BONN AGREEMENT

DATA REQUEST NOTE

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CONTENTS

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APPENDICES

1 Introduction

1.1 Background

The BE-AWARE project is the first area-wide risk assessment of marine oil pollution for the Greater North Sea using a common methodology that allows the risk for impacts to be mapped and compared for different scenarios. The project outcomes will improve disaster prevention by allowing the countries around the Greater North Sea to better focus their resources on areas of high risk. The project is in part funded by the EU Civil Protection Financial Instrument, the project partners and co-financers. The project is coordinated by the Bonn Agreement Secretariat.

This data request note specifies the work to be carried out during the data collection for the project in terms of the type of data requested, data format, possible sources of information and allocation of tasks between Project Partners and Bonn Agreement Secretariat/COWI.

The requested data will be used for modelling and describing the response preparedness and the environmental and socio-economic sensitivity towards oil spills. The note describes the additional data requirements of the BE AWARE II project, based on the method modifications, which have arisen from the BE AWARE project. The development of the note has been built on the outcome of the method seminar held between the contracting parties (CP) in Southampton on April 8-9 2014.

1.2 Data collection strategy

The data collection will be carried out by Project Partners, Bonn Agreement and COWI and coordinated by the Bonn Agreement coordinator in line with this data Request Note. The collected data will be stored in a centrally held database with geo-referenced data developed by Bonn Agreement. COWI will prepare the maps from the collected data

The data collection will be carried out in two rounds:

- During the first round the required data are provided and stored in the database. COWI will aggregate the data and prepare the required maps. The maps will then be presented to the project partners. During the presentation some gaps or inconsistencies may appear.
- During the second round these gaps will be filled by provision of additional information by the partners and/or Bonn Agreement to achieve a higher level of consistency of the data inventory

The final data inventory will form the basis for the sensitivity ranking workshop and hence the data analyses within the project.

The Project Partners Countries (and EMSA) will collect data that are only available nationally and Bonn Agreement Secretariat/COWI will collect centrally available data.

1.2.1 Data collected by Project Partner Countries

The primary task of the project partner countries (including EMSA) is to collect:

- Data on response capability to oil spills
- Data required for the scenarios to be modelled and
- Data on selected socioeconomic features

The data requested from the Project Partner Countries are specified in Chapter 4 below).

Although some of the information is expected to be provided by central sources (Cf. Chapter 5 Environmental data), individual countries are encouraged to provide such data if readily available. Such data will be valuable for verification of the central sources and potentially suited for upgrading and updating the central information.

1.2.2 Data collected by Bonn Agreement Secretariat and COWI

This section specifies the data to be collected by Bonn Agreement and COWI from central sources including:

- Data for habitat mapping

- Data for mapping of bird areas
- Data for mapping marine mammal areas
- Data for mapping spawning and nursery areas for fish
- Data on location of protected areas
- Data on selected socioeconomic sites

The data to be collected by Bonn Agreement/COWI are specified in Chapter 5 below).

2 Methodology vulnerability mapping

The data on environmental and socioeconomic features collected through this note will be used for a common North Sea area-wide vulnerability mapping approach.

During BE-AWARE 1 it was agreed that the vulnerability ranking should be based on a methodology that should be prepared by MUMM, The Management Unit for North Sea Mathematical Modelling at The Royal Belgian Institute of Natural Sciences. MUMM participates in the Bonn Agreement cooperation. The method description is documented and reported in (Schallier et al, 2013). The method is a modification of the BRISK methodology (Brisk, 2012) to comply with the findings and recommendations of the BE-AWARE 1.

2.1 Overall procedure

The ranking of the vulnerability of ecological and socioeconomic features to oil spills in the different regions of the BA area will be carried out in the following four distinct steps:

- **Step 1,** which include the identification of ecological and socioeconomic features to be mapped and ranked according to vulnerability to oil spill.
- **Step 2,**which include the mapping of the identified ecological and socioeconomic features
- **Step 3** which include the ranking of the vulnerability of the identified ecological and socioeconomic features to oil spill, during the four seasons:
  - Spring (March, April, May)
  - Summer (June, July, August)
  - Autumn (September, October, November) and
  - Winter (December, January, February)

› **Step 4** which include the total seasonal vulnerability mapping by combining the results of Step 3.

