EMODnet Thematic Lot n° 6 – Human Activities

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EMODnet Phase III – Interim/Final Report

Reporting Period: 03/03/2017 – 01/03/2019

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Contents

Disclaimer

Executive summary

The objective of EMODnet Human Activities is to become the entry point for data on human activity in EU waters. Special attention is thus given to collating accurate data from official sources, as well as to making user experience as smooth as possible.

In the current phase of EMODnet, the focus is on further developing its operational service where marine data and data products are made interoperable and freely available. EMODnet Human Activities is mandated to build the following data themes:

- Aggregate extraction
- Cultural heritage
- Dredging (e.g. navigational)
- Fisheries zones
- Hydrocarbon extraction
- Ports (traffic and waste)
- Aquaculture (including freshwater)
- Ocean energy facility
- Spatial planning zones
- Pipelines and cables
- Protected areas
- Waste disposal
- Wind farms

Furthermore, even though not requested by the contract, the Human Activities team have also made available a number of additional datasets, such as:

- Algae production facilities
- State of bathing waters
- Fish catches
- Monthly first sales of fish
- Hydrocarbon extraction licences
- Lighthouses

Moreover, one of the key objectives of the new phase is to make available a series of vessel density maps. This was also a requirement of the previous phase, when in fact it turned out impossible to obtain the necessary data to compile the maps. For this reason, with the new phase it was decided to purchase a set of data from a commercial provider. Processing the data to create the maps has proved to be a challenging task. The dataset acquired includes nearly 2.1 billion records for just one-year worth of data. It has been necessary to set up a dedicated machine, purchase new software, write bespoke algorithms, and devise an entirely new method in collaboration with the JRC. At the time of writing, a set of maps for 2017 has been completed and is scheduled to go live on 11 March 2019. Shortly thereafter, the Human Activities team will start working on 2018 data, so to release new maps before the end of the year.

Besides collecting and making available data, other activities have also been carried out.

The team have compared EMODnet data models with INSPIRE's, in view of increasing compliance with INSPIRE standards. In the next step of this task, our findings will be submitted to the INSPIRE working group to agree on what measures might be taken to improve compliance.

In view of fostering cooperation with Regional Sea Conventions, a series of meetings took place between 2017 and 2018. The Human Activities team met the organisations responsible for the implementation of Regional Sea Conventions and discussed how to better liaise in the future to mutual benefit. A structured form of cooperation was formally presented to the Black Sea Commission at their meeting in October 2018. Follow-up meetings will take place in the coming months to assess the progress made.

Further to the release of new visual guidelines, a revamped version of the portal went live in May 2018. The layout is now perfectly consistent with EMODnet's visual identity.

In order to increase the visibility of EMODnet HA and expand its user base, a communication strategy was drafted at the beginning of the project. Amongst other things, communication activities include participation in events, publication of articles and blog posts. The blog that was launched in the previous EMODnet phase has proved to be an effective tool to spread the word about EMODnet outside its inner circle. Blog posts on themes related to EMODnet HA have been shared on social media, attracting users that were previously unaware of the project.

Web statistics show that new users visit the portal each month. Human Activities can now boast a significant share of users from industry, which may lead to conclude that providing harmonised and interoperable data is contributing to generating value added in the blue economy. With the release of the new portal, the team have slightly modified the form that users have to fill out before downloading data. It is now mandatory to leave a name and an email address (personal data are treated in compliance with the GDPR). Users who so wish may also share additional information as to how they plan on using the data. This has made it possible to better understand how and if EMODnet is yielding concrete benefits to its users. A number of use cases, mainly concerning SMEs, has been drafted; more will follow over the course of 2019.

1 Introduction

The contract for the new phase of EMODnet Human Activities was signed in March 2017. The consortium that was awarded the contract is the same that developed the portal in the previous phase:

- Cogea (lead company), Italy
- AND International, France
- AZTI Tecnalia, Spain
- CETMAR, Spain
- Eurofish International Organisation, Denmark
- Lovell Johns, UK

EMODnet Human Activities has been a member of the EMODnet family since September 2013. Since it was not included in the first EMODnet phase from 2009 to 2012, in the previous EMODnet phase (2013-2016) its main objective was to quickly build a base of data, so as to catch up with the other portals.

With the new phase of EMODnet, the focus is on further developing the operational service where marine data and data products on the spatial extent and intensity of human activities in the ocean are made interoperable and freely available. According to the contract, EMODnet Human Activities is mandated to build the following data themes:

- Aggregate extraction
- Cultural heritage
- Dredging (e.g. navigational)
- Fisheries zones
- Hydrocarbon extraction
- Ports
- Aquaculture (including freshwater)
- Ocean energy facility
- Spatial planning zones
- Pipelines and cables
- Protected areas
- Waste disposal
- Wind farms

Compared with the previous phase, there are some new datasets, such as freshwater aquaculture, waste collected in ports and spatial planning zones. Furthermore, even though not requested by the contract, the Human Activities team have also made available a number of additional datasets, such as:

- State of bathing waters
- Fish catches
- Monthly first sales of fish
- Hydrocarbon extraction licences
- Lighthouses
- Algae production facilities (microalgae, macroalgae)

Moreover, one of the key objectives of the new phase is to make available a series of vessel density maps. This was also a requirement of the previous EMODnet phase, when in fact it turned out impossible to obtain the necessary data to compile the maps. For this reason, with new phase it was decided to purchase a set of data from a commercial provider. Vessel density maps also happened to be the most requested dataset by users, according to a survey carried out in 2016. For this reason, it is expected that the release of the maps might increase EMODnet's visibility considerably, especially because shipping is by far the maritime activity that has the largest impact on the marine environment.

The general objective of EMODnet Human Activities is to become the entry point for maritime data on the spatial extent and intensity of human activity in the ocean. For this reason, the team developing the pay special attention to collating accurate data from official sources, as well as to making user experience as friendly as possible. With a view to increase EMODnet visibility, a blog was launched in the previous phase of EMODnet to increase awareness on the work of the Human Activities team and on how its data could be used.

The current phase of EMODnet also takes on some new challenges, such as improving compliance with INSPIRE standards, analyse standards and protocols of non-EU organisations involved in similar initiatives, and better coordinate with Regional Sea Conventions.

Last but not least, special attention is now placed on developing "use cases" to better understand how EMODnet Human Activities creates value for its users.

2 Highlights in this reporting period

- **All datasets received at least one update.**

- **An entirely new dataset on pipelines was released**: in the previous EMODnet phase it was not possible to compile a dataset on pipelines, mainly due to lack of information. Upon further research, we have managed to collate data from a limited number of sources, so as to develop a first dataset on submarine pipelines, albeit with limited coverage. A "request for data" on pipelines has also been posted on the EMODnet Data Ingestion Portal.

- **An entirely new dataset on algae production was released**: the dataset was created together with the JRC, who collected information from the producers. As of today, it covers a number of establishments and their production on method. In the future, it will be expanded by adding information of species and quantities cultivated/wild-harvested.

- **An entirely new dataset on waste in ports was released**: at moment it only covers a limited number of ports in Estonia, Finland, France, Latvia, Portugal and Spain. Based on MARPOL Convention, waste is reported in metric tonnes (m3) and classified as oily waste (Annex I), garbage (Annex V), sewage (Annex IV), Harbor Waste (garbage) and Total Amount.

- **The work on the vessel density map has been completed**: the map is due to go live on 11 March 2019, after a series of communication actions carried out together with the Secretariat.

- **Web Feature Services (WFS) were migrated from MapServer to GeoServer**: the migration was implemented in late 2017 in view of OpenSeaLab. It has allowed greater compatibility with the central portal.

- **WFS for Main Ports and Fish Sales were also published**: due to technical reasons no WFS used to be available for these two datasets. Again, a solution was found in view of OpenSeaLab, after migrating from MapServer to GeoServer**.**

- **A revamped website went live**: just like most of the other portals, the new visual guidelines developed by Trust-IT were implemented on EMODnet Human Activities. Amongst other things, it also includes a new download form, whereby users who download data will be requested to type a valid email address. The Human Activities team might use the address to enquire about what the data have been downloaded for. Live Chat was implemented on all pages of EMODnet HA website.

- **New features were added to the map viewer**: these include a search facility, a tool to capture features and download tabular data, a print tool and a button to adjust layer transparency. The new features are scheduled to go live on 11 March 2019, together with the vessel density maps.

- **4 meetings with Regional Sea Conventions took place**: in view of increasing coordination and fostering cooperation with Regional Sea Conventions, the Human Activities team met with each of the organisations responsible for Regional Sea Conventions. Follow-up meetings will report on the actions agreed.

- **A detailed analysis of compliance with INSPIRE was developed**: all current EMODnet dataset models were compared with INSPIRE Application schemas and feature types, so as to understand to what extent EMODnet data models are compliant with INSPIRE.

3 Summary of the work done

Task 1 - Develop a common method of access to data held in repositories: the contract was signed in March 2017. The portal had not been updated since September 2016, when the previous contract expired. Initially we focused on updating all of our datasets. At the time of writing, all of them have been updated, in some cases with the addition of new sources and/or information.

Work has also been completed on the datasets that were not included in the previous EMODnet phase. A new dataset on freshwater aquaculture has been developed from scratch and is now available for users to view and download. Furthermore, we have also collated information on pipelines, a dataset that proved particularly difficult to build in the previous EMODnet phase, due to a general lack of data. The dataset on pipelines went live in January 2018, albeit with limited coverage. In some EU and non-EU countries it is not allowed to disclose information on the exact location of pipelines, lest they might become a potential objective for a terrorist attack. Some information is available through commercial providers, but, even if purchased, it cannot be disseminated to the wider public. Moreover, commercial databases often only provide a schematic representation of pipeline routes, which would be of scant significance for EMODnet, where accuracy of geographic information is key.

"Waste collected in ports" is a new dataset, which at moment only covers a limited number of ports in Estonia, Finland, France, Latvia, Portugal and Spain. In accordance with MARPOL Convention, waste is reported in cubic metres and classified as oily waste (Annex I), garbage (Annex V), sewage (Annex IV), harbour waste (garbage) and total amount.

"Maritime Spatial Planning" (MSP) is the only dataset still awaiting publication. At the time of writing, data have been collected and georeferenced for Belgium. As agreed during a meeting with the Member States' Expert Group (MSEG) on MSP, the data model will have to be validated by the Member States' contact points for MSP.

Last but not least, an entirely new dataset on nuclear plants has been developed, albeit not yet available online.

Task 2 - Construct products from one or more data sources that provide users with information about the distribution of parameters in time and space: EMODnet Human Activities is mandated to develop vessel density maps of the EU, and to do so a set of AIS data has been purchased from a commercial provider.

The data consists of messages sent by automatic tracking systems installed on board ships and received by terrestrial and satellite receivers alike. The dataset covers the whole 2017 for an area covering all EU waters. The messages have been imported in a database as points. From the points, we have created a segment every two consecutive positions of a vessel. The segments have then been intersected with a grid with 1 km^2 cells. For each ship we have calculated the total time spent in a cell by calculating the portion of segment intersecting the cell, dividing it by the total length of the segment and multiplying the result by the total time of the segment. Density is expressed in terms of hours spent by ships in a cell over a month. The longer the time, the higher the density. Ships have been grouped according to the following types: cargo, dredging or underwater operations, high speed craft, fishing, military and law enforcement, passenger, pleasure craft, sailing, service, tanker, tug and towing, other, unknown.

The paragraph above condenses in few words what has been a lengthy and cumbersome process. Messages had to be processed in the billions, through a dedicated machine (10 cores, 52 GB RAM), several pieces of software (Linux shell, PostgreSQL, ArcGIS, QuantumGIS), and custom-made scripts. The method used to calculate vessel density is completely original and has been developed by the Human Activities team together with the JRC.

Vessel density maps are by far the most requested dataset by users, according to a survey carried out in the previous EMODnet phase. Making them available for free on the portal might increase EMODnet's visibility considerably. The Human Activities team have paid great attention to building momentum around this initiative, with a series of blog posts that delve into the many challenges of such a complex task. The latest blog published on this topic was shared on LinkedIn where it received more than 2,000 views. The maps are due to go live on 11 March 2019, after an aggressive communication campaign conducted under the auspices of the Secretariat.

Task 3 - Develop procedures for machine-to-machine connections to data and data products: all of EMODnet Human Activities' datasets can be served via webservices (WFS and WMS). WMS was unavailable in the previous EMODnet phase and was implemented in view of OpenSeaLab. Web Feature Services (WFS) were migrated from MapServer to GeoServer to allow greater compatibility with the central portal. WFS for Main Ports and Fish Sales (previously unavailable) were also published. A number of organisations have made initial requests for WFS or WMS links. The vessel density maps are the only raster datasets available on EMODnet Human Activities, and will be served via WMS and WCS.

Task 4 - Develop a web portal allowing users to find, visualise and download data: the textual content of the portal was updated to reflect the new contract. New style guidelines have been implemented to the map, search and information pages. New features have also been added to the map viewer: a search facility, a tool to capture features and download tabular data, a print tool and a button to adjust layer transparency.

Task 5 - Ensure the involvement of regional sea conventions: in order to establish a structured form of cooperation with regional sea conventions, 4 meetings (one for each convention) took place between 2017 and 2018. The meetings were used to discuss the progress of EMODnet Human Activities, what actions should be taken to ensure that our work is consistent with the work of the RSCs, and what could be improved to make EMODnet Human Activities team more useful to them. A structured form of cooperation on data exchange was formally presented to the Black Sea Commission at their meeting in October 2018.

New meetings will take place over the course of 2019.

