



Maintenance Report

15/05/2011 – 15/05/2012

Lot N°4 – Biology (SI2.531562) of the Service Contract No MARE/2008/03 on the Preparatory Actions for European Marine Observation and Data Network

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1. Introduction

In 2008 the European Commission launched a set of preparatory actions to construct the European Marine Observation and Data Network, EMODnet. The overall objectives are to assemble fragmented and inaccessible marine data into interoperable, contiguous and publicly available data streams for complete maritime basins. This will help to define the appropriate processes, best technology and approximate costs of a final operational European Marine Observation and Data Network as well as provide first components of a final system which will in themselves be useful to the marine science community and to commercial concerns who will use the data to provide value-added services. The call for tenders comprises 4 lots: hydrographic data, marine geological data, chemical data, biological data and one seabed habitat mapping project.

The pilot projects started in 2009 and had a duration of 36 months consisting of two main phases, a development phase during the first 24 months and a maintenance phase during the last 12 months. During the development phase of the Biological lot a biological data portal was constructed and published. At month 24 a final report was drafted and send to the European Commission including what was done in the project, challenges faced, an analysis of performance and lessons learned and an analysis of sustainability. The report is available at the project website at <http://bio.emodnet.eu/documents/Final-Report/>

During the maintenance phase (from month 24 till month 36), the portal was maintained. This report describes the activities and that were being performed during the maintenance phase.

2. Activities during maintenance phase

In March 2011, the biological data portal has been launched. A complete description of the portal functionalities and the data content has been described in the final report. During the maintenance phase, the usage of the data portal has being monitored in detail and three types of activities has being carried out, being the necessary technical updates in order to maintain a correct functioning of the data portal, data management activities and the organisation of additional data workshops in order to create new biological data products and to involve and engage new end users and stakeholders into the EMODnet project.

2.1. Technical updates

During the maintenance phase no new major functionalities have been developed. However some technical implementations turned out to be necessary in order to maintain an efficient usage of the data portal.

2.1.1 Increased performance of the data portal

At the moment 15,190,976 distribution records of marine species occurring in European marine waters are available through the EMODnet Biological data portal. For some species, more than 500,000 records are available. When someone wants to visualize the geographic distribution of these data records, or if we want to map distribution data on higher taxonomic levels (genus level or family level, see also 2.1.2), the performance of the data portal was becoming critically slow. Therefore, we implemented an aggregation technique, based on the geographic resolution you select on the data portal.

If we take the example of the Northern Fulmar (*Fulmar glacialis*), the EMODnet portal contains 342,524 distribution records of this seabird, mainly observations from the North Sea and North East Atlantic waters. The observations available through the EMODnet biology Portal start from 1966 till 2004. The performance of the portal became extremely low when plotting these distribution records, and we observed one main 'coloured spot' in the North Sea and North East Atlantic (Fig 1).

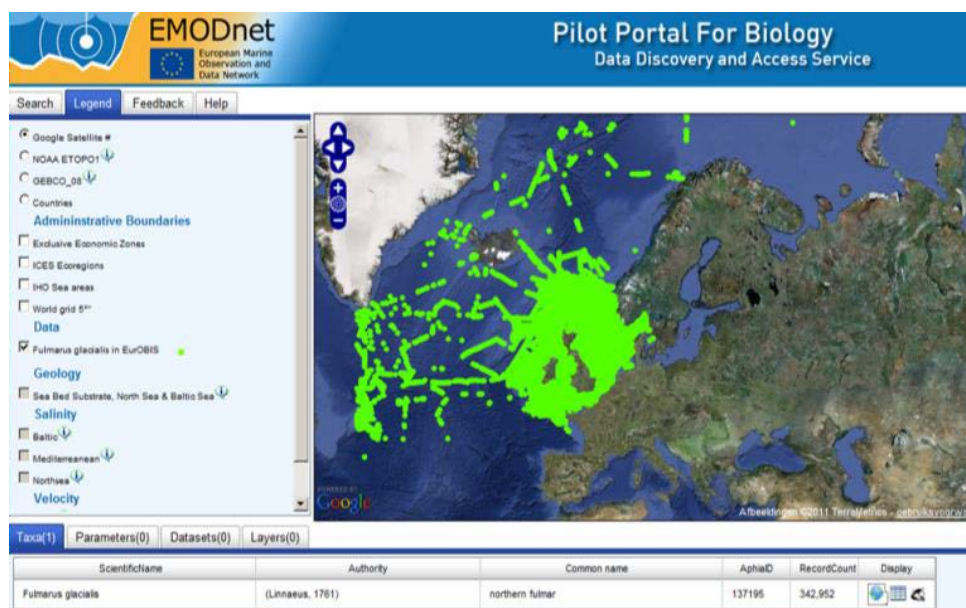


Fig 1: Visualization of the Northern Fulmar before aggregation of data

Figure 2, 3 and 4 below shows the different steps of the implementation of the spatial data aggregation that is performed on the biological data portal. When plotting distribution data of the Northern Fulmar, the portal will visualize the gridded distribution. The colour intensity of the grids indicates the number of distribution records per grid. By clicking on a grid, the user can retrieve the number of distribution records of the Northern Fulmar per dataset. When increasing the zooming level, the size of the grid cells decreases and the value of the grid changes accordingly. We implemented five different levels of resolution, being a 1 by 1 degree grid, a 30 by 30 minute grid, a 15 by 15 minute grid and 6 by 6 minute grid. The value of the grid cells is then calculated by rounding the latitude and longitude value to the according resolution level and adding up the data records.

When the user clicks on a grid cell, the portal will give the number of records per taxon per dataset. At highest zooming level, the user can visualize the exact locations of the distribution records of the Northern Fulmar. For each distribution records, all attributes of the distribution record (time, latitude, longitude, precision, depth, individual count, sample size, link to metadata) can be retrieved. This new functionality increases significantly the plotting performance of the data portal and allows the user to observe spatial patterns of data distributions.

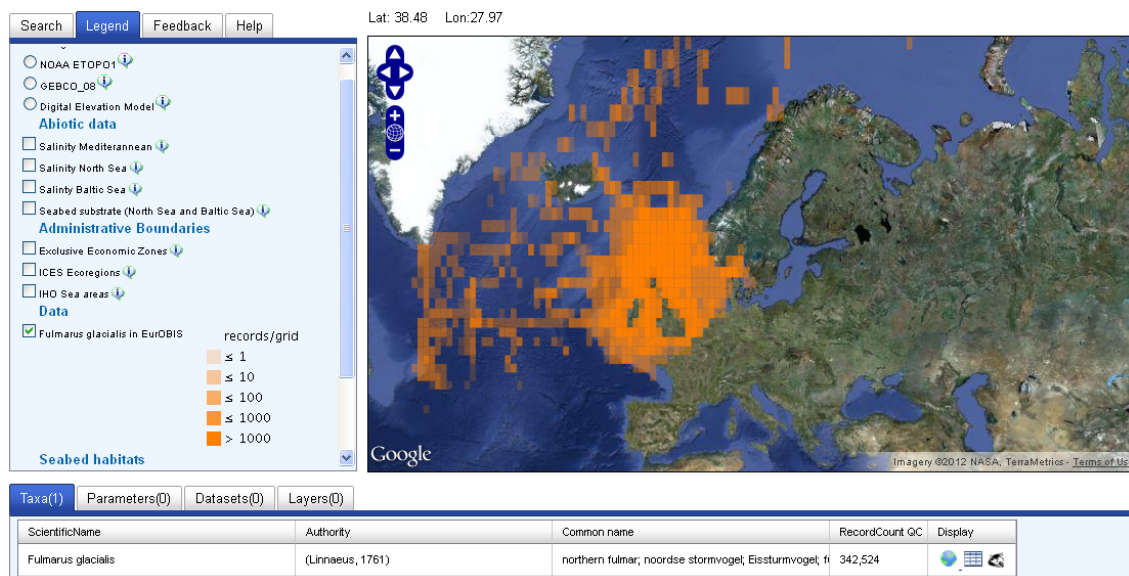


Fig 2: Visualization distribution of Northern Fulmar after aggregation. The colour intensity indicates the number of distribution records per 1 by 1 degree grid.