Step1 was basically carried out during Be Aware 1. This data request note defines and specify the environmental and socioeconomic data to be collected for the mapping (part of **Step 2**). The remaining steps will be carried out when the data have been collected.

2.2 Environmental and socioeconomic features to be mapped

A long-list of selected ecological and socioeconomic features to be mapped and ranked according to sensitivity to oil spill was made during Be Aware 1 (Schallier et al., 2013). The identified ecological features are listed in Table 1-1 and the identified socioeconomic features are listed in Table 1-2 (with some amendments made by COWI).

Table 1-1 Sensitive environmental features identified during BE-AWARE 1 to be mapped and ranked according to sensitivity to oil spill.

Sensitive Ecological features in the BA area	
Shoreline and Coastal Habitats	**Species Features**
› Exposed rocky shores and reefs (<20m;> 20m) › Sheltered rocky shores and reefs (<20m;> 20m) › Littoral chalk communities › Sandy beaches › Shingle beaches › Muddy beaches › Tidal sand and mud flats › Salt marshes › Estuaries › Large shallow inlets and bays › Coastal lagoons (open to the sea) › Underwater sandbanks (<20m;> 20m) › Biogenic reefs (<20m;> 20m) › Maerl beds › Seagrass beds	› Wintering areas for birds › Staging areas for birds › Breeding areas for birds (incl. foraging areas) › Moulting areas for birds › Coastal feeding grounds for otters › Breeding, moulting and haul-out sites for seals › Feeding, breeding and migration areas for cetaeceans › Spawning areas for fish › Nursery areas for fish
Open Sea Habitats	**Coastal and marine Protected areas**
› Open water (<20m) › Deep sea floor (>20m) › Deep sea water column (>20m) › Seamounts › Coral gardens and sponge aggregations › Carbonate mounds › *Lophelia pertusa* reefs › Sea-pen and burrowing megafauna	› EC Habitat and Birds Directive (SACs and SPAs) › RAMSAR Convention › OSPAR Convention › Etc.

Table 1-2 Sensitive Industries and socioeconomic features identified during BE-AWARE 1 that will be mapped and ranked according to sensitivity to oil spill.

Sensitive Industries and Socioeconomic features in the BA area	
Fisheries	**Aquaculture**
› Offshore fisheries › Coastal fisheries (incl. fishing harbours) › Shellfish/seaweed (algae) harvesting	› Fish farms › Shellfish cultures › Algae cultures
Tourism and recreation	**Coastal facilities with sea water inlets**
› Amenity beaches › Marinas › Tourism activities › Densely populated towns and communities › Surfing hot spots › Main recreational fishing locations › Cruise liner stops	› Energy plants › Onshore fish farms › Industrial activities (incl. oil and chemical industry)
Heritage sites	**Ports**
Mineral extraction sites	**Renewable energy sites** › Wind farm areas

3 Data Formats

All data shall be provided as GIS shape files in the first instance. If they are not available and cannot be sourced geographical coordinates or in some cases maps will be accepted. The GIS requirements of the data are given below:

The preferred GIS format is as ArcGIS shape files. All data are required to use the projected coordinate reference system World Geodetic System 1984 (WGS84) in the form of an associated .prj file. All shape files to be provided with a minimum of an associated .dbf, .sbn and shx file in addition to the .prj file.

4 Data to be collected by Project Partner Countries

This section specifies the data to be collected by the Project Partner Countries. The Project partners are requested to collect the following types of data:

› Data on response capability to oil spills

› Data required for the scenarios to be modelled

› Data on selected socioeconomic features

4.1 Data on response capability to oil spills

The data in request on response capability to oil spills include information on existing response capabilities and locations of equipment. This should include the following information on oil spill combat vessels:

› Number of vessels , home port, response time, speed, capacity

› Information on equipment (booms, skimmers and storage)

› Wave restriction (wind speed, fetch, wave height 1.5 m)

› Daylight restriction (seasonal) and bad visibility restriction (regional).

It is important to know the amount and type of equipment, which can be deployed from a given vessel. Additionally, availability of additional storage capacity of recovered oil is be included in the excel spreadsheet.

