 60 datasets into EMODnet Biology, from which 19 are new and 41 are updated datasets, from both partners and ad-hoc data providers, including data from the EU funded projects DTO-Bioflow. This data harvest increased the EMODnet Biology occurrence data holdings in more than 1.3 million new records distributed around the Atlantic and Arctic Oceans and the Mediterranean, Baltic and North Seas with a temporal coverage ranging between 1890 and 2024 and covering primarily fish, birds, macroalgae, benthos, mammals, phytoplankton and zooplankton and, to a lesser extent, angiosperms and reptiles.

A list of the published datasets and their details is available in the Annex and the maps with the distribution per functional group and sea region are included in Figure 2 and the geographic distribution of all occurrences published during the reporting period is in Figure 3, also in the Annex.

Part of this last data harvest of 2024 is the first integration of eDNA derived occurrence datasets into EMODnet Biology. A total of 3 datasets with circa 20 thousand DNA derived occurrence records have been published. Relevant adaptations to the data system infrastructure were carried out in collaboration with the WP5 team in order to accommodate for the omics data. More information about this process will be provided in the Guidance for data management practices applied to omics data (Deliverable 2.5.1) due in May 2025.

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

During the reporting period, WP3 held its 7th Quarterly Community Call (Deliverable 3.2.1), where progress on ongoing data products was assessed and discussed. Most products are on track for timely submission by the end of the calendar year, with many already submitted and in the process of publication. An unexpected data availability issue was identified for one planned product and alternative solutions are currently under discussion. The necessity of adopting and potentially creating CF standard names for biodiversity-related variables in the next EMODnet phase was also highlighted.

The *EMODnetWFS* R package was revised following reviewer feedback from rOpenScience. A response to the reviewers has been submitted ([details here](#)). Thanks to this feedback, the package has significantly improved and is now awaiting final approval before publication on CRAN, ensuring wide visibility and applicability for end-users.

WP3 members participated in the EMODnet Biology Workshop: Supporting Marine Biodiversity Data Management (19–20 November 2024). The primary objective of the workshop was to facilitate the publication of data and products from EU-funded projects by leveraging EMODnet's expertise in marine biodiversity data management.

WP3 initiated internal discussions on managing the influx of external data products submitted to the thematic lot, where a multi-faceted approach is proposed to make outputs findable and accessible through the EMODnet catalogue. This approach involves harvesting metadata, requesting compliance with the EMODnet Biology data product creation guidance, and assessing the relevance of outputs for publication in the EMODnet viewer and webservices. Products published through EMODnet may have a defined "lifetime" in the viewer, after which they will remain findable via the metadata catalogue and accessible through web services.

WP3 continued liaising with external entities regarding the impacts of human activities on cetacean and bird migration routes. Several potential data sources have been identified, and follow-ups with respective experts are planned.

Additionally, three Mission Atlantic products were added to the EMODnet catalogue:

1. [Decadal abundance of calanoid copepods within the North Atlantic](#)
2. [Day and night zooplankton abundance maps in the North Atlantic \(1960–2019\)](#)
3. [Predictive distribution models of deep-sea elasmobranchs in the Azores EEZ \(down to 2,000m depth\) using Generalized Additive Models](#)

These additions enrich the catalogue and exemplify the collaborative efforts of EMODnet Biology and external stakeholders.

Task 3: Develop a complete and robust machine to machine (M2M) interface to transfer data and products in bulk, which is easily accessible for other machines and initiatives

Various technical developments took place during the reporting period, more specifically:

- Fix duplicated DiscoveryLevel2 extended Measurement or Fact (eMoF) listing in the API that provides the filters for the Biodiversity records layer
- Upgrade IPT to the latest version (3.1.2)
- Upgrade Geoserver to the latest version (2.26.1), to fix known CVE-2024-45748 (security issue rated as “high” impact)
- Upgraded the Ubuntu kernel of all involved virtual machines, due to slowdowns in network throughput, caused by a kernel bug
- Set up three new IPTs for external organisations ([ILVO](#), [IOLR](#) and [CNR-ISP](#))
- Work on going to automatically update INSPIRE relevant metadata fields and ensure they are harvested in the CP catalogue
- Install & test the EMODnet Central Portal tool to monitor web service usage by all lots, designed by Trust-IT. The EMODnet Biology OGC services will be used as an example for the pilot implementation.

Task 4: Contribute data, data products and content to a central portal that allows users to find, view and download data and data products

The main actions taken during the reporting period are listed below:

- Harvest Nov 2024 together with WP2: including technical changes to procedures to allow for the publication of omics data
 - Implement eMoF-like database structure in EurOBIS to store DNA-derived data, based on the Darwin Core Standard extension
 - Improve and test DwC harvest procedure for the (new) DNA extension
- Multiple speed improvements and SQL query optimizations within the harvest and indexing procedures

Omics data can be found and subset and downloaded via the mapviewer but future improvements consist in the creation of dedicated filters to assist users in the query of this data type. This development is planned during the first half of 2025.