Task 6 - Facilitate interoperability with data distributed by non-EU organisations: initiatives similar to EMODnet Human Activities have been mapped. The management of the UNESCO's inventory on MSP has been contacted, as it is expected that existing MSP portals around the world are in principle quite similar to EMODnet Human Activities. Unfortunately, there does not seem to be many initiatives worldwide which are similar in scope to EMODnet Human Activities, the only one being the Marine Cadastre in the US.

Task 7 - Install a process to monitor performance and deal with user feedback: user feedback is being monitored consistently across the various portals following the indications from the Secretariat and Trust-IT. In addition, in the second year of the project it was envisaged to administer a questionnaire to a list of

users to elicit feedback on the portal. However, because several other user surveys were run by other organisations (e.g. EMODnet Secretariat, Deloitte) it was decided to focus on use cases from industry. Companies which have downloaded Human Activities' data have been contacted individually to enquire about use. At the time of writing, two use cases (Biosfera XXI, Cathie Associates) have been developed, and two more are being prepared. This type of monitoring is particularly useful, as it makes it possible to show how EMODnet creates value for its users by improving certainty and access to information, ultimately reducing costs. This activity will be carried out throughout the duration of the contract.

Task 8 - Operate a help desk offering support to users: a help-desk service was set up shortly after the signature of the contract. Currently, it is possible to request help via email, telephone or live chat. The telephone and live-chat help-desk services are manned Monday through Friday during business hours. Users seem to still prefer email though, as no one has requested help via telephone and very few have used live chat. E-mail requests are generally addressed with 1.5 half days; telephone and chat requests are addressed in real time.

4 Challenges encountered during the reporting period

Main challenge	Measures taken
Aquaculture (1) Update of national datasets realised at different pace in the MSs. (2) Lack of data and/or no reply from national authorities concerning conditions for disclosure in several MS and non-EU countries (3) Different approaches identified for mapping shellfish areas (polygons) in different MS and non-EU countries (4) Wide range of freshwater finfish farmed within the EU	(1) Bi-monthly consultation of websites and/or contacts with data owner for being informed of updates (2) Renewal of contacts/demands and promotion of EMODnel portal (3) Inventory of available datasets providing polygons for farming areas and comparison of representation choices (cages, tables / whole concessions). Analysis on the way for harmonizing data. (4) Grouping by main species and relevant family of species (ex: salmonids, cyprinids…)
Maritime heritage (1) Underwater archaeology site and wrecks: very few new sources identified with generally no access to detailed coordinates of sites (2) Lack of information on the age and characteristics of shipwrecks in available datasets and no clear criteria for assessing their heritage value (3) No regular updates for lighthouses data and difficulties to obtain replies from alternative sources on the costs and conditions for access to full information (including metadata allowing to better characterise each lighthouse)	(1) Searching for new sources (national authorities, scientific bodies…) and new approaches (polygons for protected areas) (2) Investigation of new sources providing information on the age and the type of wrecks. Reflexion on the relevance of defining different historic periods for wrecks (Hellenistic, Roman, middle-age….) (3) Investigation on the interest of purchasing datasets from alternative sources with more accurate coordinates and metadata
Maritime spatial planning Deadline for implementation of Maritime Spatial Plans is 2021 (Directive 2014/89/EU). Several Member States indicate that they will not get any plan in place before that deadline.	To reinforce the message that plans in preparation and projects are valuable information for EMODNET. To strengthen the relationship with MSP national contact points by attending the Member States Expert Group on MSP (14-15 March 2018)

Main challenge	Measures taken
Waste collected in ports Highly fragmented data in multiple formats. European Maritime Safety Agency (EMSA) does not hold data on waste at major ports. DG-MOVE has the data, but the requirements of the data protection regulation imply the need to obtain individual authorization port by port	A specific action has been implemented to speed up the gathering of individual authorisations.
Pipelines In many countries there are no useful sources of data., Commercial providers are not helpful, because, if we buy the data, they do not allow us to disseminate them.	By collating data from available sources, a dataset with limited coverage has been released. It will be used to encourage other sources to share their data.
Vessel density map (1) Data not easily available through EMSA for legal reasons. (2) The contract requires to create vessel density map but does not specify what is meant by 'density'. (3) The vast amount of data required to create the maps requires enormous computing power.	(1) Data have been purchased from a commercial provider. (2) Ongoing dialogue on methods with the JRC, HELCOM and other organisations. (3) A dedicated machine has been set up with bespoke configuration. Scripts and algorithms have been written to speed up data processing.
WFS compatibility issues with the central portal	Migrated WFS from MapServer to GeoServer

5 Allocation of project resources

Categories	Resource usage (%)
Making data and metadata interoperable and available	39%
Preparing data products	16%
Preparing web-pages, viewing or search facilities	18%
Managing user feedback	3%
Project management	5%
Outreach and communication activities	5.5%
Involvement of Regional Sea Conventions	1.5%
Analysis of standards and protocols used by non-EU organisations	2%
Other costs	10%

6 Work package updates

WP 2 – Data Collection

Cultural heritage

What's new: Collection and pre-processing of new datasets on wrecks and underwater archaeology in the Mediterranean. Identification and contacts with new data sources in different sea basins (Baltic Sea, Black Sea, Atlantic Ocean) concerning underwater archaeology sites and wrecks. Investigation on the availability at EU level of data on protected areas (e.g. no diving, no human activity) aimed at preserving archaeological sites.

Discussion with data providers of wrecks and lighthouses has been launched in view of striking a deal for extracting from their databases and defining conditions for dissemination through EMODnet.

What's next: Upload of new datasets onto the portal. Improve the accuracy and relevance of the dataset on lighthouses (coordinates accuracy and coverage) through current sources and/or alternative sources. Enlarge coverage of submerged prehistoric archaeology (Baltic, Black Sea, Mediterranean).

Aquaculture

What's new: Update and enlargement of the datasets on mariculture (including land-based seawater farms). Enlargement of the aquaculture dataset to freshwater aquaculture: 11 Member States covered. New fields added on production methods and new typology (based on farms specialisation). Work on more relevant/accurate data (polygons) for shellfish and algae farming. Data collection pursued in other EU MSs and neighbouring countries.

What's next: Update of existing datasets. Improvement of geographical coverage (MSs not yet covered and neighbouring countries) and accuracy of data (e.g. polygons instead of points). Addition of a new dataset of interest to Aquaculture Advisory Council (AAC) members: suitable areas for mariculture (biologically and "politically"), sanitary areas, restricted areas.

Algae production facilities

What's new: this dataset is entirely new and currently includes macroalgae and microalgae production sites. The dataset stems from a joint effort made by EMODnet Human Activities, the JRC and the producers themselves. In October 2017, the FAO, the JRC and the COST association co-organised a workshop on algae. Amongst other things, it was pointed out that the available information on algae production was quite poor. In agreement with the producers attending the workshop, it was decided to create a dataset that would be made available on EMODnet Human Activities. The JRC and the EMODnet Human Activities team created a data model. The JRC led the data collection effort and gleaned information from multiple sources, including the producers themselves. A tabular dataset was submitted via the Data Ingestion portal. The Human Activities team created a geographic dataset and made it available on the portal. As of today, the dataset is made up of points representing macroalgae or microalgae production facilities, with information on producer name, country and production method.

What's next: a new workshop took place in Brussels in February 2019. The JRC and the Human Activities team would like to update the dataset by adding information on species and quantities harvested/cultivated.

Aggregate extraction

What's new: the entire dataset has been updated and a new field has been added in the data model ('Material Type'), including information on the type of the extracted material (e.g. sand, fill sand, gravel, till, mud, etc.), when available. New data on raw material production have been added for Denmark. A new dataset on polygons of license areas for aggregate extractions has been prepared and is now available

What's next: provide a new update in 2019.

Dredging

What's new: the entire dataset has been updated and a new field has been added in the data model ('Material Type'), including information on the type of the extracted material (e.g. sand, fill sand, gravel, till, mud, etc.), when available.

What's next: provide a new update in 2019.

Environment

What's new: "Natura 2000" and "Nationally designated areas (CDDA)" layers have been updated. The dataset "State of bathing waters" has been updated with the latest information reported by EU Member States for the 2017 bathing season

What's next: provide a new update in 2019, usually available around May.

Ocean energy facilities

What's new: the dataset has been updated to include new facilities and provide up-to-date information on those previously included. A new field has been included in the data model to add the link to the studies conducted for the Environmental Impact Assessment during the consenting process for different test sites and projects in Ireland, Spain, Portugal, France, Sweden, the Netherlands, Denmark and the United Kingdom.

What's next: provide a new update in 2019.

Other forms of area management

What's new: the dataset was updated in October 2017. Compared with the previous version the update includes information on the newly-established Black Sea Advisory Council, and also 'Market', 'Aquaculture', and 'Outermost Regions' Advisory Councils. The new dataset groups all the advisory councils in a single layer (previously split across several layers).

In addition, the Economic Exclusive Zone dataset was reconstructed, its attributes updated including supporting legal documents.

What's next: provide a new update in 2019.

Waste disposal

What's new: new data have been collected on Spain, data on sites in Scotland were acquired in August. Some datasets included the same waste disposal points for several disposal materials. They are now being cross-checked to make sure that single points are reported.

What's next: search new data sources and update collected data.

Wind farms

What's new: the dataset was updated twice in 2018 to include new wind farms and provide up-to-date information on those already available in the data set. Data have been purchased from a commercial provider (www.thewindpower.net) to crosscheck the information collected.

What's next: provide a new update in 2019.

Fisheries

What's new: the dataset on fish catches was updated in 2019 and it covers a time series from 1950 to 2017. Compared with the previous version this new version includes data for 2017, as well as the new Main Commercial Species identified by the EUMOFA in 2018. The dataset on monthly first sales was also updated in 2019 and now includes new information on fish presentation (e.g. whole, headed, gutted, etc.), preservation state (e.g. fresh, frozen, etc.) and size. Information on presentation and preservations state are also retrieved from EUMOFA. Furthermore, information is now available down to the level of individual species (FAO code).

What's next: provide new updates in 2020.

Hydrocarbon extraction

What's new: The entire dataset has been updated and installations previously not covered have been added through Marine Traffic's AIS data. The new installations are located in Bulgaria, Libya, Poland, Russia (in the Baltic Sea and in the Black Sea), Spain and Ukraine.

What's next: provide a new update in 2019.

Cables

What's new: the dataset has been updated. Compared with the previous version, this version includes the gigabit per second values that come from the Cable System Database of the Packet Clearing House Organisation, available online at https://prefix.pch.net/applications/cablesystem/.

What's next: provide a new update in 2019.

Pipelines

What's new: this is a completely new dataset created in 2017 and made available early in January 2018. It is the result of the aggregation and harmonization of datasets provided by several sources from all over the EU (plus Norway). The database contains lines representing the actual routes of offshore pipelines (where available) in the following countries: Croatia, Denmark, Estonia, Finland, Germany, Ireland, Netherlands, Norway, Poland, Russia, Spain (Andalucía).

What's next: the dataset is incomplete, as many countries do not make available these data for security reasons. It is unlikely it will ever be complete, unless the legislative framework changes. However, the dataset will be updated as soon as additional data are available.

Major ports

What's new: the dataset has been updated with 2017 data from Eurostat.

What's next: provide a new update in 2019 with 2018 data.

Major ports – waste collected

What's new: this is a new dataset and an extensive research of data sources is being carried out. Contacts have been established with EMSA, DG MARE and DG MOVE in order to get access to MARPOL information. DG-MOVE suggested a contractor that carried out a study on waste in ports. The contractor sent a list of contacts, some suggested by ESPO. In parallel, direct contacts have been made port by port in order to get access to the information. Authorisations by individual ports were obtained but data available were off-date (2014-2015) compared to the information provided by individual ports (from 2016 onwards).

A partial dataset was released in 2018.

What's next: Provide a new update in 2019 to complete dataset coverage and include 2017 data.

Spatial planning zones

What's new: all national authorities in charge of MSP have been contacted. Data have been obtained from Belgium and Mecklenburg Vorpommern Federal State (Germany), Denmark, Spain and Lithuania have indicated that they do not envisage to have data available until 2021. A complete round of contacts with the Member States provided a tentative calendar for MSP publication.

The Belgium MSP has been harmonized using the MSP directive categories. A working document has been prepared for the Belgium MSP authorities explaining the rationale for re-labelling the 32 uses of the plan into the 12 categories of the EU directive. Once the Belgium authorities validate the process the dataset will be released. A similar document is under preparation for Germany.

What's next: release a dataset in 2019.

WP 3 – Data Harmonisation

Generally speaking, data harmonisation procedures have remained the same for all datasets, with only few exceptions.

"Pipelines" is a new dataset, and information from different sources has had to be harmonised so to create a common data model. Each pipeline has now the following harmonised attributes (where available): status (in service, decommissioned, under construction, proposed, planned), country, code, name, year, medium (air, condensate, 'control', cooling water, gas, geothermal heating, glycol, methanol, oil, sewage, water), operator, from and to locality or facility, length (metres) and size (inches). It should be noted that when a pipeline crosses more than a country, it may appear as two different pipelines which do not perfectly overlap. This is because it was not possible to harmonise the geometric component of the data,

as each source reports a slightly different pipeline's path and there is no way to know which is more accurate.

"Freshwater aquaculture" is also a new dataset and includes data from 10 EU MS (Austria, Bulgaria, Denmark, Greece, Ireland, Poland, Slovenia, Spain, UK-Scotland and Czechia) and Norway, thus making 11 different sources. The preparation of this new dataset involved important data harmonisation work, including transposition of data into a dataset format, translation and harmonisation of species names, production stages and farm types, creation of geodatabase entities from Excel and CSV files and conversion of all entities into WGS 84 SCR.