An excel workbook together with an explanatory note has been developed to accompany this note for gathering of all information. Appendix A outlines the sheet for response equipment. An explanatory note intending to guide and facilitate the process of filling is presented in Appendix C

4.2 Data required for the scenarios to be modelled

An excel spreadsheet has also been developed to describe the specific information required for the 10 model scenarios decided upon. The spreadsheet is attached as Appendix B. The purpose and the content of the requests of the appendix are explained in the following.

4.2.1 Scenario classes

Three scenario classes are selected by the project partners:

1 Two Reference (Ref.) scenarios
requiring descriptions of the response measures (RM) in the reference scenario for the year 2011 (now situation) and for the year 2020 (future scenario). The difference between these scenarios will illustrate the expected risk development comprising the expected development of ship traffic, marine special planning and risk reducing measures (RRM) and RM s as decided upon.

2 Five Risk Reducing Measure (RRM) scenarios
requiring descriptions of additional RRM in the year 2020. The result of the analyses for these scenarios shall be compared with the result of the 2020 reference scenario mentioned above in order to compare the relative effect and the cost estimate of introducing the specific scenario and to decide whether or not the scenario is viable.

3 Three Response Measure (RM) Scenarios
requiring descriptions of additional RM in the year 2020. The result of the analyses for these scenarios shall be compared with the result of the 2020 reference scenario mentioned above in order to quantify the relative effect and the cost estimate of introducing the specific scenario and to decide whether or not the scenario is viable.

Reference scenarios:

1 <u>2011: Existing risk reducing and response measures.</u>
The current response measures needs to be given in the appendix A (the existing RRM are included already).

2 2020: Risk reducing and response measures already planned.
The future response measures already planned need to be given in the appendix A. This is the reference scenario that all remaining scenarios have to be compared with (the RRM decided upon for 2020 are included already).

Risk Reduction Measure scenarios:

3 2020: Vessel Traffic Services (VTS) in selected areas.
Please provide shape file with the areas that you would like to have included for this scenario. This can include any areas in the BE-AWARE area that you consider additional VTS would be beneficial. An estimate of the cost of the systems should also be included.

4 2020: Traffic Separation Schemes (TTS) in selected areas.
Please inform about the extent of the routes (shape file) where you would like to have included TSS for this scenario anywhere in the BE-AWARE area. An estimate of the cost of the systems should also be included.

5 2020: AIS guard rings and virtual buoys in selected areas.
Please provide shape file with the areas that you would like to have included for this scenario (e.g. guard ring areas around dangerous areas not covered by VTS including those outside territorial waters, i.e. wind farms.) The range of the measure shall be included with the shape file. An estimate of the cost of the systems should also be included.

6 2020: Vessel Traffic Management (VTM) in selected areas.
In this case VTM means a fully integrated traffic management and control system equivalent to air traffic control. Please provide shape file with the areas that you would like to have included for this scenario. This can include any areas in the BE-AWARE area that you consider VTM would be beneficial. Please also inform about the effect and price of this scenario compared to VTS.

7 2020: Mandatory pilotage in wind farm areas.
Please provide shape file with the areas that you would like to have mandatory pilotage included, this can include wind farms outside territorial waters. The range of the measure shall be included, i.e. with the shape file. An estimate of the cost of the systems should also be included.

Response Measure Scenarios

8 2020: Improved night visibility.
The efficiency of oil collection during application of improved night visibility is compared to the efficiency of oil collection during daylight. A quotient has to be given. In BRISK this efficiency quotient was set to 0.85, meaning that the crews only are 85% efficient during night. During OTSOPA a quotient of 0.6 or even 0.5 was discussed.
It is important the vessel is identified on which the device is expected to be mounted and the expected efficiency. This vessel shall be identifiable in Appendix A or Scenario 10. An estimate of the cost of the systems should also be included.

9 2020: Further use of dispersants.
To what extent wish the partners to apply dispersants in this scenario. Please fill in the overview of the use according to the appendix.
For countries that are able to describe the policy, method, efficiency and costs of deploying dispersant their respective information will be used. In cases where countries only intent to investigate "what would be the effect of applying dispersants in this and that area – we have never done it and we don't know how to do it" it is the intention to apply the methods and approaches from a neighbouring country, e.g. UK.