Task 5. Contributing static content to dedicated spaces in the Central Portal

EMODnet Biology contributed with various items to the EMODnet website static content, more specifically news items and event announcements, as follows:

News items

- 2024-10-31: [EMODnet Biology Activities](#)

- 2024-10-14: [New data product published by EMODnet Biology](#)
- 2024-11-28: [EMODnet Biology workshop for European Research and Innovation, and Mission: Restore our Ocean and Waters biodiversity projects](#)
- 2024-12-19: [EMODnet increases its marine biodiversity data holdings by over 1.2 million new occurrence records!](#)

Event announcements

- [Join a course on “FAIR data for marine scientists” to be held in April 2025](#) to be held from 2025-04-01 to 2025-04-03
- [EMODnet Biology workshop for EU funded projects](#) held from 2024-11-19 to 2024-11-20

The publication of a Use Case was planned for this period, however due to staff constraints in the, its completion was postponed to the next quarter.

Task 6: Ensure the involvement of Regional Sea Conventions (RSC)

No changes since the previous report.

Task 7: Contribute to the implementation of the EU legislation and broader initiatives for open data

In order to support open and FAIR data initiatives, the partnership has organized the workshop “EMODnet Biology workshop: supporting marine biodiversity data management” dedicated to EU research projects to train different organizations in data management according to consolidated standard protocols. The workshop was organized online over two consecutive sessions in November 19 and 20 and saw the participation of 45 representatives from different EU projects and initiatives. The workshop report, which includes an analysis of the pre-workshop survey is due to be published in May 2025.

The thematic lot joined the October TG DATA meeting where it present an overview of the workplan and a suggestion on the flow of data from the member states to the EEA and subsequent publication in EMODnet Biology.

Task 8: Monitor quality/performance and deal with user feedback

Monitoring of user enquiries is done via the JIRA helpdesk, managed by the EMODnet Secretariat. During the reporting period, five requests were received and had a first reply within 48 hours of being assigned to the thematic lot.

The continuous monitoring of the webservices is performed by the GeoHealthCheck tool, managed by the EMODnet Central Portal team. A screenshot including the period from 2024-01-06 to 2025-01-06 is included below where it is possible to confirm that all the thematic lot’s services were compliant with INSPIRE guidance both in terms of operationality and reliability.

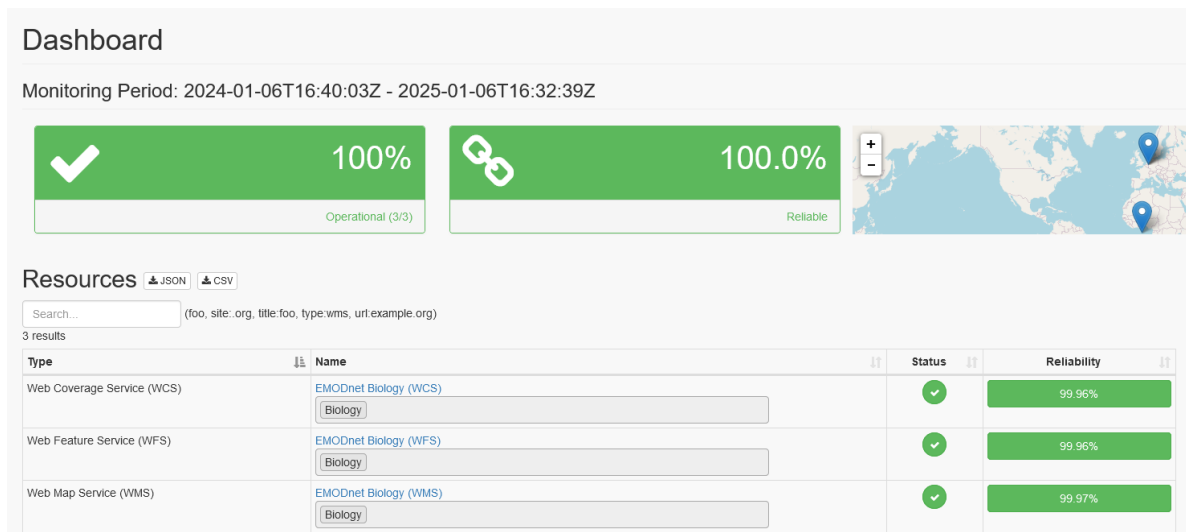


Figure 1. GeoHealthCheck monitor of the EMODnet Biology's webservices covering the period from 2024-01-06 to 2025-01-06

Status of the Milestones and Deliverables listed in the workplan					
Milestone/Deliverable in numerical order	WP	Date due	Status (To do/ Delivered/ Delayed)	Date delivered	If Delayed: reason for delay and expected delivery date
1.1.1 Quarterly Progress reports	WP1	2023-07-15 2023-10-15 2024-01-15 2024-04-15 2024-07-15 2024-10-15 2025-01-15 2025-01-15 2025-04-15 2025-07-15	Delivered Delivered Delivered Delivered Delivered Delivered Delivered	2023-07-14 2023-10-13 2023-01-15 2024-04-15 2024-07-15 2024-10-15 2025-01-15	
1.1.2 Interim report	WP1	2024-05-10	Delivered	2024-06-28	
1.1.3 Final Report	WP1	2025-05-09			
1.2.1 Update of EMODnet Biology data products via the EMODnet CP catalogue	WP1	2024-05-10 and 2025-05-09	Ongoing		
1.3.1 Monitoring user feedback via EMODnet JIRA	WP1	2023-05-10 to 2025-05-09	Ongoing		
1.3.2 Operation of the EMODnet CP helpdesk	WP1	2023-05-10 to 2025-05-09	Ongoing		
1.4.1 Minutes from the three project meetings (kick off, annual and final)	WP1	2023-06-10 2024-05-10 2025-05-09	Delivered Delivered	2023-06-30 2024-05-09	
1.5.1 Participation in the EMODnet Steering Committee meetings	WP1	2023-05-10 to 2025-05-09	Delivered Delivered	2023-12-01 2024-04-29/30 2024-10-07 and 2024-11-13	Other dates to be confirmed
1.5.2 Participation in the EMODnet Open Conference	WP1	2023-05-10 to 2025-05-09	Delivered	2023-11-29/30	
1.6.1 Appropriate mechanisms and guidelines for handover	WP1	2025-05-09			
2.1.1 Maintenance of adequate mechanisms to ensure data are interoperable	WP2	2023-05-10 to 2025-05-09	Ongoing		
2.1.2 Report on the standardisation and integration of datasets published during the Phase	WP2	2025-05-09			
2.2.1 Summary on consortium data flows	WP2	2023-11-10	Delivered	2023-11-10	
2.3.1 Plan to optimise procedures to make	WP2	2023-05-10 to 2025-05-09			