Furthermore, a significant harmonisation effort is required for the new dataset on Maritime Spatial Planning. The protocol designed requires re-labelling uses identified at Member State level according to the uses defined in the MSP directive. To ensure the quality of the process, it has been agreed with the MSP Managing Authorities that they will validate a beta version of the dataset before it is released on the portal.

Most importantly, we have analysed all current EMODnet dataset models, comparing them with INSPIRE Application schemas and feature types and searching for closest matches, so as to understand to what extent EMODnet data models are compliant with INSPIRE. A result of this analysis was attached to the Interim Report of 2017.

The next step will be to cross-check the results of this analysis with the INSPIRE working group and decide if and how EMODnet data models can be modified without altering the information provided.

WP4 - Design of the GIS database

In the second phase of EMODnet Human Activities the design and implementation of the geographical database aimed to improve the representation of data, as well as the management and the feeding of the database. In the current phase, there are 16 populated data themes, each organized in one or more geodatabases with their spatial domain and coordinate system (WGS84). Each geodatabase is storing one or more feature classes, tables and relationship classes (if required).

The schemas developed for each geodatabase define not only the physical structure of the database, but also the geometry types (points, polygons, lines), rules, relationships, properties of each dataset, and field types (text, double, short or long integer).

Based on our previous experience, population and harmonisation of the database have been improved by using standardised attributes for both the mandatory fields specified in the Tender Specifications and the additional attributes that are continuously updated.

Once the database schemas had been defined, we have edited the data collected harmonising mandatory and additional attributes. Data have been uploaded into each geodatabase after the harmonisation process. Harmonisation mainly consist of projecting raw data in a common coordinate system, editing the attributes of collected shapefiles or tables, and calculating common numeric values like the distance to coast. This procedure has made it possible to feed the database without modifying its schema as we did in the past.

16 data themes are currently populated with vector data of one or more geometry types. Each feature class is a collection of geographic features that share the same geometry type (such as point, line, or polygon) and the same attribute fields for a common area.

Generally speaking there are two ways to organise feature classes:

1. E.g. in the case of Hydrocarbon Extraction, after the harmonisation process, data were loaded in their feature class (boreholes or platforms, both point type) where they are automatically organised according to fields properties and several coded values domains.
2. E.g. In the case of Major Ports Traffic, given the amount of information contained in each related table (passengers, goods and vessels traffic) it was decided to keep the geometric (i.e. points representing main ports) and the alphanumeric (i.e. tables containing attributes) components separate. Subsequently, through a relationship class (one-to-many) it was possible to correlate the geometric and the alphanumeric component using a common key field.

A shapefile version of each geodatabase dataset has also been made available, so as to make it easier to read and write geographical datasets using the EMODnet Human Activities data with a wide variety of software.

WP 5 – Population of the database

The following datasets have been uploaded:

- Aggregate extraction
- Macroalgae (seaweed)
- Microalgae
- Dredging
- Lighthouses
- Wrecks
- Submerged Prehistoric Archaeology and Landscapes
- Natura 2000 areas
- Nationally Designated areas (CDDA)
- State of bathing waters
- ICES Statistical Areas
- FAO Fishery Statistical Areas
- Fish Catches by FAO Fishery Statistical Areas
- Monthly first sales of fish
- Active licences (hydrocarbon extraction)
- Boreholes (hydrocarbon extraction)
- Offshore installations (hydrocarbon extraction)
- Main ports (passengers, goods, vessels traffic)
- Waste in ports (Main ports)
- Finfish production (aquaculture)
- Freshwater production (aquaculture)
- Shellfish production (aquaculture)
- Project locations (ocean energy)
- Test sites (ocean energy)

- Advisory councils
- Exclusive Economic Zones
- International conventions
- Maritime boundaries
- Telecommunication cables (schematic routes)
- Telecommunication cables (actual route locations)
- Cable landing stations
- Pipelines
- Dredge spoil dumping
- Dumped munitions
- Wind farms (points and polygons)
- Vessel density

WP 6 – Maintenance of the portal

Content: Textual content was updated to reflect the new contract.

LiveChat: Implementation of LiveChat and associated mobile and desktop help software to allow instant communication with users. LiveChat is available on all pages within EMODnet Human Activities. The Help desk is manned Monday through Friday during business hours, apart from public holidays in Italy. In this case a user can leave a message via the live chat software where a standard holding response will be generated.

WFS/WMS: Web Feature Services (WFS) were migrated from MapServer to GeoServer to allow greater compatibility with the central portal. WFS for Main Ports and Fish Sales (previously unavailable) were also published. Information pages were updated with WFS link examples (e.g. Filtering).

Web Map Services (WMS) were made available through GeoServer. Example links and code to implement in OpenLayers were made available in the information pages.

Piwik/Matomo: Matomo (formerly known as Piwik) was implemented to allow a centralised version to monitor web statistics. TrustIT have been given access.

Revamped Website: New style guidelines have been implemented to the map, search and information pages.

Map viewer: new features implemented:

- Search facility
- Tool to capture features and download tabular data: users are now allowed to draw a rectangle on the map and download all the features in it in tabular format.
- Print tool: it is now possible to print the map as currently viewed by a user. The tool makes it possible to add a title, a legend and any other comment.
- Layer transparency can now be adjusted for polygon layers.
- Improved display of tool and base map selection buttons.

Next steps:

- Implementation of WCS to serve the density maps.
- Implement INSPIRE plugin in GeoServer to facilitate metadata links in GetCapabilities request

WP 7 – Development of data products

Vessel density maps are the only data product developed by EMODnet Human Activities. Their development was the result of a fairly complex process, with a number of challenges.

A set of AIS data had to be purchased from CLS, a commercial provider. The data consists of messages sent by automatic tracking system installed on board ships and received by terrestrial and satellite receivers alike. The dataset covers the whole 2017 for an area covering all EU waters.

Figure 1 – Vessel density maps: area of interest

The area of interest (AOI) was defined based on the spatial extent of the MSFD marine subregions shapefile (the MSFD marine regions shapefile is not usable) and according to the spatial extent of the MSFD_areas_v1_201403 layer. We obtained the current AOI (without land) by intersecting the AOI polygon layer with the polygons of the European coastline and the polygons of the world countries shapefile at 1:1 Million scale available on GISCO. Both datasets are provided by the EEA. It was necessary to complete the EEA coastline polygon by adding the missing land of Greenland and remote Russian regions from the GISCO dataset. Once all layers were re-projected into the ETRS89-LAEA Europe projected coordinate system, we erased land areas from the whole AOI. The final AOI covers all EU waters and does not include land areas.

A partial pre-processing of the data was carried out by CLS, based on instructions received from the Human Activities team:

- The only AIS messages delivered by CLS were the ones relevant for assessing shipping activities (AIS messages 1, 2, 3, 18 and 19). This helped reduce the number of messages to be processed in the subsequent steps.
- The AIS DATA were down-sampled to 3 minutes; this also helped reduce the number of messages to be processed considerably.

- Duplicate signals were removed
- Wrong MMSI signals were removed
- Special characters and diacritics
- Signals with erroneous speed over ground (SOG) were removed (negative values or more than 80 knots)
- Signals with erroneous course over ground (COG) were removed (negative values or more than 360°)
- A Kalman filter was applied to remove satellite noise. The Kalman filter was based on a correlated random walk fine-tuned for ship behaviour. The consistency of a new observation with the modelised position is checked compared to key performance indicators such as innovation, likelihood and speed.
- A footprint filter was applied to check for satellite AIS data consistency. All positions which were not compliant with the ship-satellite co-visibility were flagged as invalid.

The AIS data were converted from their original format (NMEA) to CSV, and split into 12 files, each corresponding to a month of 2017. Each month starts from the last day of the previous month and ends with the first day of the following month.

Upon importing the data into a database, it emerged that some messages still contained invalid characters. This is a common issue known to everyone working with AIS data; certain fields of an AIS message are inputted manually by the crew, and so are easily prone to errors. By running a series of commands from a Linux shell, all invalid characters were removed.

The data – approximately 1.9 billion records after pre-processing – were then imported into a relational database. Some MMSI numbers are associated to more than a ship type during the year. In principle, this is not an anomaly, as the MMSI number is associated to a device and not to a ship, and the device can be moved from one ship to another. However, in some cases, MMSI numbers changed repeatedly during the year, which is more unlikely. In these instances, we attributed to an MMSI the most recurring ship type.

There is a field in AIS messages that indicate ship type. Because a wide number of ship types are admitted, we created macro-categories, as per the table overleaf.

Table 1 EMODnet and AIS ship types

EMODnet Ship Type	AIS Ship Type Code	AIS Ship Type Description
Other	0	Not available
	1	Reserved for future use
	2	Reserved for future use
	3	Reserved for future use
	4	Reserved for future use
	5	Reserved for future use
	6	Reserved for future use
	7	Reserved for future use
	8	Reserved for future use
	9	Reserved for future use
	10	Reserved for future use
	11	Reserved for future use
	12	Reserved for future use
	13	Reserved for future use
	14	Reserved for future use
	15	Reserved for future use
	16	Reserved for future use
	17	Reserved for future use
	18	Reserved for future use
	19	Reserved for future use
	20	Wing in ground (WIG), all ships of this type
	21	Wing in ground (WIG), Hazardous category A
	22	Wing in ground (WIG), Hazardous category B
	23	Wing in ground (WIG), Hazardous category C
	24	Wing in ground (WIG), Hazardous category D
	25	Wing in ground (WIG), Reserved for future use
	26	Wing in ground (WIG), Reserved for future use
	27	Wing in ground (WIG), Reserved for future use
	28	Wing in ground (WIG), Reserved for future use
	29	Wing in ground (WIG), Reserved for future use
	34	Diving ops
	38	Reserved
	39	Reserved
	56	Spare - Local Vessel
	57	Spare - Local Vessel
	59	Noncombatant ship according to RR Resolution No. 18
	90	Other Type, all ships of this type
	91	Other Type, Hazardous category A
	92	Other Type, Hazardous category B
	93	Other Type, Hazardous category C
	94	Other Type, Hazardous category D
	95	Other Type, Reserved for future use
	96	Other Type, Reserved for future use
	97	Other Type, Reserved for future use
	98	Other Type, Reserved for future use
	99	Other Type, no additional information
	100-255	Not available (local coding system)
Fishing	30	Fishing
Service	50	Pilot Vessel
	51	Search and Rescue vessel
	53	Port Tender
	54	Anti-pollution equipment
	58	Medical Transport
Dredging or underwater operations	33	Dredging or underwater ops

EMODnet Ship Type	AIS Ship Type Code	AIS Ship Type Description
Sailing	36	Sailing
Pleasure craft	37	Pleasure Craft
High-speed craft	40	High speed craft (HSC), all ships of this type
	41	High speed craft (HSC), Hazardous category A
	42	High speed craft (HSC), Hazardous category B
	43	High speed craft (HSC), Hazardous category C
	44	High speed craft (HSC), Hazardous category D
	45	High speed craft (HSC), Reserved for future use
	46	High speed craft (HSC), Reserved for future use
	47	High speed craft (HSC), Reserved for future use
	48	High speed craft (HSC), Reserved for future use
	49	High speed craft (HSC), No additional information
Tug and towing	31	Towing
	32	Towing: length exceeds 200m or breadth exceeds 25m
	52	Tug
Passenger	60	Passenger, all ships of this type
	61	Passenger, Hazardous category A
	62	Passenger, Hazardous category B
	63	Passenger, Hazardous category C
	64	Passenger, Hazardous category D
	65	Passenger, Reserved for future use
	66	Passenger, Reserved for future use
	67	Passenger, Reserved for future use
	68	Passenger, Reserved for future use
	69	Passenger, No additional information
Cargo	70	Cargo, all ships of this type
	71	Cargo, Hazardous category A
	72	Cargo, Hazardous category B
	73	Cargo, Hazardous category C
	74	Cargo, Hazardous category D
	75	Cargo, Reserved for future use
	76	Cargo, Reserved for future use
	77	Cargo, Reserved for future use
	78	Cargo, Reserved for future use
	79	Cargo, No additional information
Tanker	80	Tanker, all ships of this type
	81	Tanker, Hazardous category A
	82	Tanker, Hazardous category B
	83	Tanker, Hazardous category C
	84	Tanker, Hazardous category D
	85	Tanker, Reserved for future use
	86	Tanker, Reserved for future use
	87	Tanker, Reserved for future use
	88	Tanker, Reserved for future use
	89	Tanker, No additional information
Military and law enforcement	35	Military ops
	55	Law Enforcement
Unknown	Error (-1)	

The subsequent step consisted of creating points representing ship positions from the AIS messages. This was done through a custom-made script for ArcGIS. Another custom-made script reconstructed ship routes (lines) from the points, by using the MMSI number as a unique identifier of a ship. Rather than recreating the whole route of a ship, however, what the script did was to create a line for every two consecutive positions of a ship. In addition, for each line the script calculated its length (in km) and its duration (in hours) and appended them both as attributes to the line. There is an important exception,

though: if the distance between two consecutive positions of a ship was longer than 30 km or if the time interval was longer than 6 hours, no line was created. This was a necessary precaution, because in many cases a ship might stop sending messages while on voyage, and then start again after days. As can be grasped intuitively, interpolating the data in such cases would have produced inaccurate results and implausible routes. On the other hand, the interpolation method adopted – i.e. creating a line only between two consecutive positions of a ship and not for her whole route – produced better, more accurate results.

Both datasets (points and lines) were projected into the ETRS89/ETRS-LAEA coordinate reference system, used for statistical mapping at all scales, where true area representation is required (EPSG: 3035).