10 2020: Additional response equipment as suggested by Project Partners.
Please provide information on equipment that the project partners wish to have included in this scenario. This means specifics about the location of the material etc. Please remember to fill in the costs section of the spreadsheet.

The information required for the scenarios should be reported in the excel workbook which supports this data request note (example in appendix B), and comprise shape files and filled in versions of the individual spreadsheets. If shape files cannot be provided the corner positions of the areas (polygon) can be given in latitude, longitude in decimal degrees.

An explanatory note intending to guide and facilitate the process of filling is presented in Appendix C.

4.3 Socio-economic information

The Project Partner Countries are requested the collect information on the following features (should be submitted in line with section 3):

- Location of shellfish/seaweed (algae) harvesting
- Location of aquaculture facilities including fish farms, shellfish cultures and alga-cultures
- Location of tourism sites including amenity beaches (including blue flag beaches), marinas, tourism activity (Ireland), surfing hot spots and recreational fishing location
- Location of coastal facilities with water inlets including energy plants onshore fish farms and industrial activities (incl. oil and chemical industry)
- Location of heritage sites

The remaining socio-economic parameters will be collected from central sources by Bonn Agreement and COWI (Cf. Chapter 5).

5 Data to be collected by Bonn Agreement and COWI

This section specifies the data to be collected by Bonn Agreement and COWI from central sources including:

- Data for habitat mapping
- Data for mapping of bird areas
- Data for mapping marine mammal areas
- Data for mapping spawning and nursery areas for fish
- Data on Location of Protected areas
- Data on selected socioeconomic sites

The requested data are specified in the following and possible sources of information described.

5.1 Data for habitat mapping

The mapping of habitats shall be based on a combination of the EUNIS habitat classification system and the classification used in the EU Habitats Directive Annex 1:

- The European Nature Information System (EUNIS) habitat classification is a pan-European system, which was developed between 1996 and 2001 and updated in 2004 by the European Environment Agency (EEA) in collaboration with experts from throughout Europe. It covers all types of natural and artificial habitats, both aquatic and terrestrial.
- Annex 1 in the EU Habitats directive has defined certain habitats, for which the Natura-2000 sites are designated to protect.

By combining these two classification systems it will be possible to map all the habitats defined for the Be Aware Project which are specifically relevant in an oil spill context. Table 3-1 to Table 3-3 shows the relationship between the defined “Be Aware habitats” and the EUNIS/ Annex 1 Habitat types. As will be seen the defined “BeAware habitats” can be mapped by combining different EUNIS classifications or use the Annex 1 Habitat types.

5.1.1 Possible sources of information for habitats

Maps based on EUNIS classification

Maps (and shape files) of marine habitats using the EUNIS classification can be obtained from the following sources:

- EUSeaMap. This project prepared a seabed habitat map for the North Sea, Celtic Sea and Western Mediterranean using the EUNIS classification

(Cameron and Askew 2011). The project is described in http://jncc.defra.gov.uk/euseamap. Downloads of WebGIS data are also available on this site (Figure 3-1).

› UKSeaMap 2010 project. This project prepared a seabed habitat map for the UK marine area. (McBreen,et al 2011) (Information and data from this project can be found on: http://jncc.defra.gov.uk/page-2117)

› MESH (Mapping European Seabed Habitats) is project that produced a framework for seabed habitat mapping using EUNIS classification. The project included twelve partners across Belgium, France, Ireland, the Netherlands and the UK. The geographical extent of the project was the Exclusive Economic Zones (EEC) of the partner countries (Coltman et al 2008). Information and data from this project can be found on www.searchMESH.net.