restricted data available to users					
2.4.1 Workshop on use of Zooniverse for data digitisation through citizen science	WP2	2023-11-10	Delivered	2023-11-15	
2.4.2 Data training workshop for Mediterranean organisations	WP2	2023-11-10	Delivered	2023-11-13/14	
2.4.3 Report on the availability of data following the workshops	WP2	2025-03-10			
2.5.1 Guidance for data management practices applied to omics data	WP2	2023-05-10 to 2025-05-09			
3.1.1 Internal WP3 and WP4 Workshop	WP3	2023-09-10	Delivered	2023-09-11	
3.2.1 Quarterly community calls	WP3	2023-08-10 2023-12-10 2024-03-10 2024-05-10 2024-08-10 2024-12-10 2025-03-10	Delivered Delivered Delivered Delivered Delivered Delivered	2023-06-08 2023-09-14 2023-12-04 2024-03-04 2024-04-16 2024-07-17 2024-10-03	
3.3.1 Liaison with external entities targeting seabird and cetacean migration outputs	WP3	2023-05-10 to 2025-05-09	Ongoing		
3.3.2 Data product creation	WP3	2023-05-10 to 2025-05-09	Ongoing		
4.1.1 Update connectivity maps and identification of stakeholder community	WP4	2023-09-10	Delivered	2023-09-28	
4.1.2 Informative material based 4.2.2 published in the EMODnet CP	WP4	2024-05-10	Delivered		
4.1.3 Informative material based on the 4.2.3 outcomes	WP4	2024-07-10	Delivered	2024-07-05	
4.1.4 Informative material based on the 4.3.1 outcomes	WP4	2025-05-09			
4.1.5 Publication of four Use Cases	WP4	2023-11-10 2024-05-10 2024-11-10 2025-05-10	Delivered Delivered Delayed	2023-11-27 2024-05-28	See Task 5
4.1.6 Publication of written documents	WP4	2023-05-10 to	Ongoing		

		2025-05-09			
4.2.1 Engagement plan for each RSC	WP4	2023-11-10	Delivered	2023-10-03	
4.2.2 Questionnaire to inform about what data & products EMODnet Biology offers and to collect stakeholder needs	WP4	2023-11-10	Delivered	2023-10-04	
4.2.3 Workshop with RSCs to understand major needs	WP4	2024-05-10	Delivered		
4.2.4 Report on progress for the publication of fisheries survey data	WP4	2025-05-09	Delivered		
4.3.1 Workshop with representatives of major recent and current European Research Projects and initiatives to share experience and knowledge in biodiversity monitoring and assessment and in data, tools and services	WP4	2024-11-10	Delivered	2024-11-19/20	See Task 7
4.3.2 Participation in TG DATA meetings	WP4	2023-05-10 to 2025-05-09	Ongoing	2024-05-14 2024-09-27 2024-10-08 2025-01-28	Other dates to be confirmed See Task 7
4.4.1 Ensure compatibility with INSPIRE Directive (data, metadata, data products)	WP4	2023-05-10 to 2025-05-09	Ongoing		See Task 3
4.4.2 Report on the activities to support EU Member States regarding their reporting obligations	WP4	2025-05-10	Ongoing		
5.1.1 Streamlining semantic interoperability	WP5	2023-05-10 to 2025-01-10			
5.1.2 Integration of omics data into the data model	WP5	2024-09-10	Delivered		See Task 4
5.1.3 Roadmap for marine biodiversity data	WP5	2025-05-09			
5.2.1 M2M communication plan and solutions	WP5	2023-05-10 to 2025-05-09	Ongoing		
5.3.1 Operational web services	WP5	2023-05-10 to 2025-05-09	Ongoing		
5.3.2 Technology stack upgrades	WP5	2025-05-09	Ongoing		See Task 3
5.3.3 Technical maintenance of procedures	WP5	2023-05-10 to	Ongoing		See Tasks 3 and 4

for ingestion of data from the data providers		2025-05-09			
5.3.4 Development and implementation of procedures to publish omics data	WP5	2025-05-09	Delivered		See Task 4
5.4.1 Synchronisation of all data and data products metadata to the EMODnet CP catalogue (GeoNetwork)	WP5	2023-05-10 to 2025-05-09	Delivered		
5.4.2 All data and products available through the EMODnet CP	WP5	2023-07-10 to 2025-05-09	Ongoing		
5.4.3 Participation in the EMODnet TWG meetings	WP5	2023-05-10 to 2025-05-09	Ongoing	2023-10-18 2024-03-12	Other dates to be confirmed
5.4.4 Maintenance and development of API used to query EMODnet Biology layers available via the EMODnet CP viewer	WP5	2023-05-10 to 2025-05-09	Ongoing		