At this point, a grid had to be created for our area of interest. We started from the EEA's national grids for two reasons:

1. The grids are based on the recommendations from the 1st European Workshop on Reference Grids in 2003 and are compliant with INSPIRE geographical grid systems;
2. The grids are based on an equal area projection, and so are suitable for generalising data, statistical mapping and analytical work whenever a true area representation is required.

The EEA's country grids sometimes overlap each other and do not fully cover the AOI. So, it was necessary to merge all the national grids and extend the result to the whole AOI envelope. The obtained grid fully corresponds to and exactly overlaps the cells of the merged EEA national grids. Only the cells that have their centroid in the AOI or are within an inner buffer of 200 metres from the AOI borders were selected. The 200-metre inner buffer was set to (i) avoid loss of the data along the coastline, to (ii) limit calculation only to available cells and to (iii) filter out wrong messages located onshore. The grid is made up of approximately 21 million cells, each measuring 1km*1km.

The lines obtained through the ArcGIS script were then intersected with the grid. Because each line had length and duration as attributes, it was possible to calculate how much time each ship spent in a given cell over a month. This is a distinctive feature of our method; when a line crossed two or more cells of the grid, we were able to establish how much time the ship spent in each cell, by calculating the length of the line segment that crossed a cell, dividing it by the total line length, and multiplying it by the total line time. Density is thus expressed in hours per square kilometre per month.

For each cell of the grid, we then summed the time value of each "segment" in it, thus obtaining the density value associated to that cell.

The final step consisted in creating raster files from the vector data. With 14 ship types (including 'all ship types') multiplied by 12 months, we had 168 raster files. Then we added 14 more raster files (one per each ship type) with average density values over the whole year. What is called 'vessel density map' is in fact a set of 182 different maps.

The process to create the maps was quite challenging, mostly because of the large amount of data to be processed and the intensive computational requirements due to the complexity of the method. A dedicated machine had to be set up with an Intel Xeon W-2155 10 Cores 3.30GHz CPU and 32 GB RAM. Several pieces of software had to be used (Linux shell, PostgreSQL, PostGIS, ArcGIS and QuantumGIS), each dealing with a specific step of the method, and custom-made scripts had to be developed to speed

up the calculations. The method used to calculate vessel density is completely original and was developed by the Human Activities team together with the JRC.

Vessel density maps are by far the most requested dataset by users, according to a survey carried out in the previous EMODnet phase. Making them available for free on the portal might increase EMODnet's visibility considerably. The maps are due to go live on 11 March 2019, after an aggressive communication campaign conducted under the auspices of the Secretariat.

WP 8 – Involvement of regional sea conventions

The objective of this WP is to ensure maximum coherence with data delivery to and from Regional Sea Conventions. To do so, a structured form of cooperation with RSCs has been established. Overall, four meetings took place between the Human Activities team and each organisation representing a Regional Sea Convention. The main issues discussed concerned the progress of EMODnet Human Activities and what actions should be taken to ensure that our project is consistent with and can support the work of RSCs, especially in the framework of the MSFD process. Further to the meetings, an action plan will be developed to outline what measures are to be taken to ensure data flow to and from RSCs.
Two more meetings are envisaged during the project to assess the degree of implementation of the actions decided during the previous meetings.

The Bucharest Convention
The Black Sea Commission collects data from contracting parties and harmonises them. There might be issues when it comes to sharing data with EMODnet, as approval from contracting parties is requested. Vessel density, waste disposal, aquaculture and protected areas were identified as the EMODnet datasets most relevant to the work of the Black Sea Commission. The Black Sea Commission committed to inviting a representative of the Human Activities team to their future meetings, so as to better coordinate the two initiatives.

The Helsinki Convention
CETMAR introduced EMODnet to HELCOM at their headquarters in Helsinki in December. The topics addressed during the meeting were: (i) introduction of EMODNet – Human activities (HA) datasets; (ii) assessment of the portal (overall and for specific datasets); (iii) synergies exploration for EMODnet and HELCOM. The overall conclusions of the meeting were very positive, remarking further collaboration in the datasets related to dredged material, cable and pipelines, wind farms, maritime spatial planning.

The OSPAR Convention
OSPAR has been cooperating with EMODNet Human Activities since 2014. During the meeting they suggested we try and add location of turbines to our wind farms data, and update our dataset on munitions dumpsites with OSPAR's latest data. OSPAR are very interested in the forthcoming vessel density maps and would like to liaise with the Human Activities team to share insights on methods. The cables dataset is also of the utmost interest, as OSPAR do not have this type of data. In 2018, OSPAR will start working on the Quality Status Report 2023 and will use EMODnet Human Activities' data. Cooperation will be sought also to improve compliance with INSPIRE.

The Barcelona Convention

The Convention Secretariat has not used EMODnet Human Activities much until now, although they have been using other EMODnet Portals for quite some time. During the meeting they recognised that several datasets (notably protected areas, hydrocarbon extraction, waste disposal and the forthcoming dataset on MSP) offered by Human Activities are very relevant to their work. The Secretariat also presented their new platform InfoMAP, which will provide marine data relevant to the Convention. The platform is currently at a pilot stage.

New meetings will take place in 2019.

WP 9 – Analysis of standards and protocols used by non-EU organisations

The Tender Specifications call for an analysis of standards and protocols used by non-EU organisations, particularly those based in countries such as Australia, China, India, Japan and the United States, which operate significant ocean observation programmes.

Only two initiatives have been found worldwide, which are similar in scope to EMODnet Human Activities: the Marine Cadastre in the US and the South Ocean Observing System in Australia. Basic data on both initiatives are provided in Annex to this report.

WP 10 – Monitoring of effectiveness in addressing users' needs

Originally, it was envisaged to run a user survey towards the end of the second year of the project. However, at least two user surveys were also run by the EMODnet Secretariat and Deloitte in the same period. Therefore, it was decided that running yet another survey might have been counterproductive, because some users would have had to answer to similar questions three times.

Instead of a user survey, the Human Activities team decided to have a closer look at the reasons why some users downloaded the data. Priority was given to businesses, especially SMEs, as they can be perfect examples of how homogeneous and interoperable marine data may yield tangible benefits for the blue economy.

Since May 2018, users who download Human Activities data have been requested to fill out a form and leave an email address. As of February 2019, 31.5% of users are from industry. Initial contacts have made it possible to write 3 use cases:

- **Biosfera XXI** is a small yet experienced Spanish company, specialised in providing services focused on environmental planning, assessment and risk to both national and international projects. The company has been using EMODnet data since 2016 to separate the locations of cable installation from areas of human activities, mainly for its marine projects, in particular, the environmental impact assessment project "The electricity interconnection across the Biscay Gulf". This project consists of creating an electricity interconnection across the Bay of Biscay between the French and Spanish electricity grids. It was designated by the European Commission and the European Parliament as a 'Project of Common Interest' (PCI) within the framework of the European

regulations on Trans-European energy infrastructure (347/2013) since it poses a challenge for France, Spain and Europe in the achievement of their goals towards energy transition.

Coherent, harmonised, precise and high-quality data allows them to make informed decisions and save time and money: "*Without EMODnet, our project would last 15-20% longer, it provides complex data in a simple and easy-to-understand way. It is beneficial that all EU countries use the same data*" says Marina Fuertes, Consultant from Biosfera XXI.

- **Cathie Associates** is a leading international geoscience and geotechnical engineering consultancy providing bespoke and objective solutions to the offshore and near-shore oil, gas and renewable energy industries. For over 50 technical experts, operating from offices across Europe (Belgium, France, UK, Germany and Italy) and the USA (Boston and Houston), EMODnet Human Activities database has become an important addition, especially in their early phases, to current projects and tenders, with cables, pipelines and hydrocarbon extraction being the main data sets downloaded.
  Cathie Associates explains that "*The advantage of using EMODnet data is that it helps in double checking the data supplied by others and in consolidating all the information*", thus reducing time and costs and enabling users to become more efficient, provide better services and remain competitive in the market.

- **HeraSpace** is a multi-award-winning British start-up which uses oceanographic data such as Copernicus satellite and Copernicus Marine Service global ocean model, crowd-sourcing, EMODnet Human Activities' data, and a top-notch machine-learning neural network with the aim to develop a unique tracking fish distribution system in order to empower fishermen to locate the most profitable and sustainable fishing grounds, so as to optimise their operative budgets. The company used EMODnet Human Activities as a data source to feed their neural machine-learning algorithm, which has been designed within the European Space Agency Business Centre in Madrid. The goal is to avoid that vessels might fish in vulnerable or restricted areas, by detecting their coordinates and excluding them from the predictions. With the release of the vessel density maps, the algorithm will produce even better results.
  Transparency throughout the whole process is guaranteed by the use of the blockchain technology, the same used for cutting-edge electronic currencies like Bitcoin. HeraSpace supports sustainable fisheries management practices and the recovery of fish stocks. In the words of Isaac Durá, founder and CEO, this sustainability aspect was further strengthened through data on human activities provided by EMODnet, which added key value to the solutions developed.

Furthermore, other non-user-specific case studies are:

- EMODnet Human Activities has recently created a dataset on **offshore pipelines**. Albeit incomplete, the dataset shows the true potential of EMODnet. Pipeline infrastructures laying on the seabed are extremely useful since they convey oil or gas from subsea wells to platforms. At the same time, they may be dangerous because spills or leaks could pose huge risks to marine and maritime ecosystems. Especially when a pipeline needs to be installed and its route must be traced, data on seabed topography, obstructions, debris, existing pipeline/cable crossing and other human activities, are essential to mitigate risks, to reduce time and costs. Datasets are being continually integrated, but they provide great part of the initial information needed to commence work and are available for free.

- The lack of data characterizing seabed pipeline infrastructures is as well a common variable **to offshore installations** specialised in **oil and gas exploration ad extraction**. The EMODnet human activities team therefore undertook a major effort to develop a **digital map** of **boreholes, licences and offshore structure** and classify them according to their operator, their purpose (exploration, exploitation) and their status (active, abandoned) and (where known) the type of hydrocarbon. This involved contacting the competent authorities, cross-checking data and translating national or corporate descriptions into a common set of attributes and geographical coordinates. The result has become a reference dataset that is now used by representatives of the industry themselves and other stakeholders for spatial planning, for environmental impact assessments and for emergency management.

Several companies, according to their statements, have used EMODnet's data to study new opportunities, analyse risks and plan investments in marine areas, especially in the fields of offshore wind energy and cable laying. This is the case of EU businesses and overseas large companies such as Adani Power (India), TE Subcom (United States), etc.

In some cases, the data were used in the framework of other projects funded or partly funded by the EU to reach its policy goals.

It may be also interesting to look at data usage from extra-EU companies. While most downloads are from EU Member States, companies from at least 11 extra-EU countries (Canada, China, Dominican Republic, India, Norway, Pakistan, Russia, Senegal, South Korea, Switzerland, United States) also downloaded the data, most certainly because they operate or would like to operate in the EU.

WP 11 – Setting-up and operation of a help-desk

A help-desk service was set up shortly after the signature of the contract. Currently, it is possible to request help via email, telephone or live chat. The telephone and live-chat help-desk services are manned Monday through Friday during business hours. While initially users seemed to still prefer email, the number of requests for help via live chat has increased steadily over time. No user has ever requested help via telephone. E-mail requests are generally addressed with 1.5 half days; telephone and chat requests are addressed in real time.

WP 13 – Dissemination and communication

A detailed Dissemination and Communication plan has been drafted. It analyses the opportunity and feasibility of further improving the current layout of the portal, identification, and selection of additional communication channels (print media, news and communications agencies, social media, audio-visual media, and specialized websites), identification and selection of sector events where EMODnet Human Activities may be promoted, and creation of synergies with national and regional initiatives and events. Furthermore, the content of the Human Activities section in the EMODnet general portal, the "About" section in the EMODnet Human Activities portal, and EMODnet general brochure have been updated so as to reflect the objectives and characteristics of the new phase of EMODnet.

Furthermore, since the blog section has proved to be an effective tool to increase the visibility of the project, posts related to topics covered by EMODnet Human Activities have been published regularly (2 blogs per month), in accordance with a plan that covers the entire duration of the project.

An address list with potential users has been updated on a regular basis and mass mails were circulated about the special events organised by the EMODnet team (e.g. Open Sea Lab).

Similar activities (2 blogs monthly, updates of address list, coverage in Eurofish Magazine, mass mails, general updates on portal and brochures, distribution of promotional materials on fisheries and aquaculture related events which Eurofish attends) are planned to be continued in 2019.

Specific events where EMODnet HA was promoted;

- Cogea had a stand at the European Maritime Day in Poole (2017) and Burgas (2018) where live demonstrations of EMODnet Human Activities were given to users.
- AZTI presented poster in the 'COAST Bordeaux 2017' congress. This international symposium on 'Systemic and Biodiversity Evolution of Marine Coastal Ecosystems under the Pressure of Climate Change, Natural and Anthropogenic Local Factors', was held in Bordeaux (France) from 7-10 November 2017.
- Article on EMODnet Open Sea Lab in the Eurofish magazine No 5. (October 2017 – 5000 copies)
- Eurofish had a stand at the Icelandic Fisheries Exhibition & Conference (promotional materials), September 13-15, 2017
- CETMAR had a poster and a Platform showcase at the "Providing Tools for Improving the Competitiveness of the Seafood Sector" PrimeFish Annual Conference held in Vilanova, Spain, April 4-5 2017.
- DanFish / DanAqua, Aalborg, Denmark, Exhibition of equipment for the fishing industry, seminars & workshops (promotional materials), September 28, 2017
- Madrid, Spain; conference on value addition opened with session on innovation organized by Eurofish (promotional materials), November 2017
- Eurofish hold a presentation about EMODnet HA at its annual Governing Council, February 2018
- Opportunity to promote EMODnet through channels (social media, news) of the Black Sea Commission was developed by Eurofish
- The work on the density maps was presented at a workshop on big data in the maritime domain organized by the NATO/CMRE in La Spezia (Italy) in May 2018.
- An EMODnet day was organised in Trieste (Italy) on 8 June 2018.
- AZTI presented a poster in the '6th International Symposium of Marine Science' (ISMS2018). This symposium was held in Vigo (Spain), from 20 – 22 June 2018.
- AZTI presented a poster in the '4th Blue Planet Symposium'. This international symposium was held in Toulouse (France), from 4 – 6 July 2018.
- The work on aquaculture was presented at the Aquaculture Advisory Council meeting in Brussels in October 2018.