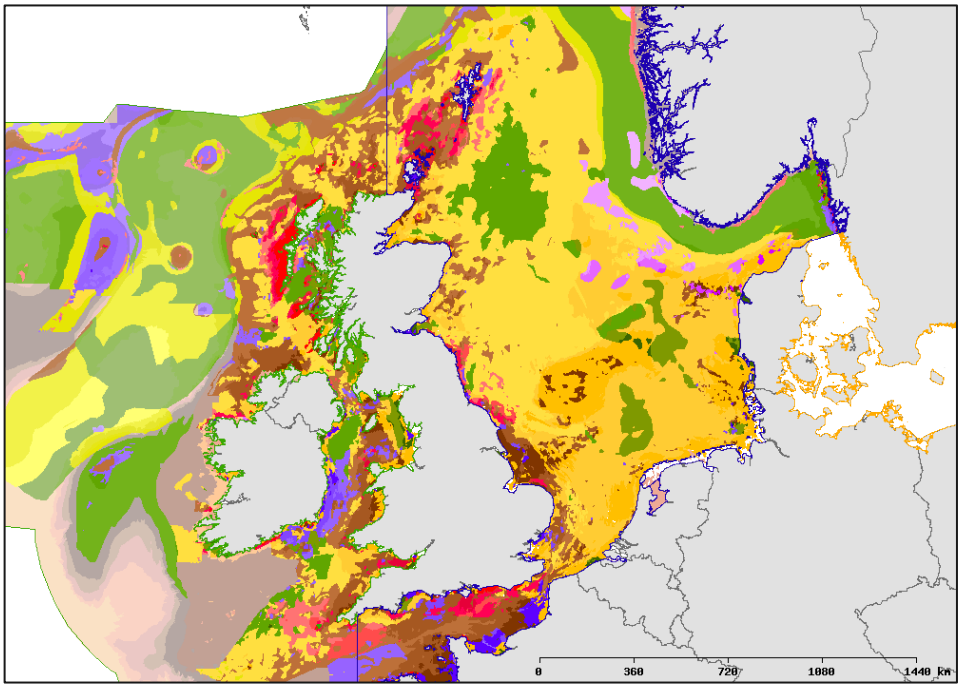


Figure 5-1 EUSeaMap. Habitat mapping based on the EUNIS classification (Cameron and Askew 2011)

Maps based on Annex 1 habitats classification

Maps of the location of different Annex 1 habitats may be found in the management plans for the Natura 2000 sites, that EU member states have been prepared. Article 6 (1) of the Habitats Directive stipulates that for “special areas of conservation, Member States shall establish the necessary conservation measures involving, if need be, appropriate management plans specifically designed for the sites or integrated into other development plans”. As Natura 2000 is implemented by the Member States, management plans play an important role in reaching the objectives of the Natura 2000 network. Many management plans for Natura 2000 sites contain maps of the distribution of Annex 1 habitat types.

For the UK digital maps of the distribution of certain Annex 1 habitats can be found on http://jncc.defra.gov.uk/page-5201.

Table 3-1 Shoreline and coastal habitats. Overview of EUNIS habitats and Annex 1 Habitat types and their relationship with the defined "Be Aware habitats)

"Be Aware Habitat"	EUNIS Code	EU Habitats Directive Annex 1 Habitat type
Exposed rocky shores and reefs	Include the following EUNIS habitats: A1.1 *High energy littoral rock* A3.1 *Atlantic and Mediterranean high energy infralittoral rock* A4.1 *Atlantic and Mediterranean high energy infralittoral rock*	The category "exposed rocky shores" not included in Annex 1 1170 *Reefs* (include both biogenic and non-biogenic reefs)
Sheltered rocky shores and reefs	Include the following EUNIS habitats: A1.2 *Moderate energy littoral rock* A1.3 *Low energy littoral rock* A3.2 *Atlantic and Mediterranean moderate energy infralittoral rock* A3.3 *Atlantic and Mediterranean low energy infralittoral rock* A4.2 *Atlantic and Mediterranean moderate energy circalittoral rock* A4.3 *Atlantic and Mediterranean low energy circalittoral rock*	The category "sheltered rocky shores" not included in Annex 1 1170 *Reefs* (include both biogenic and non-biogenic reefs)
Littoral chalk communities	Include the following EUNIS habitats: A1.126 *Osmundea pinnatifida on moderately exposed mid eulittoral rock* A1.2143 *Fucus serratus and piddocks on lower eulittoral soft rock* A1.441 *Chrysophyceae and Haptophyceae on vertical upper littoral fringe soft rock* B3.114 *Blidingia spp on vertical fringe chalk* B3.115 *Ulothrix flacca and Urospora spp on freshwater influenced vertical fringe soft rock*	Not included in Annex1
Sandy beaches	Include the following EUNIS habitats: B1.1 *Sand beach driftlines* B 1.2 *Sand beaches above the driftline*	Not included in Annex1
Shingle beaches	Include the following EUNIS habitats: A2.11 *Shingle (pebble) and gravel shores* B2 *Coastal shingle*	