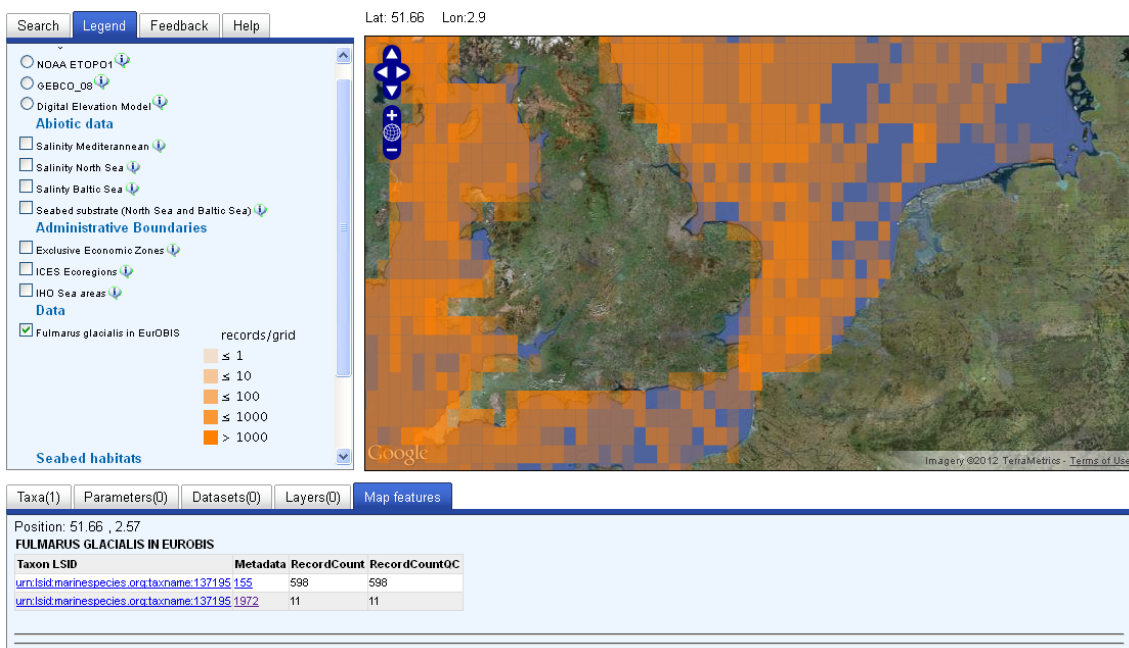


Fig 3: When increasing the zooming level, the grid cell size decreases, and the value of the grid change (here a 6 by 6 minutes grid). By clicking on a grid, you can see the number of distribution records of the Northern Fulmar per dataset.

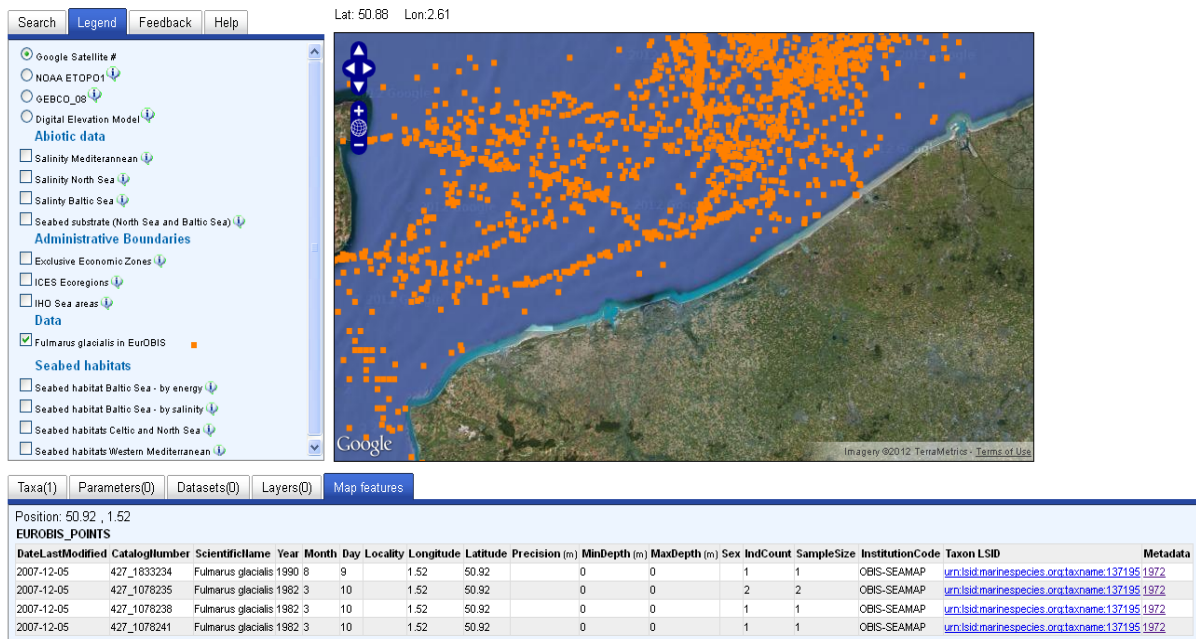


Fig 4: At highest zooming level, the user can visualize the exact locations of the distribution records of the Northern Fulmar. For each distribution records, all attributes of the distribution record (time, latitude, longitude, precision, depth, individual count, sample size, link to metadata) can be retrieved.

2.1.2 Map higher taxonomic levels data and synonymized taxa

During quality control, all biological distribution data are matched with the World Register of Marine Species (WoRMS). This taxonomic register provides a unique, authoritative list of marine species, together with a unique classification and a list of synonymized taxa. The link to WoRMS allows the biological data portal to visualize and download data on higher taxonomic levels (for example visualize all distributions of all species of a specific genus) and to download temporal and spatial distributions of a species and all his synonymized taxa. We implemented during the maintenance phase the functionality that the portal user can easily visualize and download this information. Figure 5 shows how the user can map and download all species belonging to the genus *Mytilus*, and how the user can download all observations from the species *Mytilus galloprovincialis* and from the synonymized taxon *Mytilus edulis galloprovincialis*.