- The work on algae production was presented at the first meeting of the Blue Bioeconomy Forum in Amsterdam in December 2018, and at a workshop on algae organized by the JRC in Brussels in February 2019.

7 User Feedback

Date	Organisation	Type of user feedback (e.g. technical, case study, etc.)	Response time
17/5/2017	Marum	How to cite EMODnet	Ca. 30 minutes
15/6/2017	Metocean	Technical	1 day
26/6/2017	Aquatt	Copyright	Ca. 30 minutes
28/7/2017	Heraspace	Technical: enquiry on how to use fisheries and marine protected areas for a project proposal	2 days
11/9/2017	IESE	Enquiry on missing data on shellfish aquaculture in Galicia (new source proposed)	Same day
19/9/2017	Stockholm Resilience Centre	Technical (enquiry on how to use data on aggregates extraction)	Same day
10/1/2018	JRC	Methodological- collaboration on vessel density map	1 day
24/1/2018	EMODnet Secretariat	A series of issues were reported: • It seems that WFS and WFS services are down (issue was solved immediately) • When you open the map viewer from EMODnet central portal and you open it for the first time you have always a warning: "Warning: Cannot modify header information- headers already sent by (output started at E:\WEBROOT_subroot1\emodnet\view-data.php:101) in E:\WEBROOT_subroot1\emodnet\blog\wp-content\plugins\cleantalk-spam-protect\cleantalk.php on line 183 (*issue was solved immediately*)" • I would like to use your OGC web services in my service. Would it be possible to use www.emodnet-humanactivities.eu/geoserver/emodnet/wfs instead of http://77.246.172.208/... We are not supposed to use IP addresses in our system. • I have noticed that the WMS service is blocked when I do a getmap request (connexion refused in QGIS). Why? Getcapa works fine.	Same day
25/1/2018	Unknown	Technical: he couldn't open the downloaded dataset without a GIS Software. An excel file with the required dataset was sent to him via mail	Same day

Date	Organisation	Type of user feedback (e.g. technical, case study, etc.)	Response time
14/2/2018	University of Stirling	Technical: he couldn't open the downloaded 7-Zip file. An unzipped file with the required dataset was sent to him via live chat.	Same day
27/3/2018	Hartley Anderson-environmental consultancy	It was reported that some UK platforms that should be west of Shetland and in Norwegian waters *(OSPAR, the primary source was informed of this issue that will be dealt with in their next update)*	Same day
31/5/2018	N-SEA	Technical: problem with downloading data	Instant (live chat)
31/5/2018	DLR	Restrictions to use of data	Instant (e-mail)
13/6/2018	ISMAR	Technical: problem with downloading data	Instant (live chat)
19/6/2018	Private individual	Technical: problem with downloading data	Instant (live chat)
26/6/2018	ISMAR	Request for a special layer- Marine traffic density map 2015- which is published on the EU Atlas (is was explained that HA is not a partner of the EU Atlas and that the traffic density map will be available on the HA Portal in the coming months)	Instant (live chat)
27/6/2018	Private individual	Question about the possibility to select a specific area and have all the human activities information related to that area (it was explained that this feature will be introduced in the coming months)	Instant (live chat)
28/6/2018	WindWISDEM	Question about the possibility to see latitude and longitude for the turbines in a wind farm from the map (it was answered that we haven't yet implemented this feature, but it is in the pipeline. For the moment you have to download our data and open it with a GIS Software and explained that we don't have latitude and longitude of turbines, only of farms. Farms are represented as polygons in some countries and as points in some others, this depending on the data source providing the data.	Instant (live chat)
16/7/2018	Private individual	Question about the possibility to select a specific area and have all the human activities information related to that area (it was explained that this feature will be introduced shortly)	Instant (live chat)
01/8/2018	Private individual	Requested for a shapefile of a single offshore wind turbines for the Netherlands. It was explained that Human Activities portal provides only points and polygons of farms, not turbines (our source for the Netherlands (OSPAR) do not provide us with this information)	Instant (live chat)

Date	Organisation	Type of user feedback (e.g. technical, case study, etc.)	Response time
04/8/2018	Brockman Consult	Question about the possibility to get dredging dataset in number and not text format.	Instant (live chat)
26/9/18	Smartbay	File with updated information on wind farms has been sent via Live Chat.	Instant (live chat)
10/9/2018	Wind Europe	Request for more information on coordinate system that is used by HA (wind farms dataset)	Instant (live chat)
22/10/2018	Stockholm University	Question about the possibility to get the shapefile for a shellfish dataset (on the HA website you can download a geodatabase). The shapefile was sent immediately	Instant (live chat)
25/10/2018	Sea Teach Charter & Sea School	Problems with opening the downloaded file with the data on main ports (the version available to download on the HA website is compressed in .7z). A zip version of the archive was sent.	Instant (live chat)
06/11/2018	Private individual	Question about the measure in which distance from coast is expressed (meters or miles).	Instant (live chat)
13/11/2018	Cetus Innovate Limited	Request for information on wrecks in Menorca Channel between Mallorca and Menorca. It was explained that our dataset on wrecks is very limited and it was advised to consult the EMODnet Bathymetry portal.	Instant (live chat)
13/11/2018	University of York / H2020 Pericles	PERICLES is a project on maritime cultural heritage. The deputy coordinator reached out to establish a form of cooperation, so to exchange data layers	Instant (live chat)
15/01/2019	Private individual	The user asked the source of a waste disposal site.	Instant (live chat)
21/02/2019	Private individual	The users requested assistance to process the data with their GIS software.	Instant (live chat)
25/02/2019	Private individual	The user is working on a project to build an app based on data on lighthouses. They asked how to use web services to as to link their app to our database.	Instant (live chat)
25/02/2019	Private individual	The user asked information about the coverage of the aquaculture datasets.	Instant (live chat)

Date	Organisation	Type of user feedback (e.g. technical, case study, etc.)	Response time
26/02/2019	Private individual	The users requested assistance to process the data (wind farms) with their GIS software.	Instant (live chat)

8 Meetings held/attended since last report

Date	Location	Type event (meeting, training (workshop), etc.)	Attended (A) / Organised (O)	Short description and main results (# participants, agreements made, etc.)
04/05/2017	Rome	Internal kick-off meeting	O	The purpose of the meeting was to kick-off the project and organise the internal work.
23/05/2017	Bruxelles	EMODnet kick-off	A	EMODnet kick-off meeting
20-21/06/2017	Marne-la-Vallee (France)	INSPIRE Extension workshop	A	(http://www.eurogeographics.org/content/workshop-inspire-extension-june-2017)
05-06/07/2017	Genova (Italy)	Technical working group meeting	A	The EMODnet Ad Hoc Technical Working Group supports the technical implementation of the EMODnet Central Portal.
07/09/2017	Bruxelles	Shipping density maps from AIS signals	A	The aim of this meeting was to discuss the preparation of vessel density maps by Human Activities
13-15/09/2017	Rome	8th EMODnet Steering Committee Meeting	A	The aim of this meeting was to revise progress and set the priorities for future developments
22-23/09/2017	Antwerp	OpenSeaLab Kick-off event	A	A presentation of EMODnet HA potential and actual use cases was given at OpenSeaLab kick-off event
04-06/10/2017	Bruxelles	FAO-COST workshop algae production	A	EMODnet HA's work on aquaculture was presented to producers and stakeholders.
12/12/2017	Helsinki	Involvement of Regional Sea Conventions	A	A meeting was organized with the Black Sea Commission to discuss how EMODnet could support their work and vice versa.
22/12/2017	Istanbul	Involvement of Regional Sea Conventions	A	A meeting was organized with the Black Sea Commission to discuss how EMODnet could support their work and vice versa.
16/02/2018	London	Involvement of Regional Sea Conventions	A	External: a meeting was organized with OSPAR to discuss how EMODnet could support their work and *vice versa*.

Date	Location	Type event (meeting, training (workshop), etc.)	Attended (A) / Organised (O)	Short description and main results (# participants, agreements made, etc.)
13-14/03/2018	Portorož, Slovenia	MSP MSEG meeting	A	External: EMODnet Human Activities was presented to the Member State Expert Group on Maritime Spatial Planning. The presentation focused on how the two initiatives could support each other and on the forthcoming dataset on MSP that is being prepared by EMODnet.
20-21/03/2018	Alcudia, Mallorca	Technical Working Group	A	Internal: the TWG discussed the lessons learned from OpenSeaLab and other issues related to technical aspects of the portals
21-23/03/2018	Alcudia, Mallorca	Steering Committee Meeting	A	Internal: The EMODnet Steering Committee meets twice a year to revise progress and set the priorities for future developments.
04/04/2018	Webex	Vessel density maps	A	External: the EU Commission, the JRC and EMODnet Human Activities talked to EMSA about the possibility that EMSA make vessel density maps for EMODnet.
13/04/2018	Webex	Discussion on marine data and INSPIRE	A	External: experiences from various EMODnet portals with INSPIRE were shared with DG Environment and INSPIRE experts to understand how EMODnet's compliance with INSPIRE could be enhanced.
18-19/04/2018	San Sebastian	Internal partners' meeting	O	Participants: Cogea, ANDI, AZTI, CETMAR Eurofish, Lovell Johns Discussion on what have been done so far, what kind of problems have been encountered and what are the next steps. In particular: • Approach to compile the MSP dataset. It was agreed that when a first version of the dataset is ready, it will be submitted to the MSEG on MSP for review (even if we don't need their approval). • New features of the map (e.g. the possibility of drawing a rectangle and download all records related to the features within it, the possibility of zooming in in a certain area by simply drawing a rectangle, the possibility of setting layers transparency) – introduction to be evaluated based on costs and benefits analysis • User survey • It was agreed that as a follow-up to the work done with Regional Sea Conventions, partners will draft a list of actions that they will be responsible for implementing.
05/07/2018	ISPRA	Meeting with the JRC	O	The purpose of the meeting was to define the final method to create the vessel density maps.

Date	Location	Type event (meeting, training (workshop), etc.)	Attended (A) / Organised (O)	Short description and main results (# participants, agreements made, etc.)
08/10/2018	Bruxelles	AAC working group – COPA-COGECA	A	Presentation of the aquaculture dataset and ongoing work for improving its coverage and accuracy to EU aquaculture professional organisations. The interest of the professionals for the portal was confirmed and suggestions to better match with their needs (new datasets, products…) were discussed. Three national organisations proposed their help to improve coverage and accuracy in their countries.
26/09/2018	Bruxelles	Atlas of the Seas Steering Committee meeting	A	EMODnet HA attended the Steering Committee meeting of the Atlas of the Sea.
25/10/2018	Istanbul	34th Regular Meeting	A	Black Sea HA data request presentation to Council members.
13-15/11/2018	Bucharest	Regional Conference	O	http://eurofish.dk/danube-conference/
03-04/12/2018	Copenhagen	7th meeting of the TG DATA	A	Minutes document: TGDATA_7-2018-Minutes_draft.doc
07/12/2018	Amsterdam	Marine Bioeconomy Forum	A	Presentation of the dataset on algae production
27/02/2019	Brussels	Algae workshop	A	Presentation of the dataset on algae production
SUM			**O**	**Total # of meetings organised = 4**
SUM			**A**	**Total # of meetings attended = 21**

9 Outreach and communication activities

Table 2 – List of outreach and communication activities

Date	Communication action/material	Short description (of the material, title, ...) and/or link to the activity	Main results (# participants, # views, # press clippings, etc.)
14/03/2017	Blog	New monthly fish sales dataset http://www.emodnet-humanactivities.eu/blog/?p=235	# of views: 96
04/05/2017	Blog	Update on aggregate extraction data http://www.emodnet-humanactivities.eu/blog/?m=201705	# of views: 60
18-19/05/2017	Conference	Live demonstration of EMODnet Human Activities	N/A
05/06/2017	Blog	Vessel density maps: help us make a difference http://www.emodnet-humanactivities.eu/blog/?p=286	# of views: 295
07/08/2017	Blog	What dredging data is available on EMODnet? http://www.emodnet-humanactivities.eu/blog/?p=354	# of views: 66
21/08/2017	Blog	Looking at EU maritime freight transport countries and ports http://www.emodnet-humanactivities.eu/blog/?p=318	# of views: 185
06/09/2017	Blog	Blowing in the wind, mapping the sea http://www.emodnet-humanactivities.eu/blog/?p=385	# of views: 66
21/09/2017	Blog	Waste disposal at sea: what and where http://www.emodnet-humanactivities.eu/blog/?p=398	# of views: 129
07-10/11/2017	Poster	Poster was presented in the COAST 2017 congress, an international symposium on 'Systemic and Biodiversity Evolution of Marine Coastal Ecosystems under the Pressure of Climate Change, Natural and Anthropogenic Local Factors', held in Bordeaux	N/A
09/10/2017	Blog	Contribution of EMODnet Ocean Energy to Marine Spatial Planning http://www.emodnet-humanactivities.eu/blog/?p=417	# of views: 89
10/10/2017	Eurofish Magazine no 5	Promoting of the OpenSeaLab - A short article on OpenSeaLab created in issue of the Eurofish magazine (October 2017).	N/A
28/11/2017	Blog	Inland aquaculture: a river of opportunities? http://www.emodnet-humanactivities.eu/blog/?p=433	# of views: 37