Table 3-2 Shoreline and coastal habitats. Overview of EUNIS habitats and Annex 1 Habitat types and their relationship with the defined "Be Aware habitats)

"Be Aware Habitat"	EUNIS Code	EU Habitats Directive Annex 1 Habitat type
Muddy beaches	No EUNIS code defined Muddy beaches are found in connection with tidal mud flats/saltmarshes	Not included in Annex1
Tidal sand flats	A2.2 *Littoral sand and muddy sand*	1140 *Mudflats and sandflats not covered by seawater at low tide*, i.e. include both tidal sand flats and tidal mud flats
Tidal mud flats	A2.3. *Littoral mud*	*1140 Mudflats and sandflats not covered by seawater at low tide*
Salt marshes	A2.5 *Coastal saltmarshes and saline reedbeds*	1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) 1310 Salicornia and other annuals colonising mud and sand 1320 Spartina swards (*Spartinion maritimae*)
Estuaries	No EUNIS code defined This habitat include several of the habitats for which there is a EUNIS code	1130 *Estuaries*
Large shallow inlets and bays	No EUNIS code defined This habitat include several of the habitats for which there is a EUNIS code	1160 *Large shallow inlets and bays*
Coastal lagoons	No EUNIS code defined This habitat includes several of the habitats for which there is a EUNIS code.	1150 * *Coastal lagoons*
Underwater sandbanks	A5.2 *Sublittoral sand*	1110 *Sandbanks which are slightly covered by sea water all the time*
Biogenic reefs	Include the following EUNIS habitats: A2.71 *Littoral Sabellaria reefs* A4.22 Sabellaria reefs on circalitttoral rock A561 *Subittoral polycaheta worm reefs on sediment* A2.721 *Mytilus edulis beds on littoral sediments* A5.62 *Sublittoral mussel beds on sediment*	1170 *Reefs* (includes both biogenic and non-biogenic reefs*)*
Maerl beds	A5.51 *Maerl beds*	
Seagrass beds	Include the following EUNIS habitats: A2.61 *Seagrass beds on littoral sediments* A5.53 *Sublittoral seagrass beds*	Not included in Annex 1

Table 3-3 Open sea habitats. Overview of EUNIS habitats and their relationship with the defined "Be Aware habitats".

Habitat	EUNIS Code	Remarks / possible source of data
Open water	A7. *Pelagic water column*	
Deep sea floor	A6.1 *Deep sea rock and artificial hard substrata* A6.2. *Deep-sea mixed substrata* A6.3. *Deep-sea-sand* A6.4. *Deep-Sea muddy sand* A6.5 *Deep-sea mud* A6.7 *Raised features of the deep sea bed* A6.8 *Deep sea trenches and canyons, channels slope failures and slumps on the continental slope* A6.9 *Vents, seeps, hypoxic and anoxic habitats of the deep sea*	
Deep sea water column	No EUNIS code defined	
Seamounts	A6.72 *Seamounts, knolls and banks*	
Coral gardens and sponge aggregations	**Coral gardens** occurs within each of following types (cf. deep sea floor Habitat above) A6.1, A6.2, A6.3, A6.4, A6.5, A6.7 , A6.8 and A6.9 **Deep sea sponge aggregations**: A6.62: *Deep-sea sponge aggregations*	Possible source of data for occurrence of **deep sea corals**: OSPAR 2008 Hall-Spencer, et al (2007) ICES (2007) There is no comprehensive overview of the distribution of **deep-sea sponge aggregations** within the OSPAR area (OSPAR 2008)
Carbonate mounds	A6.75 *Carbonate mounds*	
Lophelia pertusa reefs	A5.631 Circalittoral *(Lophelia pertusa)* reefs A6.611. Deep sea (*Lophelia pertusa*) reefs	Possible sources of data for distribution of *Lophelia pertusa* reefs in Europe: OSPAR 2008 ICES 1999 Freiwald (1998) Hovland & Mortensen 1999
Sea-pen and burrowing megafauna	A5.361 *Seapens and burrowing megafauna in circalittoral fine mud* A5.362 *Burrowing megafauna and Maxmuelleris lankestri in circalittoral mud*	