ScientificName	Authority	Common name	RecordCount	QC	Display
<i>Mytilus trossulus</i>	Gould, 1850	foolish mussel,	3		
<i>Mytilus edulis galloprovincialis</i> <small>accepted as <i>Mytilus galloprovincialis</i></small>	Lamarck, 1819	krombekmosset,	5		
<i>Mytilus edulis</i>	Linnaeus, 1758	blue mussel; edible blue mussel; eetbare mosset; blauw	21,846		
<i>Mytilus galloprovincialis</i>	Lamarck, 1819	Mittelmeermiesmuschel; moule de provence; diepwater	1,792		
<i>Mytilus</i>	Linnaeus, 1758		24,118		

Fig 5. The ‘=-sign’ means that also the synonymized taxa from *Mytilus galloprovincialis* will be displayed; the ‘+sign’ means that all lower taxonomic levels of a specific taxon will be displayed

2.1.3 Automated quality control steps

During the EMODnet project, a number of automated quality control (QC) procedures have been developed. When a record is flagged as 'QC' on the data portal, this indicates that the record meets a number of quality control requirements necessary to classify the record as 'useful' within a biogeographic information system:

- ✓ The taxon name is documented within the World Register of Marine Species (WoRMS)
- ✓ The taxonomic level equals the family level or is more detailed than family (e.g. the taxon has been identified till family, genus, species, subspecies ...)
- ✓ Latitude and longitude is documented and valid (e.g. values are different from zero, latitude is between -90 & +90 and longitude is between -180 & +180)

If one of these basic requirements is not met, the record cannot be plotted on the data portal. When downloading a dataset, all records not meeting these basic QC requirements will also be downloadable, but they will be flagged as 'not meeting the basic QC requirements'.

2.2. Data management activities

2.2.1 Data grant programs

During the maintenance phase, the mini data grant program that has been set up during the construction phase has been maintained and expanded towards the Mediterranean Sea. The Black Sea Data Grant Program is being coordinated by the Institute of Biology of the Southern Seas of the National Academy of Sciences of Ukraine (IBSS) for the Black Sea and has been extended towards the Mediterranean Sea under coordination of the Hellenic Sea of Marine Research (HCMR). In a first phase, 15 datasets from the Black Sea were identified and digitized through the support of so-called mini-data-grants. These mini-grants made it possible to attribute time and effort to digitize and quality control the data so they could contribute to EMODnet/EurOBIS. During the first phase, almost 120.000 distribution records on plankton, macro-algae, benthos and mammals were added to the portal. During the second phase, 13 datasets from the Black Sea and 11 datasets from the Mediterranean Sea were identified and are being digitized and made available to EMODnet/EurOBIS.

2.2.1 Growth EurOBIS data

The last year, the EurOBIS database grew with 447,575 distribution records from 81 different datasets. This increase came partly from the Black Sea and Mediterranean data program, but also other datasets from a different range of providers was integrated into EurOBIS.

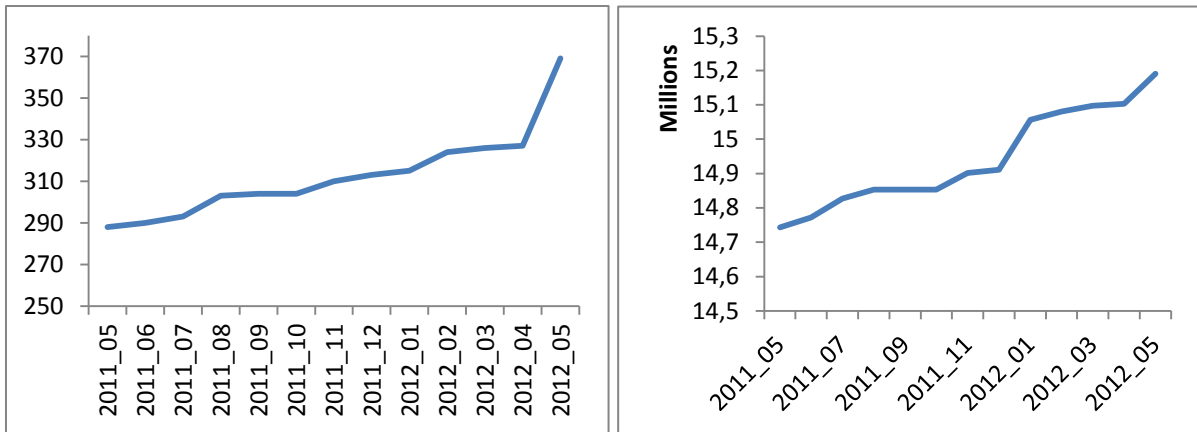


Fig 6: Growth EuroBIS datasets (left) and distribution records (right; in millions) during Maintenance phase of EMODnet Biology

2.2.2 Data products

Several marine biological data products, were being identified during a data product workshop and are added to the EMODnet biological data portal. During the maintenance phase 374 data products of different species groups are made available from the EMODnet biological data portal. These products are available as geographic maps, and are OGC compliant. The products include modelled distribution maps of economical important marine species (data provided by FAO), abundance and presence data of fish species, seagrasses and marine mammals from the Baltic Sea provided by HELCOM and European chlorophyll monitoring data provided by the EEA. Based on the data from the Continuous Plankton Recorder, gridded data products of monitoring data of Diatoms, Dinoflagellates Harmful Algae and Copepod abundances, were calculated and made accessible on the portal. Also some data products, based on the EuroBIS distribution data were calculated (number of species per species group, sampling effort per species group). The data product and data analysis workshop also provided concepts, ideas and functions for the calculation of biological diversity and species absence maps, based on the available EuroBIS data. These data products will be implemented in the future.

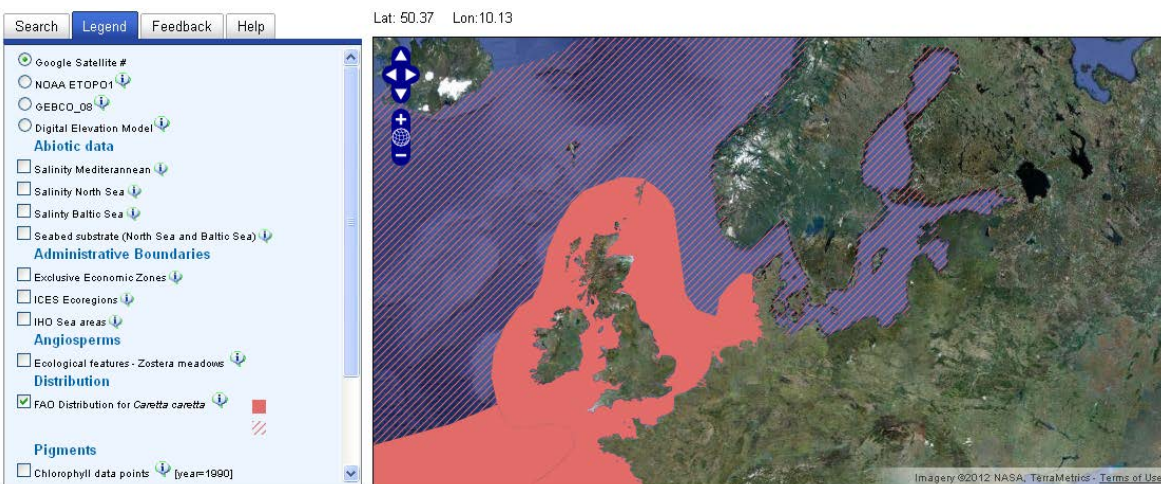


Fig 7: Example of a data product, the modelled distribution of the Loggerhead Turtle (*Caretta caretta*)