Date	Communication action/material	Short description (of the material, title, …) and/or link to the activity	Main results (# participants, # views, # press clippings, etc.)
06/12/2017	Blog	Vessel density map: and so it begins! http://www.emodnet-humanactivities.eu/blog/?p=467	# of views: 504
19/12/2017	Blog	Marine aggregate extraction data to support new 2018 MSFD reporting phase http://www.emodnet-humanactivities.eu/blog/?p=497	# of views: 137
18/01/2018	Blog	Marine aquaculture zoning and site selection, contribution of GIS-based tools http://www.emodnet-humanactivities.eu/blog/?p=513	# of views: 163
25/01/2018	Blog	And then there were pipelines http://www.emodnet-humanactivities.eu/blog/?p=533	# of views: 110
01/02/2018	Eurofish's Annual Governing Council	Presentation about EMODnet main activities was presented to the representatives of Eurofish's Contracting Parties and observers from other relevant organisations (the Baltic Sea Advisory Council, FAO, etc.) and countries.	N/A
15/02/2018	Blog	Links between dredge spoil dumping and the marine environment http://www.emodnet-humanactivities.eu/blog/?p=558	# of views: 170
02/03/2018	Blog	The importance of unified co-management of cross-boundary fisheries http://www.emodnet-humanactivities.eu/blog/?p=576	# of views: 62
19/03/2018	Blog	Wild is the Wind: Who is stepping up for offshore wind farms? http://www.emodnet-humanactivities.eu/blog/?p=584	# of views: 57
09/04/2018	Blog	Fishing for data – EMODnet and the oldest maritime activity http://www.emodnet-humanactivities.eu/blog/?p=598	# of views: 39
17/04/2018	Blog	Who watches over our limited small pelagics resources? EMODnet knows! http://www.emodnet-humanactivities.eu/blog/?p=604	# of views: 37
01/05/2018	Blog	EMODnet Human Activities behind the scenes: find out what's next! http://www.emodnet-humanactivities.eu/blog/?p=613	# of views: 67
09-10/05/2018	Participation in a workshop	Work on vessel density map presented at a workshop organised by the CMRE of the NATO in La Spezia	N/A
31/05/2018 10/06/2018	Participation in event	EMODnet Human Activities had a stand at the EU Maritime Day in Burgas	N/A
07/06/2018	Blog	Marine Spatial Planning is calling: Europe will be ready for 2021 http://www.emodnet-humanactivities.eu/blog/?p=753	# of views: 85

Date	Communication action/material	Short description (of the material, title, …) and/or link to the activity	Main results (# participants, # views, # press clippings, etc.)
08/06/2018	Organisation of event	EMODnet Human Activities presented at the EMODnet Italy Day in Trieste	N/A
20-22/06/2018	Poster	EMODnet and its human activities portal was presented at the ISMS (VI International Symposium on Marine Sciences) 2018 in Vigo (http://isms.gal/) Thematic area: Governance of the oceans, conservation and management of geological and living resources	N/A
01/07/2018	Article in the Eurofish Magazine 3	An article about the EMODnet HA partners meeting in Pasaia, Spain including the potential new datasets to be developed. https://issuu.com/eurofish/docs/eurofish_magazine_3_2018	about 6000 readers.
03/07/2018	Blog	Liquid vs. dry bulk goods – which one prevails? http://www.emodnet-humanactivities.eu/blog/?p=763	# of views: 53
04-06/07/2018	Poster	EMODnet and its human activities portal was presented at the 4th Geo Blue Planet Symposium in Toulouse (https://symposium.geoblueplanet.org/) Thematic area: Ocean and Coastal Information in Support of Blue Growth	N/A
17/07/2018	Use case	HeraSpace http://www.emodnet-humanactivities.eu/blog/?p=773	# of views: 81
21/08/2018	Blog	Marine Aggregates Production http://www.emodnet-humanactivities.eu/blog/?p=785	# of views: 57
11/09/2018	Blog	Update on the Barcelona Convention http://www.emodnet-humanactivities.eu/blog/?p=810	# of views: 79
02/10/2018	Blog	Achieving zero-waste from marine traffic http://www.emodnet-humanactivities.eu/blog/?p=836	# of views: 48
30/10/2018	Blog	The Sound of Waves in the Mutriku Wave Energy Plant http://www.emodnet-humanactivities.eu/blog/?p=860	# of views: 117
07/11/2018	Blog	Algae, the next big thing in the blue bioeconomy http://www.emodnet-humanactivities.eu/blog/?p=895	# of views: 500
11/12/2018	Blog	Underwater maritime heritage: disseminating the treasure map http://www.emodnet-humanactivities.eu/blog/?p=924	#of views: 51
21/12/2018	Blog	EMODnet and Extraction Activities: Feedback Opportunities http://www.emodnet-humanactivities.eu/blog/?p=958	# of views 29
15/02/2019	Blog	Working towards INSPIRE Directive compliance http://www.emodnet-humanactivities.eu/blog/?p=989	# of views 18
SUM …	Blog		**Total # of views: 3495**

Table 3 - List of known publications using EMODnet data or data products.

Date	Name of journal, conference, …	Publication title	Authors	Organisation(s)
20/03/2017	2017 World Bank Conference on Land and Poverty	Marine Cadastre in europe: state of play (Nr 355)	Evangelia Balla, Rik Wouters	World Bank; National Cadastre and Mapping Agency of Greece; Cadastre, Land Registry and Mapping Agency, the Netherlands, UNECE/WPLA.
04/2017	ScienceDirect	A survey of official online sources of high-quality free-of-charge geospatial data for maritime geographic information systems applications	Christos Kalyvas, Athanasios Kokkos and Theodoros Tzouramanis	ELSEVIER
11/07/2017	Nature International journal of science	Abrupt emergence of a large pockmark field in the German Bight, Southeastern North Sea	Knut Krämer, Peter Holler, Gabriel Herbst, Alexander Bratek, Soeren Ahmerkamp, Andreas Neumann, Alexander Bartholomä, Justus E. E. van Beusekom, Moritz Holtappels & Christian Winter	Springer Nature
31/07/2018	IW: Learn Manuals	Marine Spatial Planning (MSP) Toolkit	Angela Schultz-Zehden, Clare Waldmann, Ivana Lukic, Joseph Onwona Ansong, Lisa Simone de Grunt and Susanne Altvater	s. Pro
21/08/2018	European MSP Platform	Marine Aggregates and Marine Mining	EU MSP Platform	EU MSP Platform
25/11/2018	Journal of the Korean Society for Marine Environment and Energy - Vol. 21, No. 4	Recent Trends and Their Implications of Marine Activities Mapping for Marine Spatial Planning	Sung-Jin Cho, Hee-Jung Choi	Transportation Research Center; Ajou University; Ocean Policy Research Department of the Korea Maritime Institute

10 Updates on Progress Indicators

Indicator 1 - Volume of data made available through the portal

Table 4 – Volume of data made available through the portal

Activity		Type/format					
		Points	Lines	Polygons	Related tables/records	Raster tiles/ cells	OGC Web Services
Cultural heritage	Lighthouses	4.062					
	Ship Wrecks						1 WFS
	Submerged Prehistoric Archaeology and Landscapes						1 WFS
Aquaculture	Shellfish	1.217					
	Finfish	2.495					
	Freshwater	6.898					
Algae production	Macroalgae	73					
	Microalgae	57					
Aggregate extraction		340		834	1 table containing 2.354 records		
Dredging		985			1 table containing 4.668 records		
Ocean energy facility	Projects	143			1 table containing 209 records		
	Test sites			30			
Other forms of area management/designation	International conventions			8			
	Maritime boundaries		198				
	Advisory councils			11			
	EEZ areas			21			
Waste disposal (solids, including dredge material, dumped munitions, marine constructions)	Dumped munitions	145		163			
	Dredge spoil dumping	686		437			
Wind farms		397		206			

Activity			Type/format					
			Points	Lines	Polygons	Related tables/records	Raster tiles/ cells	OGC Web Services
Fisheries	Fishery zones (FAO and ICES)	FAO Fishery Statistical Areas			324			1 WFS
		ICES Statistical Areas			65			1 WFS
	Fishery catches by FAO statistical area				137	5 tables containing 79.608 records		
	Monthly first sales, EUMOFA		2.035			1 table containing 1.078.519 records		
Hydrocarbon extraction	Boreholes		24.776					
	Active licenses				1.980			
	Offshore installations		1.759					
Cables	Landing stations (schematic cables)		415					
	Schematic cables			166				
	Actual route locations (cables)			214				
Pipelines				1,068				
Environment	Protected areas	Nationally designated areas (CDDA)			96,257 areas, 12.492 of which are coastal and/or marine			
		Natura 2000			27,741 areas, 4,751 of which are coastal and/or marine			
	State of bathing waters		17,107					

Activity		Type/format					
		Points	Lines	Polygons	Related tables/records	Raster tiles/ cells	OGC Web Services
Vessel density						21,000,000	
Major ports traffic	Goods	2440			1 table containing 247,160 records		
	Passengers				1 table containing 148,311 records		
	Vessels				1 table containing 3,394,944 records		

Indicator 2 - Organisations supplying each type of data broken down into country and organisation type (e.g. government, industry, science)

Table 5 – List of data sources

Organisation	Country	Type
Administration of the Republic of Slovenia for Food Safety, Veterinary Sector and Plant Protection	SI	Government
Amateur Radio Lighthouse Society	US	Association
APA-APFF	PT	Government
Aquakultur Register	AT	Government
Associazione Mediterranea Aquacoltori	IT	Producers organisation
Autorità Portuale di Genova	IT	Government
Autorità Portuale di Piombino	IT	Government
Basin Directorate for Water Management in the Black Sea Region	BG	Government
Biuletyn Informacji Publicznej	PL	Government
Black Sea Commission	TR	International Organisation
Boletín Oficial del Estado	ES	Government
Bollettino Ufficiale della Regione Campania	IT	Government
BSH Contis	DE	Government
Bulgarian Food and Safety Agency	BG	Government
Bureau de Recherches Géologiques et Minières	FR	Research
Capitaneria di Porto di Monfalcone	IT	Government
Capitaneria di Porto di Roma	IT	Government
CETMEF	FR	Government

Organisation	Country	Type
CHR	DK	Government
CINSEDO	IT	Research
Clarkson Research	UK	Industry
CLS	FR	Industry
Comité National de la Conchyliculture	FR	Producers organisation
Comune di Ragusa	IT	Government
Croatian Hydrocarbon Agency	HR	Government
Crown Estate, The	UK	Government
Cyprus Port Authority	CY	Government
Danish Energy Agency	DK	Government
DEME-Group	BE	Industry
Department of Agriculture, Food and the Marine	IE	Government
Department of Communication, Energy and Natural Resources	IE	Government
Department of Energy & Climate Change	UK	Government
Department of Environment - Marine Division	UK	Government
DRAVOSA	ES	Industry
Dutch Ministry of Economic Affairs	NL	Government
EMEC Orkney	UK	Industry
EMODnet Bathymetry	EU	Research
EnergiData	DK	Government
Energistyrelsen	DK	Government
ENMC	PT	Government
EUMOFA	EU	EU-funded project
European Environment Agency	DK	Research
Euroshell	EU	FP7 Project
EUROSTAT	LU	DG of the EU
Falmouth Bay Test Site	UK	Industry
FAO	IT	International Organisation
Faroese Geological Survey	FO	Research
Fiskeridirektoratet	NO	Government
Francesco Baittiner & Figli	IT	Industry
Geological Survey of Montenegro	ME	Research
Greg's Cable Map	ZA	Individual
HELCOM	FI	International Organisation
ICES	DK	International Organisation
Ifremer	FR	Science
IGME	ES	Research
Instituto de Estadística y Cartografía de Andalucía	ES	Government
Italia Nostra	IT	Association
Latvian Environment, Geology and Meteorology Centre	LV	Research

Organisation	Country	Type
LBEG Geozentrum Hannover	DE	Research
MACHU	EU	FP7 Project
MAGRAMA	ES	Government
Malta Environment & Planning Authority	MT	Government
MAPAMA	ES	Government
Marine and Hydrokinetic Technology Database	US	Research
Marine Scotland	UK	Government
Marine Traffic	EL	Industry
Maritime Administration of Latvia	LV	Government
Ministère de la Transition écologique et solidaire	FR	Government
Ministero dello Sviluppo Economico	IT	Government
Ministry for Environment	PT	Government
Ministry for Infrastructures	ES	Government
Ministry for Transport and Infrastructure - Continental Shelf Department	MT	Government
Ministry of Agriculture and Forestry	FI	Government
Ministry of Defence	ES	Government
Ministry of Energy, Commerce, Industry and Tourism	CY	Government
Ministry of Energy, Tourism and Digital Agenda	ES	Government
Ministry of Environment, Energy and Climate Change	EL	Government
Ministry of Rural Development and Food	EL	Government
MUMM	BE	Science
Nature Agency	DK	Government
NIBIS	DE	Government
Ocean Energy Systems	PT	Industry
Oil & Gas Authority	UK	Government
Oljedirektoratet	NO	Government
Orange	FR	Industry
OSPAR	UK	International Organisation
Packet Clearing House	US	Research
Polish Geological Institute	PL	Research
Préfecture de la Région Languedoc-Roussion	FR	Government
Préfecture des Alpes Maritimes	FR	Government
Préfecture du l'Herault	FR	Government
Préfecture du Var	FR	Government
Provincia di Pescara	IT	Government
Puertos del Estado	ES	Government
Queen's University Belfast	UK	Research
Regione Emilia Romagna	IT	Government
Regione Lazio	IT	Government
Regione Siciliana	IT	Government
Rijkswaterstaat Nordzee	NL	Government
Scottish Government Spatial Data Infrastructure	UK	Government

Organisation	Country	Type
SEDNET	NL	Research
SHOM	FR	Research
SOWFIA	EU	EU-funded project
SPLASHCOS	EU	FP7 Project
Státní veterinární správa	CZ	Government
Swedish Energy Agency	SE	Government
Telegeography	US	Industry
The European Atlas of the Seas	EU	Research
The Wind Power	FR	Industry
Thetys	US	Research
TNO	NL	Industry
Trasporto Europa	IT	Industry
UNEP-MAP	EL	International Organisation
Veterinary Services	CY	Government
Wageningen UR	NL	Research
WindEurope	BE	Industry

Indicator 3 - Organisations that have been approached to supply data with no result

Nothing to report.