2. 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
Task 2: Phase V position paper	Pending	The WP3-authored manuscript, titled “Realising the Potential of Interoperable Data Products to Improve the Outlook for Marine Biodiversity: Lessons from the European Marine Observation and Data Network”, has undergone a second round of revisions. It has been accepted for publication in Marine Policy and is expected to be published in early 2025. Further updates will be included in future reports		
Observations in view of Section 1.7 of the Tender Specifications on Performance and Quality Requirements				
Progress solving identified issues				
EM-83 - Biology - Web Services MetadataUrl and DataUrl	Resolved	Further updates done following feedback from the EMODnet Secretariat. Pending confirmation, by the EMODnet Secretariat, that these changes addressed all remaining issues		
EM523: EMODnet Biology Phase IV layers for European Atlas of the Sea	Pending	Ticket created by Coordinator, was considered low priority due to centralisation work and subsequently the end of Phase IV and start of Phase V		End of Phase V
EM524: IUCN red list Near Threatened category layer	Pending	Ticket created by Coordinator, was considered low priority due to centralisation work and subsequently the end of Phase IV and start of Phase V		End of Phase V
EM577: Update of zooplankton layers in the European Atlas (if available)	Pending	Ticket created by the EMODnet Secretariat, was considered low priority due to centralisation work and subsequently the end of Phase IV and start of Phase V		End of Phase V

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
Users do not have access to absence occurrences	Ongoing	Species' absence in surveys can provide invaluable information for data product creation and overall ecosystem knowledge. Within the thematic lot, there are several datasets where data providers have reported true absences (species were looked for but not found) or derived absences (i.e a list of species was defined for the project and systematically used throughout. When a species is absent from the data	QR22	

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
		submitted, we know that this is because such individuals were absent from the samples). Work is underway to allow for these data to be available to users		
Users do not have access to genomics data	Resolved	Data have been integrated in the database the can be downloaded via the mapviewer. Work is ongoing to allow for users to query and select the genomics datasets through the mapviewer using specific filters. See Task 4 for more details	Phase V	QR31
Delays due to situation in the Ukraine	Ongoing	UkrSCES is slowly picking up the work and interacting again with the planned activities, including those related with data provision. Further updates will be given in subsequent reports		

3. Communication assets

A. (Co-)Authoried peer-reviewed publications in the quarter					
Date of publication	Type of publication	Full reference	ISBN	DOI	Is it open access? Yes/No
2024-11-06	Paper	Maioli, Federico, Benjamin Weigel, Max Lindmark, Chiara Manfredi, Walter Zupa, Isabella Bitetto, Tommaso Russo, and Michele Casini. 2024. "Assessing the Overlap between Fishing and Chondrichthyans Exposes High-Risk Areas for Bycatch of Threatened Species." Ecosphere 15(11): e70050.		https://doi.org/10.1002/ecs2.70050	Yes

B. Other/non-peer reviewed types of publications (co-)authoried in the quarter					
Date of publication	Type of publication	Full reference	ISBN	DOI	Is it open access? Yes/No

For a comprehensive overview of publications referring to/making use of EMODnet data and/or data products, please consult Google Scholar.

4. Monitoring indicators

Comments on the progress indicators in the indicators spreadsheet		
Progress indicator	Means of collecting figures	Comment
1. Current status and coverage of total available thematic data A) Volume and coverage of available data	<i>Internal systems</i>	There was an increase in the data availability for most sub-themes, with the exception of Benthic data, which saw a slight decrease. This variation is due to updates in previously published data, where the originator was either able to better identify the taxa or removed occurrences due to incorrections. Bird and fish data saw the biggest increase in data availability. All reporting regions except the Black Sea had an increment in available data. The Atlantic and Arctic had, overall, the highest increase in data for most sub-themes. Note that the Caribbean Sea is included in the Atlantic region Ocean reporting, as per tender requirement
What is your opinion on the data coverage within EMODnet for your thematic?	<i>Expert knowledge</i>	The approach to the data gaps (Arctic, Black Sea and Mediterranean) has not changed from what was reported previously. The majority of data originating from these regions are submitted by consortium members. Other mechanisms to encourage data providers from the Black and Mediterranean Seas to submit data are being pursued, as an example through the DTO-BioFlow project data grants
B) Usage of data in this quarter	<i>NA</i>	There is no information on the data usage as no systems are in place to capture usage
2. Current status and coverage of total number of data products A) Volume and coverage of available data products	<i>Internal systems</i>	Three new external products were added to the EMODnet catalogue. The external products were created under the Mission Atlantic project. As they are not published via the EMODnet viewer, they weren't taken into account for the % area covered table. Due to the growing number of external products being added to the EMODnet Biology collection, the table has been split to show internal and external products separately
B) Usage of data products in this quarter	<i>NA</i>	No systems are in place to allow for this reporting
3. Internal and external organisations supplying/approached to supply data and data products within this quarter	<i>Internal systems</i>	Various organisations provided new or updates to existing data and covered not only EMODnet Biology partners, but also Seabed Habitats, data submitted via EMODnet Ingestion as well as via the EU funded project DTO-BioFlow and also OBIS SEAMAP. The data covered all European Seas except the Black Sea and all functional groups. Most data were supplied through web services and with a CC-BY or CC-0 license