2.3. Workshops

During the development phase stakeholders were actively involved in the biological EMODnet project through the organization of workshops. These were organized to interact with scientists and policy makers to discuss the way forward in the field of data products and data analyses based on the already available data and to see which other data and information could contribute to EMODnet Biology. A first workshop was organized in February 2010, to discuss three topics:

1. The marine biological data availability and gaps in Europe
2. The prototype of the EMODnet biological data portal to different user groups
3. The development of a list of derived biological data products relevant for private bodies, public authorities and researchers.

Based on the observations made during this first workshop, a second workshop was organized in Crete, in October 2011. During this 3-day biological data analysis workshop, scientists wanted to test a number of scientific hypotheses related to biodiversity indices and the distribution patterns and trends of the European marine biodiversity. From these results, a number of the above-mentioned data products could be created. In addition to the available biological data, the participants also made use of the data offered through the other data portals, such as physico-chemical data, geological data, habitat maps and seabed maps. These data and data layers provided the necessary abiotic background information and the data layers could be used to strengthen the performed analyses. The EurOBIS database proved to be a very valuable data resource to calculate value added data products. The presence data could be used to calculate other derived biological parameters, useful for system analysis like the calculation of absence data or diversity indices. The variety of different contributing datasets gave rise to new possible correlations, for example between predator (mammals or seabirds) and prey (fish, zooplankton) datasets. This exercise triggered new scientific questions and some of them will be analyzed in more detail. Also significant new data sources were identified and mobilized into the system through the organization of this workshop.



Fig 8: Cover of second workshop report

3. Monitoring portal during maintenance phase

The first biological EMODnet portal was launched in March 2011. The prototype of the portal was launched to several relevant stakeholders across Europe (via several mailing lists, e.g. MarBEF, ...).

4.1. Visits to data portal

Since 2011, we start monitoring the usage of the data portal. This monitoring continued throughout the maintenance phase of the project. Figure 7 show the number of visitors, visits, hits of the website at March 14 2011. We see a peak when the portal was launched in March 2011, and then a gradual increase from September 2011.

Month	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Jan 2011	60	68	547	1336	80.63 MB
Feb 2011	271	397	2815	8078	572.03 MB
Mar 2011	634	1123	17572	35121	1.87 GB
Apr 2011	322	532	5212	12034	458.65 MB
May 2011	282	471	6149	12249	334.49 MB
Jun 2011	301	417	4005	8933	246.18 MB
Jul 2011	269	378	5067	8726	178.89 MB
Aug 2011	280	384	2180	4970	125.36 MB
Sep 2011	436	676	3194	8016	204.22 MB
Oct 2011	660	1078	6539	15275	460.45 MB
Nov 2011	670	1099	4273	11023	309.92 MB
Dec 2011	704	1104	4028	9602	230.01 MB
Total	4889	7727	61581	135363	5.00 GB

Month	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Jan 2012	808	1438	6800	14299	413.30 MB
Feb 2012	990	1898	10448	18689	534.17 MB
Mar 2012	1022	1550	11140	19558	442.14 MB
Apr 2012	718	1038	97917	103377	5.19 GB
May 2012	277	363	2687	4641	247.97 MB
Total	3815	6287	128992	160564	6.79 GB

Fig 8: Number of unique visitors, visits, pages and hits of the biological data portal during maintenance phase

4.2. Data downloads

Figure 9 shows the number of data downloads that was performed since January 2011. We see that at this moment 238 data downloads have been performed through the EMODnet portal (Annex I). Person, institute, email, purpose of download, download date and what was downloaded are monitored. At this moment it is too early to draw any final conclusions, but we see that the data have been used for a set of different purposes. After analysis of the download purposes, which are also provided in annex I, we can see that the main objective for data downloading was scientific research (PHD studies, scientific analysis, biogeographic research). Other categories include environmental

management, for example for environmental impact studies, data management activities, training purposes or external testing. Besides the data downloads, we also monitored 5145 WMS and WFS requests on the data server.

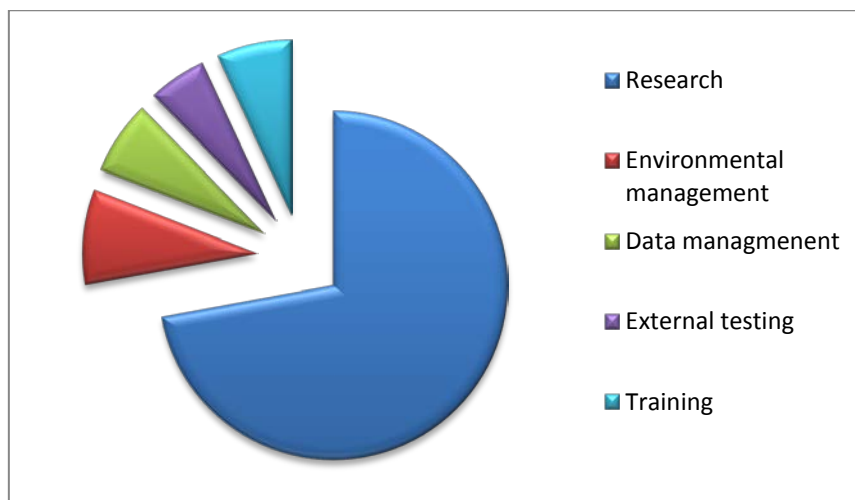


Fig 8: Relative distribution of data downloads from the EMODnet Biological data portal

5. Conclusions

During the maintenance phase from month 24 till month 36, the EMODnet Biological data portal was being maintained online. Despite the fact that the tender mentions no upgrading of the portal during the maintenance phase, some technical updates turned out to be necessary in order to assure the good functioning of the portal. The increased amount of data on the EMODnet biological data portal made several updates necessary to maintain a high performance of the portal like the automatic aggregation of data. Also, the automatic quality control procedures became unavoidable in order to maintain an acceptable quality of the data that are integrated into the system.

During the maintenance phase, several data management incentives and activities were carried out. It is essential to maintain an active dataflow towards the data portal but we have to take into account that biological data management is very labor intensive in terms of data identification, data standardization and quality control. The establishment of a data grants system in different sea basins under coordination of local partner turned out to be very successful in order to mobilize new biological data into the system. Besides raw observation and monitoring data, also aggregated biological data products were identified and made accessible through the EMODnet data portal. In some cases data providers are reluctant to share their raw data. However the creation of aggregated data and derived data products can be made available and thus overcome these barriers. These data products are provided as OGC compliant layers through the data portal and are a very strong visual tool. An extra workshop was organized to calculate biological data products based on the available data. The organization of these workshops also provided the possibility to interact with interested end users of the system and could disseminate information on the data portal and the EMODNET initiative.