Indicator 4 - Volume of each type of data and of each data product downloaded from the portal

Included are instances of downloads and initial requests for web service links. Statistics exclude Human Activities and Central Portal partners.

3rd March 2017 to 21st February 2019

Dataset	# of downloads
Wind Farms	1,025
Telecommunication Cables (schematic)	493
Telecommunication Cables (actual)	434
Shellfish Production	412
Main Ports	403
Natura 2000	239
CDDA	207
Aggregate Extraction	205
Dredge spoil dumping	182
Finfish	181
Dredging	165

Dataset	# of downloads
Pipelines	164
Active Licences	153
Dumped Munitions	152
Offshore Installations	134
Boreholes	131
Lighthouses	119
Ocean Energy Projects	113
Fish Catches	93
State of Bathing Qaters	83
International Conventions	76
First Sales of Fish	75
Advisory councils	55
OSPAR Maritime Area	48
Ocean Energy Test Sites	42
Freshwater Aquaculture	27
FAO Fishery Statistical Areas	24
Macroalgae and Microalgae	23
ICES statistical areas	16
Exclusive Economic Zone	12
Landing stations (schematic cables)	5
Ship Wrecks	n/a
Submerged Prehistoric Archaeology and Landscapes	n/a
Total	5,491

Indicator 5 - Organisations that have downloaded each data type

Users must select their sector when downloading data or requesting web service links

3rd March 2017 to 24th May 2018

Research	19.2%
Environment	32.6%
Energy	12.8%
Education	10.7%
Other	10.4%
Fisheries and agriculture	6.3%
Physical planning	2.5%
Demography	1.8%
Transport	1.4%
Mining	1.0%
Forestry	0.5%

Tourism	0.5%
Health	0.4%

25th May 2018 to 21st February 2019

Academia/Research	49.1%
Consultancy	16.2%
Small & Medium Enterprise	9.0%
Other	7.7%
Government/Public Administration	6.6%
Large Enterprise	6.6%
Non-profit Organisation	4.0%
Data Provider	0.7%
Policy/Funding Agency	0.1%

Indicator 6 - User statistics to determine the main pages utilised and identify user navigation routes

Statistics include all visitors including partners.

1st March 2017 to 31st May 2018

View Data

Month	Unique Page Views	Avg. Time on Page (mm:ss)	Page Views	New Visitors	% New Visitors
Mar-17	296	03:36	435	176	59.46%
Apr-17	312	03:22	437	186	59.62%
May-17	335	03:24	510	149	44.48%
Jun-17	384	03:45	597	179	46.61%
Jul-17	305	03:10	433	138	45.25%
Aug-17	255	02:49	401	121	47.45%
Sep-17	397	02:32	557	219	55.16%
Oct-17	416	02:37	590	205	49.28%
Nov-17	506	03:35	705	217	42.89%
Dec-17	398	03:00	567	179	44.97%
Jan-18	392	03:06	601	158	40.31%
Feb-18	469	02:27	770	227	48.40%
Mar-18	597	03:11	905	320	53.60%
Apr-18	502	02:33	731	225	44.82%
May-18	494	02:07	757	255	51.62%

Home

Month	Unique Page Views	Avg. Time on Page (mm:ss)	Page Views	New Visitors	% New Visitors
Mar-17	123	00:37	169	56	45.53%
Apr-17	155	01:25	200	60	38.71%
May-17	171	00:48	232	57	33.33%
Jun-17	184	00:56	253	65	35.33%
Jul-17	281	00:32	435	178	63.35%
Aug-17	114	01:27	157	54	47.37%
Sep-17	158	02:05	198	48	30.38%
Oct-17	194	00:55	251	78	40.21%
Nov-17	267	01:23	341	99	37.08%
Dec-17	191	00:58	269	66	34.55%
Jan-18	209	01:13	267	75	35.89%
Feb-18	218	01:12	272	88	40.37%
Mar-18	256	00:40	330	118	46.09%
Apr-18	209	01:14	278	85	40.67%
May-18	267	01:31	425	116	43.45%

Search Data

Month	Unique Page Views	Avg. Time on Page (mm:ss)	Page Views	New Visitors	% New Visitors
Mar-17	240	00:39	340	141	58.75%
Apr-17	280	01:12	450	144	51.43%
May-17	231	01:26	351	109	47.19%
Jun-17	327	01:36	496	166	50.76%
Jul-17	305	00:51	452	157	51.48%
Aug-17	156	00:38	230	83	53.21%
Sep-17	326	00:32	541	181	55.52%
Oct-17	623	01:00	1,066	296	47.51%
Nov-17	592	00:49	892	272	45.95%
Dec-17	401	01:06	628	187	46.63%
Jan-18	489	01:10	748	217	44.38%
Feb-18	688	01:04	973	345	50.15%
Mar-18	770	00:47	1,200	379	49.22%
Apr-18	671	00:49	991	389	57.97%
May-18	810	00:33	1,222	391	48.27%

April to July 2018

Page	Unique Page Views	Avg. Time on Page (mm:ss)	Page Views
View data	1243	01:26	1915
Search data	247	00:27	585
Submit data	20	02:25	30
Documents	57	01:14	66
Home page	517	n.a.	792

July to September 2018

Page	Unique Page Views	Avg. Time on Page (mm:ss)	Page Views
View data	1028	01:45	1557
Search data	397	00:32	210
Submit data	n/a	n.a.	n/a
Documents	42	00:30	48
Home page	443	n.a.	686

October to December 2018

Page	Unique Page Views	Avg. Time on Page (mm:ss)	Page Views
View data	1521	01:45	2325
Search data	252	00:32	501
Submit data	n/a	n.a.	n/a
Documents	60	02:11	79
Home page	643	n.a.	928

The monitoring numbers reported as part of the progress monitoring of EMODnet performance are collected using different monitoring tools (e.g. Matomo, Awstats, Google Analytics, etc.) which use different technical approaches and which each have their 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.

Indicator 7 - List of what the downloaded data has been used for

Since May 2018, users who download data have been asked to report the reason for download. It is a non-mandatory field, so only a fraction of total users actually provides information.

Below is a list of reasons for download:

- Academic illustration and graphic design
- Academic research
- Analysis of CO_2 capture potential in Europe
- Assessing wind offshore potential
- Assign potential new offshore wind parks to maintenance ports
- Cable planning
- Check the distance between Industries emitting the CO_2 and ports in Europe
- Comprehend the wind offshore effect on tourism
- Cultural heritage and climate change analysis
- Environmental context for route analysis
- Environmental research
- EU projects preparation and participation planning of a seismic survey
- Geospatial analysis
- Geostatistical analyses of fishing and marine litter data
- Designing a habitat management plan for a marine protected area
- Habitat mapping of commercial fish species
- Deep seabed research
- Research on renewable energy
- Developing of a mapping-tool for European Oil & Gas activities
- Developing maps
- Publication on newspapers
- Marine spatial planning in Guatemala
- Mapping Lithuania lease areas for presentation[1]
- Mapping ports in Mediterranean and environmental impact
- To aid in planning development
- Construction of offshore wind farms
- Assess the offshore wind potential for some countries
- See the obstacles for wind power energy
- Analyse vessel traffic in North Sea

[1] Potentially interesting use case, as the data were downloaded by an investment fund.

- Visualise wind park locations in the context of bird movement studies
- Identify risks in areas where pipelines are located
- Analyse radio transmission system over UK wind farms.

Indicator 8 - List of web-services made available and organisations connected through these

List of Web Feature Services (WFS)

WFS are available as XML format, or JOSN format.

Aggregate Extraction

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=aggregates&OUTPUTFORMAT=json

Algae Production - Macroalgae (seaweeds)

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=macroalgae&OUTPUTFORMAT=json

Algae Production – Microalgae

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=microalgae&OUTPUTFORMAT=json

Aquaculture - Finfish Production

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=finfish&OUTPUTFORMAT=json

Aquaculture - Shellfish Production

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=shellfish&OUTPUTFORMAT=json

Aquaculture - Freshwater

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=freshwater&OUTPUTFORMAT=json

Cultural Heritage - Lighthouses

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=lighthouses&OUTPUTFORMAT=json

Dredging

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=dredging&OUTPUTFORMAT=json

Environment - Protected Areas - Nationally Designated Areas

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=cdda&OUTPUTFORMAT=json

Environment - Protected Areas - Natura 2000

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=natura2000&OUTPUTFORMAT=json

Environment - State of Bathing Waters

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=bathingwaters&OUTPUTFORMAT=json

Fisheries - First Sales of Fish

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=fishsales&OUTPUTFORMAT=json

Fisheries - Fish Catches by FAO Fishery Statistical Areas - Major Area

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=majorcatches&OUTPUTFORMAT=json

Fisheries - Fish Catches by FAO Fishery Statistical Areass - Sub-area Area

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=subareacatches&OUTPUTFORMAT=json

Fisheries - Fish Catches by FAO Fishery Statistical Areas - Division Area

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=divisioncatches&OUTPUTFORMAT=json

Fisheries - Fish Catches by FAO Fishery Statistical Areas - Sub-division Area

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=subdivisioncatches&OUTPUTFORMAT=json

Fisheries - Fish Catches by FAO Fishery Statistical Areas - Sub-unit Area

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=subunitcatches&OUTPUTFORMAT=json

Hydrocarbon Extraction - Active Licenses (Points)

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=activelicenses&OUTPUTFORMAT=json

Hydrocarbon Extraction - Active Licenses (Areas)

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=aggregateareas&OUTPUTFORMAT=json

Hydrocarbon Extraction - Boreholes

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=hydrocarbons&OUTPUTFORMAT=json

Hydrocarbon Extraction - Offshore Installations

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=platforms&OUTPUTFORMAT=json

Main Ports - Goods Traffic

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=portgoods&OUTPUTFORMAT=json

Main Ports - Passengers Traffic

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=portpassengers&OUTPUTFORMAT=json

Main Ports - Vessels Traffic

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=portvessels&OUTPUTFORMAT=json

Main Ports – Waste at Ports

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=portswaste&OUTPUTFORMAT=json

Ocean Energy Facilities - Project Locations

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=oenergy&OUTPUTFORMAT=json

Ocean Energy Facilities - Test Sites

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=oenergytests&OUTPUTFORMAT=json

Other Forms of Area Management/Designation - Advisory Councils

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=advisorycouncils&OUTPUTFORMAT=json

Other Forms of Area Management/Designation - Barcelona Convention

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=barcelona&OUTPUTFORMAT=json

Other Forms of Area Management/Designation - Bucharest Convention

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=bucharest&OUTPUTFORMAT=json

Other Forms of Area Management/Designation - HELCOM Maritime Area

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=helcom&OUTPUTFORMAT=json

Other Forms of Area Management/Designation - ICES Statistical Areas

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=icesareas&OUTPUTFORMAT=json

Other Forms of Area Management/Designation - Maritime Boundaries

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=maritimebnds&OUTPUTFORMAT=json

Other Forms of Area Management/Designation - OSPAR Maritime Area

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=ospar&OUTPUTFORMAT=json

Other Forms of Area Management/Designation - Exclusive Economic Zone

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=eez&OUTPUTFORMAT=json

Pipelines

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=shellfish&OUTPUTFORMAT=json

Cables - Telecommunication Cables (schematic routes)

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=cablesschematic&OUTPUTFORMAT=json

Cables - Kis Orca Subsea Cables

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=kisorcacables&OUTPUTFORMAT=json

Cables - Maltese Telecommunication Cables

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=maltacables&OUTPUTFORMAT=json

Cables - Landing Stations

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=landingstations&OUTPUTFORMAT=json

Cables - SIGCables Submarine Cables Route

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=sigcables&OUTPUTFORMAT=json

Cables - BSH CONTIS Cables

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=bshcontiscables &OUTPUTFORMAT=json

Waste Disposal - Dredge Spoil Dumping (Points

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=dredgespoil &OUTPUTFORMAT=json

Waste Disposal - Dredge Spoil Dumping (Polygons)

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=dredgespoilpoly&OUTPUTFORMAT=json

Waste Disposal - Dumped Munitions (Points)

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=munitions&OUTPUTFORMAT=json

Dumped Munitions (Polygons)

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=munitionspoly&OUTPUTFORMAT=json

Wind Farms - Wind Farms (Points)

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=windfarms&OUTPUTFORMAT=json

Wind Farms - Wind Farms (Polygons)

http://77.246.172.208/geoserver/emodnet/wfs?SERVICE=WFS&VERSION=1.1.0&request=GetFeature&typeName=windfarmspoly&OUTPUTFORMAT=json

List of Web Map Services (WMS)

Aggregate Extraction - Aggregate Extraction

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=activelicenses&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Algae Production - Macroalgae (seaweeds)

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=macroalgae&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Algae Production – Microalgae

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=microalgae&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Aquaculture - Finfish Production