Comments on the progress indicators in the indicators spreadsheet		
Progress indicator	Means of collecting figures	Comment
5.1 Daily number of page views of EMODnet Thematic entry page	Europa Analytics	There is no clear trend in this indicator throughout time. A clear peak in page views can be observed on November 25th, which could be a consequence of the workshop organised and hosted by EMODnet Biology for the EU Mission Ocean funded projects dealing with biodiversity data.
5.2 Quarterly total number of visitors, page views, unique page views and percentage of returning visitors	Europa Analytics	There was an overall increase in all indicators throughout the reporting period, with the exception of the returning visitors to the Biology page, which had a ~12% decrease.

The monitoring numbers reported as part of the progress monitoring of EMODnet performance are collected through Europa Analytics, unless reported otherwise.

Annex: Ancillary information

Task 1: Maintain and improve a common method of access to data held in repositories

Dataset title	New/Update	Phase	Organisations	License
Macro- and megafauna from the North Aegean Sea from 1997-1998	Update	V	Partner(HCMR)	Attribution (CC BY)
Syllidae (Polychaeta) from the North Mediterranean Coast of Egypt	Update	V	Partner(HCMR)	Attribution (CC BY)
Records of fish species in coastal lagoons and sea shore that belong to Municipality of Preveza, for the period 2002-2011	Update	V	Partner(HCMR)	Attribution (CC BY)
Aegean Polychaetes	Update	V	Partner(HCMR)	Attribution (CC BY)
Mollusca fauna from the Mediterranean reef ecosystem (1170 habitat)	Update	V	Partner(HCMR)	CC 0 (No Rights Reserved)
BIOMAERL.Maerl Biodiversity.Functional Structure And Antropogenic Impacts (1996-1998).	Update	V	Partner(HCMR)	Attribution (CC BY)
"Pola" Expedition: Mollusks, in the Eastern Mediterranean and the Adriatic Sea, 1890-1894	New	V	Partner(HCMR)	Attribution (CC BY)
Israel's sea turtle monitoring program	Update	NA	Ad-hoc(OBIS-SEAMAP)	Attribution-NonCommercial (CC BY-NC)
Marine impactful cryptogenic and alien species in the Greek Seas: A georeferenced dataset (1893-2020)	New	V	Partner(HCMR)	Attribution (CC BY)
Tunisian Polychaetes by 2022	New	V	Partner(HCMR)	Attribution (CC BY)
ICES Eggs and Larvae	New	V	Partner(ICES)	Attribution (CC BY)
Andalusia, Spain. Small loggerheads from a nest at Pulpã- (Almerã-a)	Update	NA	Ad-hoc(OBIS-SEAMAP)	Attribution-NonCommercial (CC BY-NC)
Northern Elephant Seals Post-Molting 2016	Update	NA	Ad-hoc(OBIS-SEAMAP)	Attribution-NonCommercial (CC BY-NC)
ICES Vulnerable Marine Ecosystems	Update	V	Partner(ICES)	Attribution (CC BY)
Cover of intertidal macroalgae along the N and NW coast of the Iberian Peninsula in 2011	Update	V	Partner(IHCantabria)	Attribution-NonComm

				ercial (CC BY-NC)
MAREANO - Base-line mapping of fauna obtained with grab	Update	V	Partner(IMR)	Attribution (CC BY)
MAREANO - Base-line mapping of epifauna obtained with Beamtrawl	Update	V	Partner(IMR)	Attribution (CC BY)
MAREANO - Base-line mapping of hyperbenthic crustacea fauna obtained with RP-sledge	Update	V	Partner(IMR)	Attribution (CC BY)
IMR Occurrences of fish from research and rental vessels 2000-2023	Update	V	Partner(IMR)	Attribution (CC BY)
Spatial and temporal distribution of phytoplankton off the coast of Portugal	New	V	Partner(IPMA)	Attribution-NonCommercial (CC BY-NC)
Phytoplankton variability on the Portuguese coast	New	V	Partner(IPMA)	Attribution-NonCommercial (CC BY-NC)
Toxic phytoplankton dynamics on the Portuguese Coast	New	V	Partner(IPMA)	Attribution-NonCommercial (CC BY-NC)
Plankton community in R��gent (680��m) net, Point B, Villefranche-sur-Mer, France	Update	NA	Ad-hoc(LOV)	Attribution (CC BY)
Plankton community in Juday-Bogorov (330��m) net, Point B, Villefranche-sur-Mer, France	Update	NA	Ad-hoc(LOV)	Attribution (CC BY)
Plankton community in WP2 net (200��m), DYFAMED point, Ligurian Sea, France	Update	NA	Ad-hoc(LOV)	Attribution (CC BY)
Plankton community in Bongo net, MOOSE-GE cruises, North-Western Mediterranean Sea	Update	NA	Ad-hoc(LOV)	Attribution (CC BY)
Plankton community in WP2 net (200��m), PNMIIR cruises, Parc Naturel Marin d'Iroise, France	Update	NA	Ad-hoc(LOV)	Attribution (CC BY)
2015 Scottish Environment Protection Agency (SEPA) Eden Estuary Intertidal Seagrass Survey	Update	V	Partner(MBA)	Attribution (CC BY)
2015 Marine Biological Association of the UK (MBA) Wembury South Devon Introduction to Seaweeds course sightings	Update	V	Partner(MBA)	Attribution (CC BY)
1975 University of London Kent Ficopomatus enigmaticus collections	Update	V	Partner(MBA)	Attribution (CC BY)
LBBG ZEEBRUGGE - Lesser black-backed gulls (Larus fuscus, Laridae) breeding at the southern North Sea coast (Belgium and the Netherlands) [subsamped representation]	Update	NA	Ad-hoc(INBO)	CC 0 (No Rights Reserved)
HG OOSTENDE - Herring gulls (Larus argentatus, Laridae) breeding at the southern North Sea coast (Belgium) [subsamped representation]	Update	NA	Ad-hoc(INBO)	CC 0 (No Rights Reserved)