Annex I Monitoring of the downloads of the EMODnet biological portal since February 2011

organisation	country	purpose	download_date	data
NULL	Netherlands	PhD	2011-01-24	Dataset: Historical hyperbenthos data (1987-2001) from the North Sea and some adjacent areas (35153)
NULL	Netherlands	PhD	2011-01-24	Dataset: Historical hyperbenthos data (1987-2001) from the North Sea and some adjacent areas (35153)
Nioz	netherlands	informative	2011-02-01	Dataset: macrobenthos in the Dutch Sector of the North Sea 1991-2001 (4663)
Nioz	netherlands	informative	2011-02-01	Dataset: macrobenthos in the Dutch Sector of the North Sea 1991-2001 (4663)
Netherlands Environmental Assessment Agency	The Netherlands	Scientific purposes (Governmental institution)	2011-02-02	Dataset: Seasearch Marine Surv...
Netherlands Environmental Assesemnt Agency	The Netherlands	Scientific research (Governmental institute)	2011-02-02	Dataset: Seasearch Marine Surv...
OBIS	USA	Integrating into iOBIS	2011-02-03	Dataset: Biocean (29954)
NULL	USA	Integration into iOBIS	2011-02-03	Dataset: Biocean (29954)
NULL	USA	Integration into OBIS	2011-02-03	Dataset: Biocean (29954)
NULL	USA	Integration into iOBIS	2011-02-03	Dataset: Biocean (29954)
NULL	USA	Integration into OBIS	2011-02-03	Dataset: Biocean (29954)
Alfred Wegener Institute for Polar and Marine Research, Bremerhaven	Germany	validation routines	2011-02-08	Chlorofyl a in Åµg/l in water(123929)
University of Vigo	spain	For classes	2011-02-22	Dataset: Taxonomic Information System for the Belgian coastal area (22150)
Malone O'Regan	Ireland	Research	2011-02-28	Dataset: BioMar - Ireland: ben...
Marine Institute	Ireland	Test	2011-03-04	Dataset: iziko South African Museum - Shark collection (162)
PANGAEA	Germany	Portal Evaluation	2011-03-04	Dataset: PANGAEA - Data from Glacial Atlantic Mapping and Prediction (GLAMAP2000) (16689)
PANGAEA	Germany	Portal Evaluation	2011-03-04	Dataset: PANGAEA - Data from Benthic biology and geochemistry of a North-Eastern Atlantic Abyssal locality (BENGAL) (1937)

PANGAEA	Germany	Portal Evaluation	2011-03-04	Dataset: PANGAEA - Data from Benthic biology and geochemistry of a North-Eastern Atlantic Abyssal locality (BENGAL) (1937)
university of auckland	new zealand	Biogeographic research	2011-03-05	Observations of Amphipoda (6828)
IODE trainer	USA	marine data mgt. training	2011-03-09	Observations of Abramis brama (358)
IODE	USA	marine data mgt. training	2011-03-09	Observations of Abramis brama (358)
IPIMAR	Portugal	Testing for MODEG	2011-03-10	Observations of Trachurus trachurus (72025)
IPIMAR	Portugal	Testing for MODEG	2011-03-10	Observations of Trachurus trachurus (72025)
CMRC	Ireland	Research	2011-03-14	Dataset: Cold water corals (3365)
CMRC	Ireland	Research	2011-03-14	Dataset: Cold water corals (3365)
Emu Limited	UK	Data comparisons	2011-03-16	Observations of Arctica islandica (4107)
German Federal Agency for Nature Conservation	Germany	science	2011-03-16	Dataset: Baltic Sea benthic meiofauna and macrofauna mid 1990s (611)
German Federal Agency for Nature Conservation	Germany	research	2011-03-16	Observations of Arctica islandica (4107)
German Federal Agency for Nature Conservation	Germany	research	2011-03-16	Observations of Arctica islandica (4107)
German Federal Agency for Nature Conservation	Germany	research	2011-03-16	Observations of Nucella lapillus (21617)
German Federal Agency for Nature Conservation	Germany	research	2011-03-16	Observations of Ostrea edulis (1305)
German Federal Agency for Nature Conservation	Germany	research	2011-03-16	Observations of Patella ulyssiponensis (1046)
German Federal Agency for Nature Conservation	germany	research	2011-03-16	Observations of Acipenser sturio (11)
NULL	Germany	research	2011-03-16	Observations of Alosa alosa alosa (7)
NULL	germany	reseach	2011-03-16	Observations of Alosa alosa (111)
NULL	Germany	research	2011-03-16	Observations of Thunnus thynnus (362)
NULL	Germany	research	2011-03-16	Observations of Thunnus thynnus thynnus (1)
NULL	Germany	research	2011-03-16	Observations of Squatina squatina (28)
NULL	Germany	research	2011-03-16	Observations of Squalus acanthias (17063)
NULL	Germany	research	2011-03-16	Observations of Caretta caretta (2670)

NULL	Germany	research	2011-03-16	Observations of Dermochelys coriacea (1753)
NULL	Germany	research	2011-03-16	Observations of Balaenoptera musculus (609)
NULL	Germany	research	2011-03-16	Observations of Balaena mysticetus (1)
NULL	germany	research	2011-03-16	Observations of Eubalaena glacialis (1)
NULL	Germany	research	2011-03-16	Observations of Phocoena phocoena (4901)
NULL	Germany	research	2011-03-17	Observations of Anguilla anguilla (3820)
NULL	Germany	research	2011-03-17	Observations of Centroscymnus coelolepis (140)
NULL	Germany	research	2011-03-17	Observations of Centrophorus granulosus (49)
NULL	germany	research	2011-03-17	Observations of Centrophorus squamosus (47)
NULL	germany	research	2011-03-17	Observations of Cetorhinus maximus (524)
NULL	Germany	research	2011-03-17	Observations of Coregonus lavaretus (549)
NULL	Germany	research	2011-03-17	Observations of Dipturus batis (1093)
NULL	Germany	research	2011-03-17	Observations of Raja batis (41)
NULL	Germany	research	2011-03-17	Observations of Raja montagui (10037)
NULL	Germany	research	2011-03-17	Observations of Gadus morhua (612879)
NULL	Germany	research	2011-03-17	Observations of Gadus morhua (612879)
NULL	germany	research	2011-03-17	Observations of Hippocampus guttulatus (14)
NULL	Germany	research	2011-03-17	Observations of Hippocampus hippocampus (22)
NULL	Germany	research	2011-03-17	Observations of Hippocampus ramulosus (42)
NULL	Germany	research	2011-03-17	Observations of Hoplostethus atlanticus (126)
NULL	Germany	research	2011-03-17	Observations of Lamna nasus (48)
NULL	Germany	research	2011-03-17	Observations of Petromyzon marinus (93)
NULL	Germany	research	2011-03-17	Observations of Raja clavata (12992)
NULL	Germany	research	2011-03-17	Observations of Rostroraja alba (1)
NULL	Germany	research	2011-03-17	Observations of Salmo salar (6238)
NULL	Germany	research	2011-03-17	Observations of Larus fuscus fuscus (67)
NULL	Germany	research	2011-03-17	Observations of Pagophila eburnea (80)