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=finfish&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-11,35,14,60&WIDTH=600&HEIGHT=600

Aquaculture - Shellfish Production

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=shellfish&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-11,35,14,60&WIDTH=600&HEIGHT=600

Aquaculture - Freshwater

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=freshwater&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-11,35,14,60&WIDTH=600&HEIGHT=600

Cultural Heritage - Lighthouses

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=lighthouses&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-11,35,14,60&WIDTH=600&HEIGHT=600

Dredging

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=dredging&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-11,35,14,60&WIDTH=600&HEIGHT=600

Environment - Protected Areas - Nationally Designated Areas

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=cdda&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Environment - Protected Areas - Natura 2000

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=natura2000&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Environment - State of Bathing Waters

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=bathingwaters&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-11,35,14,60&WIDTH=600&HEIGHT=600

Hydrocarbon Extraction - Active Licenses (Points)

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=activelicenses&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Hydrocarbon Extraction - Active Licenses (Areas)

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=aggregateareas&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Hydrocarbon Extraction - Boreholes

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=hydrocarbons&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-11,35,14,60&WIDTH=600&HEIGHT=600

Hydrocarbon Extraction - Offshore Installations

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=platforms&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-11,35,14,60&WIDTH=600&HEIGHT=600

Main Ports - Port Locations

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=portlocations&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-11,35,14,60&WIDTH=600&HEIGHT=600

Main Ports – Waste at Ports

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=portswaste&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Ocean Energy Facilities - Project Locations

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=oenergy&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-11,35,14,60&WIDTH=600&HEIGHT=600

Ocean Energy Facilities - Test Sites

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=oenergytests&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Other Forms of Area Management/Designation - Advisory Councils - Baltic

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=baltic&FORMAT=image%2Fpng&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG%3A4326&BBOX=-20,0,20,60&WIDTH=500&HEIGHT=500

Other Forms of Area Management/Designation - Advisory Councils - Long Distance Fleet

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=longdistancefleet&FORMAT=image%2Fpng&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG%3A4326&BBOX=-20,0,20,60&WIDTH=500&HEIGHT=500

Other Forms of Area Management/Designation - Advisory Councils - Mediterranean

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=mediterranean&FORMAT=image%2Fpng&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG%3A4326&BBOX=-20,0,20,60&WIDTH=500&HEIGHT=500

Other Forms of Area Management/Designation - Advisory Councils - North Sea

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=northsea&FORMAT=image%2Fpng&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG%3A4326&BBOX=-20,0,20,60&WIDTH=500&HEIGHT=500

Other Forms of Area Management/Designation - Advisory Councils - North Western Waters

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=northwesternwaters&FORMAT=image%2Fpng&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG%3A4326&BBOX=-20,0,20,60&WIDTH=500&HEIGHT=500

Other Forms of Area Management/Designation - Advisory Councils - Pelagic Stocks

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=pelagicstocks&FORMAT=image%2Fpng&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG%3A4326&BBOX=-20,0,20,60&WIDTH=500&HEIGHT=500

Other Forms of Area Management/Designation - Advisory Councils - South Western Waters

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=southwesternwaters&FORMAT=image%2Fpng&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG%3A4326&BBOX=-20,0,20,60&WIDTH=500&HEIGHT=500

Other Forms of Area Management/Designation - Barcelona Convention

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=barcelona&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Other Forms of Area Management/Designation - Bucharest Convention

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=bucharest&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Other Forms of Area Management/Designation - HELCOM Maritime Area

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=helcom&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Other Forms of Area Management/Designation - ICES Statistical Areas

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=icesareas&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Other Forms of Area Management/Designation - Maritime Boundaries

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=maritimebnds&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Other Forms of Area Management/Designation - OSPAR Maritime Area

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=ospar&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Other Forms of Area Management/Designation - Exclusive Economic Zone

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=eez&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Pipelines

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=pipelines&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Cables- Telecommunication Cables (schematic routes)

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=cablesschematic&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Cables - Kis Orca Subsea Cables

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=kisorcacables&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Cables - Maltese Telecommunication Cables

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=maltacables&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Cables - Landing Stations

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=landingstations&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-11,35,14,60&WIDTH=600&HEIGHT=600

Cables - SIGCables Submarine Cables Route

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=sigcables&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Cables - BSH CONTIS Cables

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=bshcontiscables&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Waste Disposal - Dredge Spoil Dumping (Points)

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=dredgespoil&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-11,35,14,60&WIDTH=600&HEIGHT=600

Waste Disposal - Dredge Spoil Dumping (Polygons)

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=dredgespoilpoly&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Waste Disposal - Dumped Munitions (Points)

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=munitions&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-11,35,14,60&WIDTH=600&HEIGHT=600

Waste Disposal - Dumped Munitions (Polygons)

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=munitionspoly&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Wind Farms - Wind Farms (Points)

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=windfarms&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-11,35,14,60&WIDTH=600&HEIGHT=600

Wind Farms (Polygons)

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=windfarmspoly&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

Vessel Density

Example:

http://77.246.172.208/geoserver/emodnet/wms?LAYERS=2017_01_st_All&FORMAT=image/png&TRANSPARENT=TRUE&SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&STYLES=&SRS=EPSG:4326&BBOX=-30.4269,23.7383,42.3846,72.2793&WIDTH=650&HEIGHT=400

The Vessel Density WMS are provided monthly by vessel type.

The name of a specific layer is '<year>_<month>_st_<vessel code>' Eg. '2017_01_st_All' for all vessels during January 2017.

The vessel codes are as follows:

All - All types

00 - Other

01 - Fishing

02 - Service

03 - Dredging or underwater ops

04 - Sailing

05 - Pleasure Craft

06 - High speed craft

07 - Tug and towing

08 - Passenger

09 - Cargo

10 - Tanker

11 - Military and Law Enforcement

12 - Unknown

Available data: January 2017 - December 2017

11 Recommendations for follow-up actions by the EU

- Extend the scope of the project to neighbouring countries: EMODnet Human Activities already covers some non-EU countries on a voluntary basis. However, in certain areas (e.g. in the Mediterranean) it is paramount to also include neighbouring countries to give a better picture of human activity. Data might not be easily available, and additional financial resources might thus be required.
- Organise a meeting with various DGs and agencies of the EU Commission potentially interested in AIS data analysis and vessel density maps (e.g. MARE, ENV, CLIMA, MOVE, JRC). AIS data are not easily available and require time and money to be acquired and process. Therefore, it might be useful to explore what other uses can be made.
- Consider introducing an obligation to share data with EMODnet. The example of the Marine Cadastre in the US – where the initiative is implemented through a federal act – shows that implementation through hard law instruments may make it easier to collect and make available data. This might be especially true for human activity in the ocean, for which there is no scientific community of reference, and data are gleaned from multiple sources on an entirely voluntary basis. A legal obligation would make it possible to improve the coverage of critical datasets such as aquaculture, pipelines and cables. The US Marine Cadastre also gives free access to AIS data, something which would bring enormous added value to the EU marine data community.

12 Annex: Other documentation attached

US Marine Cadastre

Geographic area / Countries involved

The United States of America, with limited data coverage in Alaska, Hawaii, and U.S. Pacific Island territories. The waters of the Great Lakes are not included.

Short description

The objective is to provide a federal natural resource management perspective and to expand it as the interest and versatility of the marine cadastre becomes more apparent with other stakeholders, i.e., coastal state governments, private industry, and the academic community.

MarineCadastre.gov provides spatial data, visualisation, and analytical tools in one location, making it an essential tool for ocean energy and marine planning. The website provides authoritative and regularly updated information on offshore boundaries, infrastructure, human uses, natural resources, energy potential, Bureau of Ocean Energy Management-funded research projects, and many other data sets. Users can create and customise maps to share with ocean-planning partners.

Governance (authorities, sectors and stakeholders involved) and legal basis

The project was initiated by the Energy Policy Act of 2005 (P.L. 109-58) – Sec. 388 – Alternative Energy-Related Uses on the Outer Continental Shelf. This act directs the U.S. Department of the Interior, in cooperation with three other federal agencies—the U.S. Department of Commerce, U.S. Coast Guard, and U.S. Department of Defense—to establish a mapping initiative to assist in decision-making related to alternative energy uses on the Outer Continental Shelf (OCS). It is also providing the geospatial framework needed for the broader marine spatial planning initiative called for in the National Ocean Policy.

MarineCadastre.gov is recognised by regional ocean planning groups as the go-to place for authoritative federal ocean data. Data, metadata, and services from the project are being integrated into the Northeast Ocean Data Portal, Mid-Atlantic Ocean Data Portal, and the West Coast Ocean Data Portal.

Initial driver

The vision of the project has been to provide access to data directly from the source through web map services. The long-term goal is to have each authoritative data set hosted and maintained by the agency of responsibility and usable by all levels of users. The “make-it-once-and-use-it-many-times” model guarantees that users have access to current data, and it increases efficiency among all levels of government data providers. The services are designed to deliver data without replication and directly from the source.

Timescale of the project

It is a long-term project. Its implementation started in 2006. More can be seen here.

Funding

Government through U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) Office for Coastal Management and the U.S. Department of the Interior's Bureau of Ocean Energy Management (BOEM). Albeit available online, BOEM's budget is not broken down by item so as to make it possible to single out the budget allocated to developing and maintaining the Marine Cadastre.

Data and data sources

With over 280 layers, MarineCadastre.gov provides direct access to the authoritative and trusted datasets organisations need for ocean planning, tasks that include locating offshore energy, developing marine protected areas, and addressing use conflicts.

Data on human activities include: maritime boundaries, AIS data, vessel density maps, wrecks, oil and gas leases, active renewable energy leases, aid to navigation, anchorage areas, aquaculture leases, artificial reefs, fishing revenue intensity, cables, planning areas, coastal energy facilities, drilling platforms, marine protected areas, military operating ares, marine monuments, ocean disposal sites, oil and natural gas wells, permitted marine hydrokinetik projects, principal ports, raster nautical charts, regulated navigation areas, selected pipelines, shipping lanes and regulations, unexploded ordnance locations, US historical lighthouses.

A trusted source is one that is not mandated to create information but does so for its own reasons. For instance, NASCA Submarine Cables data layer is provided through an agreement with that organisation and is not an authoritative source, but since that type of information is not provided by any other source, the location of the cables under that organisation's purview is known to be the best available information and is used by agencies needing this type of information.

The format of the data within MarineCadastre.gov depends on the authoritative source from which the data were derived. The data registry provides a full listing of data and available formats.

Data providers include: Bureau of Ocean Energy Management, Center for Coastal and Ocean Mapping Joint Hydrographic Center, University of New Hampshire, Department of Energy (DOE) Office of Energy Efficiency & Renewable Energy (EERE), DOE EERE, National Renewable Energy Laboratory, Duke University Marine Geospatial Ecology Lab, Federal Emergency Management Agency, Marine-Life Data and Analysis Team, NOAA National Centers for Coastal Ocean Science, NOAA National Geophysical Data Center. NOAA National Marine Fisheries Service, NOAA National Marine Protected Areas Center, NOAA National Weather Service, NOAA Northeast Fisheries Science Center, NOAA Office for Coastal Management, NOAA Office of Coast Survey, NOAA Office of Response and Restoration, Northeast Ocean Data Portal, U.S. Army Corps of Engineers, U.S. Bureau of Indian Affairs, U.S. Coast Guard, U.S. Department of Defence, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Geological Survey, U.S. Integrated Ocean Observing System, U.S. National Park Service and U.S. Navy.

Standards and protocols

- **National Viewer:** Provides ocean-related data and information from authoritative sources to support ocean-planning efforts
- **Ocean Law Search**: Allows users to search a database of environmental and historic preservation statutes, legislative histories, cases, and other documents on the Outer Continental Shelf

- **Environmental Studies Program Information System**: Allows users to search by text or map to find relevant BOEM-funded studies information, including downloadable study profiles, technical summaries, final reports, and links to publications and digital data
- **AIS Data Handler:** The AIS Data Handler is a desktop AIS data conversion tool and ArcGIS add-in that streamlines the acquisition, loading, filtering, display, and analysis of AIS vessel-tracking data. Please note that this tool is now archived.
- **AIS Track Builder**: Converts a collection of point features into a track line according to date, time, and an identifier.
- **OGC-compliant webservices**

Number and type of users

No information available.

Dissemination and communication strategy

- Code library, best practices, one –on- one support.
- News and updates sections with short posts are published regularly on the website.

Hyperlink

https://marinecadastre.gov

13 List of abbreviations and acronyms

AAC	Aquaculture Advisory Council
AIS	Automatic Identification System
BSC	Black Sea Commission
CDDA	Common Database on Designated Areas
CEO	Chief Executive Officer
CO_2	Carbon Dioxide
CSV	Comma Separated Variable
EEZ	Exclusive Economic Zone
EMODnet	European Marine Observation and Data Network
EMSA	European Maritime Safety Agency
EU	European Union
EUMOFA	European Market Observatory on Fisheries and Aquaculture
FAO	Food and Agriculture Organisation
GIS	Geographic Information System
HA	Human Activities
HELCOM	Helsinki Commission
JRC	Joint Research Centre
MARPOL	Marine Pollution
MS	Member State
MSEG	Member States' Expert Group
MSFD	Marine Strategy Framework Directive
MSP	Maritime Spatial Planning
OSPAR	Oslo-Paris Convention/Commission
PCI	Project of Common Interest
RSC	Regional Sea Convention
SCR	Système de Coordonnées de Référence
SMEs	Small and Medium Enterprises
UNESCO	United Nation Educational, Scientific and Cultural Organization
WCS	Web Coverage Service
WFS	Web Feature Service
WGS	World Geodetic System
WMS	Web Map Service