CURLEW VLAANDEREN - Eurasian curlews (Numenius arquata, Scolopacidae) breeding in Flanders (Belgium) [subsamped representation]	Update	NA	Ad-hoc(INBO)	CC 0 (No Rights Reserved)
LBBG JUVENILE - Juvenile lesser black-backed gulls (Larus fuscus, Laridae) hatched in Zeebrugge (Belgium) [subsamped representation]	Update	NA	Ad-hoc(INBO)	CC 0 (No Rights Reserved)
MEDGULL ANTWERPEN - Mediterranean gulls (Ichthyaeetus melanocephalus, Laridae) breeding near Antwerp (Belgium) [subsamped representation]	Update	NA	Ad-hoc(INBO)	CC 0 (No Rights Reserved)
O AMELAND - Eurasian oystercatchers (Haematopus ostralegus, Haematopodidae) breeding on Ameland (the Netherlands) [subsamped representation]	Update	NA	Ad-hoc(INBO)	CC 0 (No Rights Reserved)
O ASSEN - Eurasian oystercatchers (Haematopus ostralegus, Haematopodidae) breeding in Assen (the Netherlands) [subsamped representation]	Update	NA	Ad-hoc(INBO)	CC 0 (No Rights Reserved)
O BALGZAND - Eurasian oystercatchers (Haematopus ostralegus, Haematopodidae) wintering on Balgzand (the Netherlands) [subsamped representation]	Update	NA	Ad-hoc(INBO)	CC 0 (No Rights Reserved)
O SCHIERMONNIKOOG - Eurasian oystercatchers (Haematopus ostralegus, Haematopodidae) breeding on Schiermonnikoog (the Netherlands) [subsamped representation]	Update	NA	Ad-hoc(INBO)	CC 0 (No Rights Reserved)
O VLIELAND - Eurasian oystercatchers (Haematopus ostralegus, Haematopodidae) breeding and wintering on Vlieland (the Netherlands) [subsamped representation]	Update	NA	Ad-hoc(INBO)	CC 0 (No Rights Reserved)
Circalittoral faunal turf occurrences on the Azores shelves (central north Atlantic) from 2005 to 2018	Update	NA	Ad-hoc(IMAR)	Attribution-NonCommercial-NoDerivatives (CC BY-NC-ND)
Rhodolith occurrences in the Azores (central north Atlantic) between 1998 and 2018	Update	NA	Ad-hoc(IMAR)	Attribution-NonCommercial-NoDerivatives (CC BY-NC-ND)
LBBG ADULT - Lesser black-backed gulls (Larus fuscus, Laridae) breeding in Belgium	New	NA	Ad-hoc(INBO)	CC 0 (No Rights Reserved)
SPOONBILL VLAANDEREN - Eurasian spoonbills (Platalea leucorodia, Threskiornithidae) in Flanders (Belgium)	New	NA	Ad-hoc(INBO)	CC 0 (No Rights Reserved)