NULL	Germany	research	2011-03-17	Observations of Polysticta stelleri (7)
NULL	Germany	research	2011-03-17	Observations of Uria lomvia (304)
NULL	Germany	research	2011-03-17	Observations of Uria aalge
Environment Agency	UK	species mapping and marine protection zones	2011-03-17	Dataset: Eastern Channel dataset (493)
LOG UMR8187	France	I will use these data to estimate the ecological requirements of the speices	2011-03-17	Observations of Gadus morhua (612879)
IFM GEOMAR	Germany	The purpose of my research is to understand the impact of the environment on behaviour of species .	2011-03-17	Observations of Temora longicornis (39)
LOG UMR 8187	France	I study the ecological requirements of the specie.	2011-03-17	Observations of Gadus morhua (612879)
SMW	France	Ecological Niche	2011-03-17	Observations of Gadus morhua (612879)
UMR LOG 8187	France	The assess the ecological nich of the species	2011-03-18	Observations of Calanus finmarchicus (81034)
UMR 8187 LOG	France	Ecological Niche	2011-03-20	Observations of Gadus morhua
IFM-GEOMAR	Germany	Variation of Copepod behaviour and effect of biomass variation	2011-03-22	Observations of Temora longicornis (43737)
IFM-GEOMAR	Germany	effect of biomass on copepod behaviour	2011-03-22	Observations of Temora longicornis (43737)
IFM-GEOMAR	Germany	Effect of biomass on copepod behaviour	2011-03-22	Observations of Temora longicornis (613)
European Commission - JRC	Italy	Habitat modelling.	2011-03-23	Observations of Balaenoptera physalus (28820)
European Commission - JRC	Italy	Habitat modelling.	2011-03-23	Observations of Balaenoptera physalus (28820)
wintershall	netherlands	environmental analysis	2011-03-24	Dataset: Benthic fauna around Franz Josef Land (1714)
NULL	Netherlands	environmental analysis	2011-03-24	Dataset: Benthic Fauna in the Barents Sea (1410)
NULL	NL	environmental analysis	2011-03-24	Dataset: North Sea Benthos Survey (16838)
MRAG	UK	Mapping species	2011-04-01	Dataset: Marine Nature Conservation Review (MNCR) and associated benthic marine data held and managed by CCW (13897)
MRAG	UK	Testing portal downloads	2011-04-01	Dataset: Polish Arctic Marine Programme (603)

MRAG	UK	Testing download capability	2011-04-01	Dataset: Polish Arctic Marine Programme (603)
MRAG	UK	testing emodnet portal	2011-04-01	Dataset: Cysts from plankton from the South Adriatic Sea (146)
MRAG	UK	For a study on bird interactions with fishing vessels	2011-04-05	Observations of Puffinus puffinus (34868)
MRAG	UK	For a study on Bird interaction with fishing vessels for DG Mare	2011-04-05	Observations of Puffinus puffinus (34868)
MRAG	UK	For a study on Bird interactions with fishing vessels for DG MARE	2011-04-05	Observations of Uria aalge (197767)
MRAG	UK	for a study on bird interactions with fishing vessels for DG Mare	2011-04-05	Observations of Uria aalge (197767)
MRAG	UK	For a study on bird interactions with fishing vessels for DG MARE	2011-04-05	Observations of Uria aalge (197767)
MRAG	UK	for a study on the interaction between birds and Fishing vessels for DG MARE	2011-04-05	Observations of Cephus grylle (4141)
BMT	UK	research	2011-04-08	Dataset: North Sea Benthos Survey (16838)
mrage	UK	To conduct a study on behalf of DG Mare on the data in the Emodnet portals, and the accessibility of the data	2011-04-11	Observations of Uria aalge (197767)
MRAG	UK	To conduct a study on behalf of DG Mare on the data in the Emodnet portals, and the accessibility of the data	2011-04-11	Dataset: PIROP Northwest Atlantic 1965-1992 (9836)
NOAA	USA	Habitat mapping	2011-04-18	NULL
Creocean	France	Data collection for environmental studies	2011-04-26	Dataset: European Seabirds at Sea - data collected by the Research Institute for Nature and Forest (INBO), Belgium (85090)
Creocean	France	Data collection for environmental studies	26/04/2011	Dataset: European Seabirds at Sea - data collected by the Research Institute for Nature and Forest (INBO), Belgium (85090)
NULL	Germany	I am leading part of a project which aims to investigate the relationship between species and environment.	17/05/2011	Observations of Amphipoda, including child taxa

University of Hamburg	germay	I am part of a project which aims to investigate the relationship between species and environment.	17/05/2011	Observations of Amphipoda, including child taxa
University of Hamburg	Germany	I am part of a project which aims to investigate the relationship between species and environment.	17/05/2011	Dataset: PANGAEA - Data from paleoenvironmental reconstructions from marine sediments @ AWI
University of Hamburg	Germany	I am part of a project which aims to investigate the relationship between species and environment	17/05/2011	undefined
University of Hamburg	Germany	I am part of a project which aims to investigate the relationship between species and environment	17/05/2011	undefined
University of HAMBURG	GERmany	I am part of a project which aims to investigate icelandic benthic fauna	17/05/2011	undefined
NULL	Germany	I am part of a project which aims to investigate icelandic fauna	17/05/2011	undefined
Marine Institute	Ireland	Habitat mapping research	20/05/2011	Dataset: BioMar - Ireland: benthic marine species survey
Heriot Watt University	Scotland	PhD research into Marine Spatial Planning using GIS	26/05/2011	NULL
VAttenfall	UK	Offshore windfarm site analysis	6/06/2011	NULL
Vattenfall	UK	Offshore wind farm site analysis	6/06/2011	NULL

Vattenfall	UK	Offshore wind farm site analysis	6/06/2011	NULL
Aarhus University	Denmark	Marxan study on fishery and bird conflicts.	21/06/2011	Observations of Gadus morhua, including synonyms
Aarhus University	Denmark	Marxan study fishery, conflict with bird habitats	21/06/2011	NULL
Aarhus University	Denmark	Marxan study fishery, conflict with bird habitats	21/06/2011	NULL
Aarhus University	Denmark	Marxan study fishery, conflicts with birds	21/06/2011	undefined
NULL	Denmark	Marxan study	21/06/2011	undefined
vims	usa	research	17/07/2011	Dataset: MAR-ECO 2004
NHM	UK	Meta-analysis	21/08/2011	Dataset: Aegean Sea Bathyal Nematodes
Tragsatec	Spain	Working on related fields	21/09/2011	Dataset: CeDoc de Biodiversitat Vegetal: BCN-Phycophyta
NULL	Scotland - UK	conservation and MPAs	18/10/2011	Observations of Lagenorhynchus acutus
NULL	germany	creating a conceptual map	18/10/2011	Observations of Amphipoda, including child taxa
NULL	Germany	creating a conceptual map	18/10/2011	Observations of Gammaridea, including child taxa
UCL	Belgium	Research	27/10/2011	Annual Anomaly of Copepoda Biomass
Universidade Aveiro	Portugal	PhD project	8/11/2011	Dataset: Seabird 2000
Universidade Aveiro	Portugal	PhD Project	11/11/2011	Dataset: MEDITS Seabird surveys 1999 - 2000 - 2002
Universidade Aveiro	Portugal	PhD project	18/11/2011	Dataset: Continuous Plankton Recorder (Zooplankton)