2014 Marine Biological Association of the UK (MBA) Noss Mayo Yealm Estuary Transect Survey of Crassostrea gigas	Update	V	Partner(MBA)	Attribution (CC BY)
Texel sand wave June 2017	New	V	Partner(NIOZ)	CC 0 (No Rights Reserved)
Finnish Baltic Sea phytoplankton monitoring, KPLANK database	Update	V	Partner(SYKE)	Attribution (CC BY)
Acoustic telemetry data for Atlantic cod (Gadus morhua) in the C-Power wind farm in the southern North Sea (Belgium)	Update	V	Partner(VLIZ)	Attribution (CC BY)
HELCOM/OSPAR Finland ports water sampling	New	NA	Ad-hoc(EMODnet Ingestion)	CC 0 (No Rights Reserved)
Acoustic telemetry data for European eel (Anguilla anguilla) in the Scheldt estuary and southern North Sea (Belgium)	Update	V	Partner(VLIZ)	CC 0 (No Rights Reserved)
2011 RIVIERPRIK - Acoustic telemetry data for river lamprey (Lampetra fluviatilis) in the upper Scheldt river (Belgium)	New	V	Partner(VLIZ)	CC 0 (No Rights Reserved)
2013 ALBERTKANAAL - Acoustic telemetry data for European eel (Anguilla anguilla) and hatched Salmon (Salmo salar) in the Albert canal (Belgium)	New	V	Partner(VLIZ)	CC 0 (No Rights Reserved)
2014 DEMER - Acoustic telemetry data for four fish species in the Demer river (Belgium)	New	V	Partner(VLIZ)	CC 0 (No Rights Reserved)
Isle of Lewis Benthic Ecology Drop-down Video Survey - Envision (2011)	Update	NA	Ad-hoc(JNCC)	Attribution (CC BY)
2015 DIJLE - Acoustic telemetry data for five fish species in the Dijle river (Belgium)	New	V	Partner(VLIZ)	CC 0 (No Rights Reserved)
2012 LEOPOLDKANAAL - Acoustic telemetry data for European eel (Anguilla anguilla) in a polder area in Flanders (Belgium)	New	V	Partner(VLIZ)	CC 0 (No Rights Reserved)
Acoustic telemetry data for Atlantic cod (Gadus morhua) in the Scheldt estuary and southern North Sea (Belgium)	Update	V	Partner(VLIZ)	CC 0 (No Rights Reserved)
ARMS-MBON data on long-term monitoring of hard-bottom communities: COI results from 2018-2020	New	V	Partner(VLIZ)	Attribution (CC BY)
ARMS-MBON data on long-term monitoring of hard-bottom communities: ITS results from 2018-2020	New	V	Partner(VLIZ)	Attribution (CC BY)
ARMS-MBON data on long-term monitoring of hard-bottom communities: 18S results from 2018-2020	New	V	Partner(VLIZ)	Attribution (CC BY)

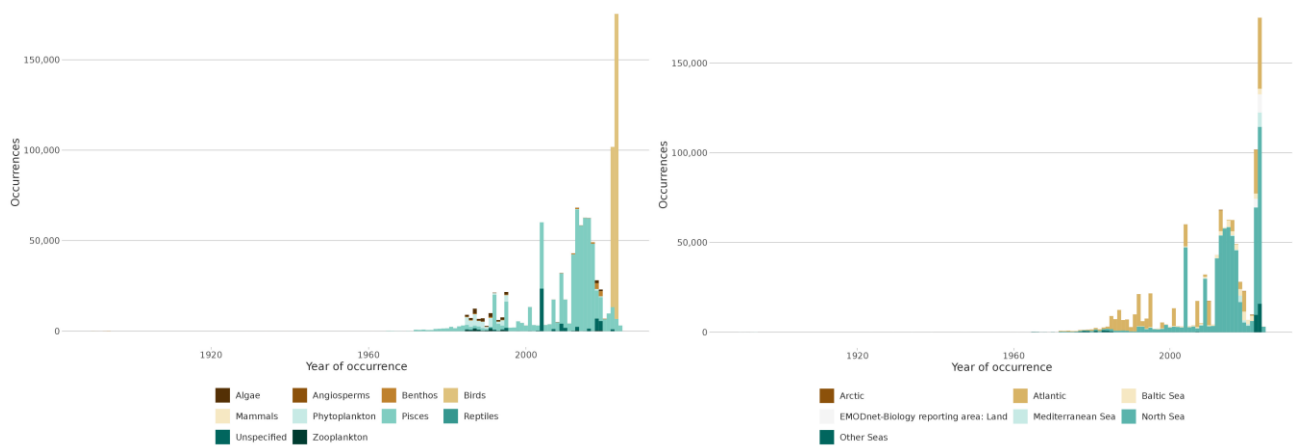


Figure 2. Occurrence distributions, for data published during the reporting period, per year of occurrence of the Functional group (left) and Sea region (right).

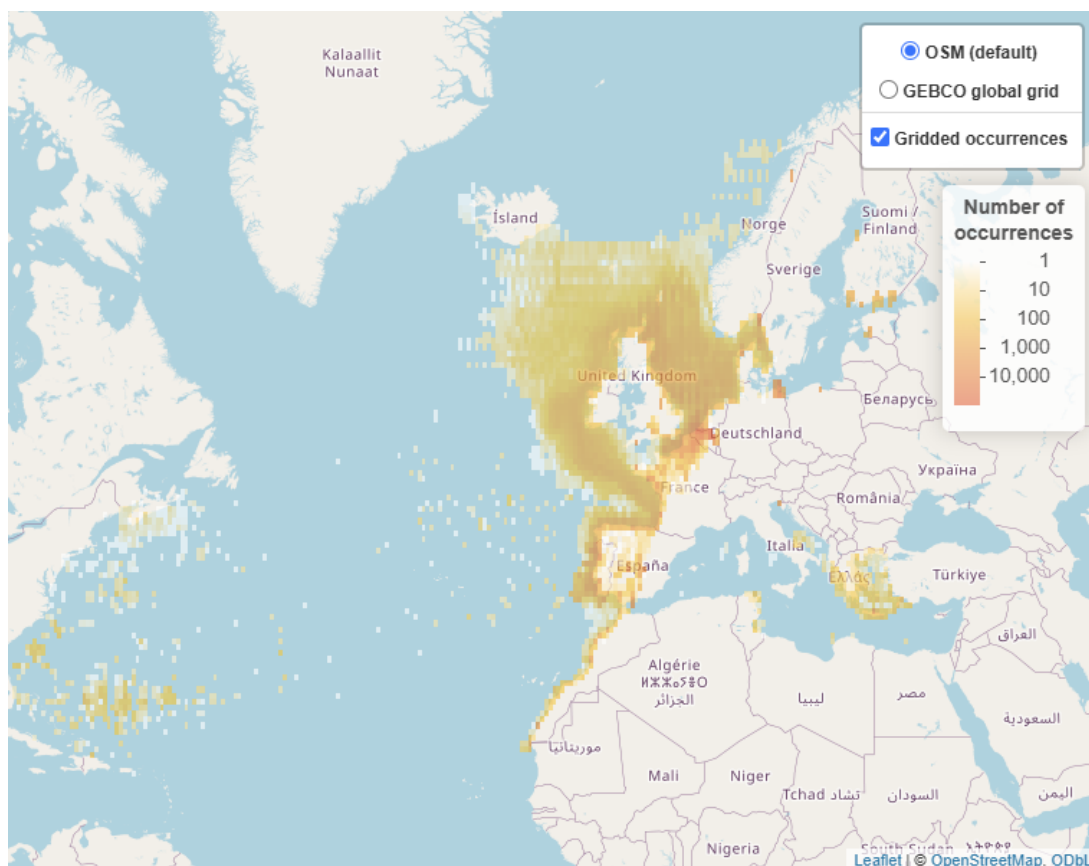


Figure 3. Occurrences distribution for data published during the reporting period. Image is centered in Europe even though published data covers other sea regions.

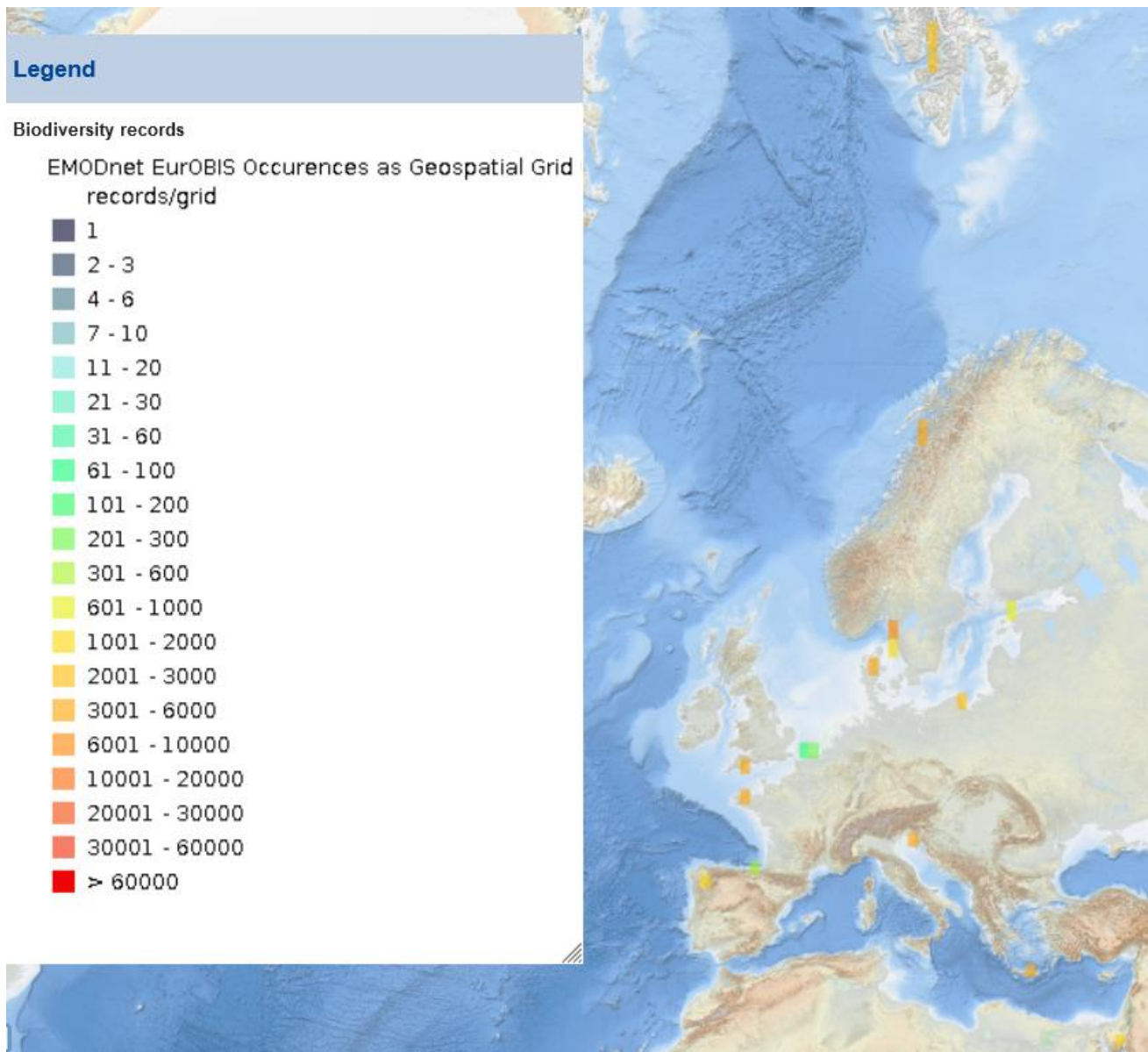


Figure 3. Occurrences distribution for the first genomics data published during the reporting period. The data originate from the ARMS datasets (the last three listed in the table above)