Universidade Aveiro	Portugal	PhD project	18/11/2011	Dataset: Continuous Plankton Recorder (Zooplankton)
Netherlands Environmental Assessment Agency	Netherlands	Scientific research	22/11/2011	Observations of Calanus finmarchicus
Netherlands Environmental Assessment Agency	Netherlands	Scientific research	22/11/2011	Observations of Calanus finmarchicus
Universidade Aveiro	Portugal	PhD project	22/11/2011	Dataset: IOW Macrozoobenthos monitoring Baltic Sea (1980-2005)
Universidade Aveiro	Portugal	PhD project	23/11/2011	Dataset: CeDAMar database for benthic biological sampling on the abyssal plains: European data
Universidade Aveiro	Portugal	PhD project	23/11/2011	Dataset: Continuous Plankton Recorder (Phytoplankton)
Universidade Aveiro	Portugal	PhD project	23/11/2011	Dataset: Continuous Plankton Recorder (Phytoplankton)
Universidade Aveiro	Portugal	PhD project	23/11/2011	Dataset: Continuous Plankton Recorder (Zooplankton)
Universidade Aveiro	Portugal	PhD project	24/11/2011	Dataset: Continuous Plankton Recorder (Phytoplankton)
NULL	Portugal	PhD project	24/11/2011	Dataset: Continuous Plankton Recorder (Zooplankton)
NULL	Portugal	PhD project	24/11/2011	Dataset: Continuous Plankton Recorder (Zooplankton)
NULL	Portugal	PhD project	24/11/2011	Dataset: NODC World Ocean Database 2001: Plankton Data
NULL	Portugal	PhD project	25/11/2011	Dataset: A comparison of benthic biodiversity in the North Sea, English Channel and Celtic Seas
NULL	Portugal	PhD project	25/11/2011	Dataset: Historical quantitative benthos grab samples from the Southern Baltic Sea - Polish data
NULL	Portugal	PhD project	25/11/2011	Dataset: Historical quantitative benthos grab samples from the Southern

				Baltic Sea - German data
NULL	Portugal	PhD project	25/11/2011	Dataset: Continuous Plankton Recorder (Phytoplankton)
NULL	Portugal	PhD project	25/11/2011	Dataset: Continuous Plankton Recorder (Zooplankton)
NULL	Portugal	PhD project	28/11/2011	Dataset: Continuous Plankton Recorder (Phytoplankton)
NULL	Portugal	PhD project	29/11/2011	Dataset: Alaska Ocean Observing System
NULL	Portugal	PhD project	1/12/2011	Dataset: MedOBIS
UPMC	France	teaching purposes	2/12/2011	Dataset: MAR-ECO 2004 - Mammals and birds
University of Hamburg	Germany	analysis of putative correlation with benthic fauna distribution	4/12/2011	Observations of Gadus morhua, including synonyms
NULL	Germany	investigating putative correlation between the selected species and benthic fauna	4/12/2011	Observations of Gadus morhua, including synonyms
NULL	germany	investigate the putative correlation between the selected species and benthic fauna	4/12/2011	undefined
NULL	germany	investigate the putative correlation between the selected species and benthic fauna	4/12/2011	undefined
NULL	germany	investigate the putative correlation between the selected species and benthic fauna	4/12/2011	undefined
NULL	germany	investigate the putative correlation between the selected	4/12/2011	undefined

		species and benthic fauna		
NULL	Belgium	Scientific purpose	7/12/2011	Observations of Abra alba
NULL	Belgium	Scientific purposes	7/12/2011	NULL
NULL	uk	ncMPA process Scotland	16/12/2011	NULL
NULL	uk	MPAs scotland	16/12/2011	NULL
NULL	uk	MPAs scotland	16/12/2011	NULL
NULL	uk	mapping black guillemot	16/12/2011	Observations of Cephus grylle
University of Hamburg	Germany	Food web exploration	2/01/2012	Dataset: IOW Macrozoobenthos monitoring Baltic Sea (1980-2005)
Maja	Germany	food web exploration	2/01/2012	Dataset: IOW Macrozoobenthos monitoring Baltic Sea (1980-2005)
Maja	Germany	food web exploration	2/01/2012	Dataset: Baltic Sea benthic meiofauna and macrofauna mid 1990s
Maja	Germany	food web exploration	2/01/2012	Dataset: Baltic Sea benthic meiofauna and macrofauna mid 1990s
Maja	Germany	food web exploration	2/01/2012	Dataset: Baltic Sea benthic meiofauna and macrofauna mid 1990s
University of St Andrews	UK	building of a database containing longterm biodiversity studies	16/01/2012	Dataset: A comparison of benthic biodiversity in the North Sea, English Channel and Celtic Seas
University of St Andrews	UK	building of a database containing longterm biodiversity studies	16/01/2012	Dataset: A comparison of benthic biodiversity in the North Sea, English Channel and Celtic Seas
University of St Andrews	UK	building of a database containing long-term biodiversity studies	16/01/2012	Dataset: Alaska Ocean Observing System
University of St Andrews	UK	creating of a database containing long-term biodiversity studies	17/01/2012	Dataset: MEDITS Seabird surveys 1999 - 2000 - 2002

University of St Andrews	UK	building of a database containing long-term biodiversity studies	19/01/2012	Dataset: Brachiopoda from sampling campaigns in the French part of the Mediterranean during the 1970-1990s
University of St andrews	UK	building of a database containing long-term biodiversity studies	19/01/2012	Dataset: CRRU Cetacean sighting in Scotland waters 1997-2010
University of St Andrews	UK	building of a database containing long-term biodiversity studies	20/01/2012	Dataset: Macroalgae of the Crimean coastal zone (Black Sea, 1967-2007)
University of St Andrews	UK	building of a database containing long-term biodiversity studies	20/01/2012	Dataset: North Sea observations of Crustacea, Polychaeta, Echinodermata, Mollusca and some other groups between 1986 and 2003
University of St Andrews	UK	building of a database containing long-term biodiversity studies	20/01/2012	Dataset: North Sea observations of Crustacea, Polychaeta, Echinodermata, Mollusca and some other groups between 1986 and 2003
University of St Andrews	UK	building of a database containing long-term biodiversity studies	25/01/2012	Dataset: United Kingdom National Whale Stranding Database 1913-2008
university of sheffield	uk	phd on shifting baselines in coastal ecosystem services	27/01/2012	Dataset: Historical benthos data from the North Sea and Baltic Sea from 1902-1912
university of sheffield	uk	phd on shifting baselines in coastal ecosystem services	27/01/2012	Dataset: Historical benthos data from the North Sea and Baltic Sea from 1902-1912
HCMR	Greece	research	30/01/2012	Observations of Posidonia angustifolia
HCMR	Greece	research	30/01/2012	Observations of Posidonia angustifolia
HCMR	Greece	research	30/01/2012	Observations of Posidonia oceanica
NULL	United Kingdom	PhD study on Shifting Baseline in COastal Ecosystem Service Provision	31/01/2012	Dataset: Historical benthos data from the North Sea and Baltic Sea from 1902-1912
NULL	United Kingdom	phd	31/01/2012	Dataset: Cefas05 - Structure of nematode communities in the

				southwestern North Sea
NULL	United Kingdom	PhD on coastal ecosystem service provision	31/01/2012	Dataset: European Seabirds at Sea - data collected by the Research Institute for Nature and Forest (INBO), Belgium
IBSS	Ukraine	To store in local data archive.	2/02/2012	Dataset: Seagrasses of the Crimean coastal zone (Black Sea, 1960-2009)
IBSS	Ukraine	To store in local data archive.	2/02/2012	Dataset: Macroalgae of the Crimean coastal zone (Black Sea, 1967-2007)
NULL	spain	possible phd thesis	8/02/2012	Dataset: Continuous Plankton Recorder (Phytoplankton)
NULL	spain	possible phd thesis	8/02/2012	Dataset: Continuous Plankton Recorder (Phytoplankton)
NULL	spain	research	8/02/2012	Dataset: Continuous Plankton Recorder (Phytoplankton)
ICES	Denmark	for MSFD matrix exercise	17/02/2012	Dataset: Marine Nature Conservation Review (MNCR) and associated benthic marine data held and managed by JNCC
NULL	UK	PhD	19/02/2012	Dataset: European Seabirds at Sea - data collected by the Research Institute for Nature and Forest (INBO), Belgium
Laboratoire d'océanographie de Villefranche	France	Estimates of North Sea calcification rates	20/02/2012	Dataset: North Sea Benthos Survey
r	France	Studies	27/02/2012	NULL
WHOI	USA	I am generally interested in phytoplankton diversity, and am attempting to get to know the data sets that may be used to estimate diversity. I have no formal plans for this data.	5/03/2012	Dataset: L4 Plankton Monitoring Programme
WHOI	USA	I am generally interested in phytoplankton diversity, and am	5/03/2012	Dataset: L4 Plankton Monitoring Programme

		attempting to get to know the data sets that may be used to estimate diversity. I have no formal plans for this data.		
NULL	spain	research	6/03/2012	Dataset: Continuous Plankton Recorder (Phytoplankton)
Laboratoire d'Océanographie Villefranche sur Mer	France	study of benthic calcification as part of a Master thesis	7/03/2012	Dataset: Biocean
Laboratoire d'Océanographie de Villefranche sur Mer	France	study of benthic calcification as part of a Master thesis	7/03/2012	Dataset: Biocean
Laboratoire d'Océanographie de Villefranche sur Mer	France	study of benthic calcification as part of a Master thesis	7/03/2012	Dataset: Pembrokeshire Marine Species Atlas
Laboratoire d'Océanographie de Villefranche sur Mer	France	study of benthic calcification as part of a Master thesis	7/03/2012	Dataset: Pembrokeshire Marine Species Atlas
Laboratoire d'Océanographie de Villefranche sur Mer	France	study of benthic calcification as part of a Master thesis	7/03/2012	Dataset: North Sea Benthos Survey
Laboratoire d'Océanographie de Villefranche sur mer	France	study of benthic calcification as part of a Master thesis	7/03/2012	Dataset: BioMar - Ireland: benthic marine species survey
LOV	France	study of benthic calcification as part of a Master thesis	7/03/2012	Dataset: BioMar - Ireland: benthic marine species survey
LOV	France	Study of benthic calcification	7/03/2012	Dataset: Plymouth Sound macrofauna

Lov	France	Study of benthic calcification	7/03/2012	Dataset: Benthos Gironde Estuary
LOV	France	Study of benthic calcification	7/03/2012	Dataset: BioMar - Ireland: benthic marine species survey
LOV	France	Study of benthic calcification	7/03/2012	Dataset: Bay of Puck dataset
LOV	France	Study of benthic calcification	7/03/2012	Dataset: National Marine Monitoring Programme data set
LOV	France	Study of benthic calcification	7/03/2012	Dataset: N3 data of Kiel bay
LOV	France	Study of benthic calcification	7/03/2012	Dataset: 70 samples data of Kiel Bay
university of sheffield	uk	phd on coastal ecosystem services	10/03/2012	undefined
university of sheffield	uk	phd on coastal ecosystem services	10/03/2012	undefined
university of sheffield	uk	phd on coastal ecosystem services	10/03/2012	undefined
university of sheffield	uk	phd on coastal ecosystem services	10/03/2012	undefined
university of sheffield	uk	phd on coastal ecosystem services	10/03/2012	undefined
university of sheffield	uk	phd on coastal ecosystem services	10/03/2012	undefined
LOV	France	Study of benthos calcification	26/03/2012	Dataset: LBMRev
LOV	France	Study of benthos calcification	26/03/2012	Dataset: Occhipinti dataset
Consultant	United Kingdom	Investigating relationship between Risso's Dolphin, Horse	2/04/2012	Observations of Grampus griseus, including synonyms

		Mussel beds and cephalopods.		
Consultant	United Kingdom	Investigating relationship between Risso's Dolphin, Horse Mussel beds and cephalopods.	2/04/2012	Observations of Modiolus modiolus
Consultant	United Kingdom	Investigating relationship between Risso's Dolphin, Horse Mussel beds and cephalopods.	2/04/2012	Observations of Eledone, including child taxa
Plymouth University Student	UK	MSc research project	11/04/2012	NULL
Plymouth University Student	UK	MSc research project	11/04/2012	NULL
DTU Aqua, Denmark	Denmark	Scientific use, during a workshop on biological valuation	18/04/2012	Dataset: North Sea Benthos Survey
NULL	Belgium	BVM workshop	18/04/2012	Dataset: Long term trends in the macrobenthos of the Belgian Continental Shelf
DTU Aqua, Denmark	Denmark	Scientific purpose, during a workshop on Biological Valuation	18/04/2012	Dataset: Macrobenthos data from the Doggerbank - 2000
DTU Aqua	Denmark	Scientific research	19/04/2012	Dataset: North Sea Benthos Survey
DTU Aqua	Denmark	Scientific research	19/04/2012	Dataset: North Sea Benthos Survey
DTU Aqua	Denmark	Scientific research	19/04/2012	Dataset: North Sea Benthos Survey
NULL	Belgium	Training	19/04/2012	Dataset: Biogeography Scheldt Estuary
NULL	Belgium	Training	19/04/2012	Dataset: Biogeography Scheldt Estuary
NULL	Belgium	Training	19/04/2012	Dataset: Biogeography Scheldt Estuary

UNIBO	Italy	Research	19/04/2012	NULL
unibo	Italy	research	19/04/2012	NULL
NULL	Italy	research	19/04/2012	NULL
NULL	Italy	research workshop	19/04/2012	NULL
NULL	italy	reserach workshop	19/04/2012	NULL
NULL	BE	workshop research	19/04/2012	NULL