5.2 Data for mapping of bird areas

The following bird areas shall be mapped

- Important wintering areas for birds

- Important breeding areas for birds (including offshore feeding areas around breeding colonies)
- Important moulting areas for birds
- Important staging areas for birds

The species shown I Table 3-4 shall be included in the mapping. From information on the distribution of these species during winter, spring, summer and autumn maps of wintering, breeding areas, and moulting areas can be prepared.

Staging areas will be mapped primarily from the distribution of wading birds during spring and autumn.

Table 3-4 Species of Seabirds that shall be included in the mapping

SEABIRDS	
Red throated Diver (*Gavia stellata*)	Goosander (*Mergus merganser*)
Black-throated Diver (*Gavia arctica*)	Great Skua (*Catharacta skua*)
Great Northern Diver (*Gavia immer)*	Little gull (*Larus minutus*)
Great Crested Grebe (*Podiceps cristatus*)	Common Gull (*Larus canus*)
Red-necked Grebe (*Podiceps grisegena*)	Lesser Black-backed Gull (*Larus fuscus*)
Cormorant (*Phalacrocorax carbo*)	Herring Gull (*Larus argentatus*)
Shag (*Phalacrocorax aristotelis*)	Great Black-backed Gull (*Larus marinus*)
Fulmar *(Fulmarus glacialis*)	Kittiwake (*Rissa tridactyla*)
Gannet (*Morus bassanus*)	Sandwich tern (*Sterna sandvicensis*)
Scaup (*Aythya marila*)	Common tern (*Sterna hirundo*)
Common eider (*Somateria mollissima*)	Guillemot (*Uria aalge*)
Common scoter (*Melanitta nigra*)	Razorbill (*Alca torda*)
Velvet scoter *(Melanitta fusca*)	Black Guillemot (*Cephus grille*)
Goldeneye (Bucephala clangula)	Little auk (*Alle alle*)
Red-breasted Merganser (*Mergus serrator*)	Puffin (Fretecula arctica)

5.2.1 Possible sources of information for mapping of birds

Available data

Data on bird distribution in the North Sea are available from the OBIS-Seamap (2013), which is an online accessible database with sea bird data hosted by JNCC (Joint Nature Conservation Committee). Several northwest European organizations have contributed with data to this database using standardized methods for counting birds primarily from ships. The data are collected in the period 1965 to 2011 and most of the data are from mid-1970's to early 1990's, but are regularly updated. The general distribution pattern of sea birds in the North Sea has, however not changed since the first comprehensive mapping of sea birds was conducted during the 1970's and 1980's.

Reports

Maps of important areas for seabirds in the North Sea including the English Channel and the Kattegat have been published by BirdLife International, which may be used for the BEAware II project. The maps are published in:

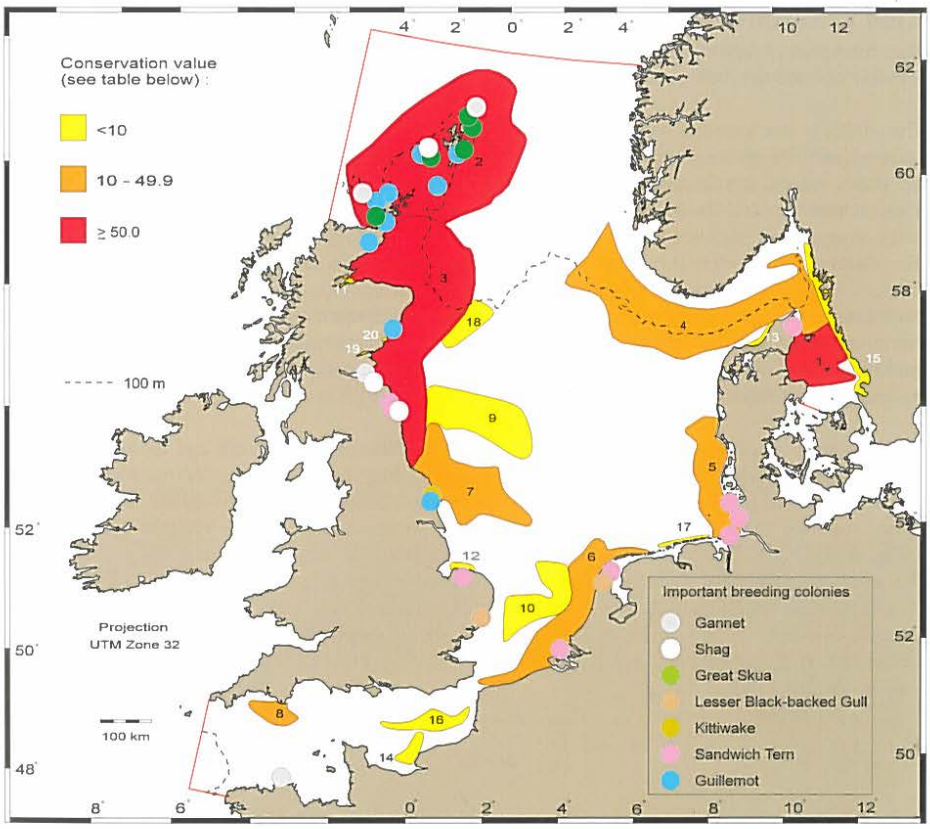
- Skov H, J. Durinck, M.F. Leopold & M.L. Tasker (1995). Important Birds Areas for seabirds in the North Sea including the channel and the Kattegat. Published by BirdLife International 1995.

The maps are in hard copy. We do not know whether digital maps are available. In case digital maps are not available the hard copy maps could be digitized. Figure 3-2 and Figure 3-3 show some examples of maps from this paper

Other possible sources of information on distribution of birds in the North Sea are:

- Carter I.C., Williams, J.M., Webb, A. & Tasker, M.L., (1992), Seabird concentrations in the North Sea: an atlas of vulnerability to surface pollutants, Companion volume to Vulnerable concentrations of seabirds south and west of Britain, NHBS No. 49352, 40 pages, A4 softback, ISBN 1 873701 25 X

- Stone CJ, A Webb, C Barton, N Ratcliffe, TC Reed, ML Tasker, CJ Camphuizen & MW Pienkowsky (1995). An atlas of seabird distribution in north-west European waters, 326 pages. http://jncc.defra.gov.uk/page-2407#download



Location and extent of the 20 selected areas and breeding colonies of international importance for seabirds in the North Sea, the Channel and the Kattegat.

Areas of international importance for seabirds in the North Sea, the Channel and the Kattegat. The sum of proportions for each area is the cumulative percentage of each species occurring within the area in internationally important concentrations, compared to the total biogeographic population. % is percentage of grand sum of 'sum of proportions' (465.4).

Area	No of species	Sum of proportions	%
1 Northern Kattegat	10	96.7	20.5
2 Orkney – Shetland	7	93.0	19.7
3 Moray Firth – Aberdeen Bank – Tees	9	71.7	15.2
4 Skagerrak – Southwest Norwegian Trench	6	47.3	10.0
5 Eastern German Bight	6	47.3	10.0
6 Cap Gris Nez – Schiermonnikoog	7	35.4	7.5
7 Flamborough Head and the Hills	7	27.8	5.9
8 Start Point	2	10.9	2.3
9 Northeast Bank	2	8.3	1.8
10 Brown Ridge – Broad Fourteens	3	7.9	1.7
11 Inner Moray Firth	2	4.9	1.0
12 Scolt Head	1	4.1	0.9
13 Jammerbugt	1	3.8	0.8
14 Baie de la Seine – Cap D'antifer	1	2.3	0.5
15 Swedish West Coast	1	2.0	0.4
16 East Channel	1	1.9	0.4
17 East Frisian Islands	1	1.9	0.4
18 Long Forties	1	1.8	0.4
19 Tay Bay	1	1.1	0.2
20 Montrose Bay	1	1.0	0.2
Total conservation value		**471.1**	**100.0**

Figure 5-2 Location and extent of 20 selected areas and breeding colonies of international importance for seabirds in the North Sea, the channel and the Kattegat (from Skov et al 1995)

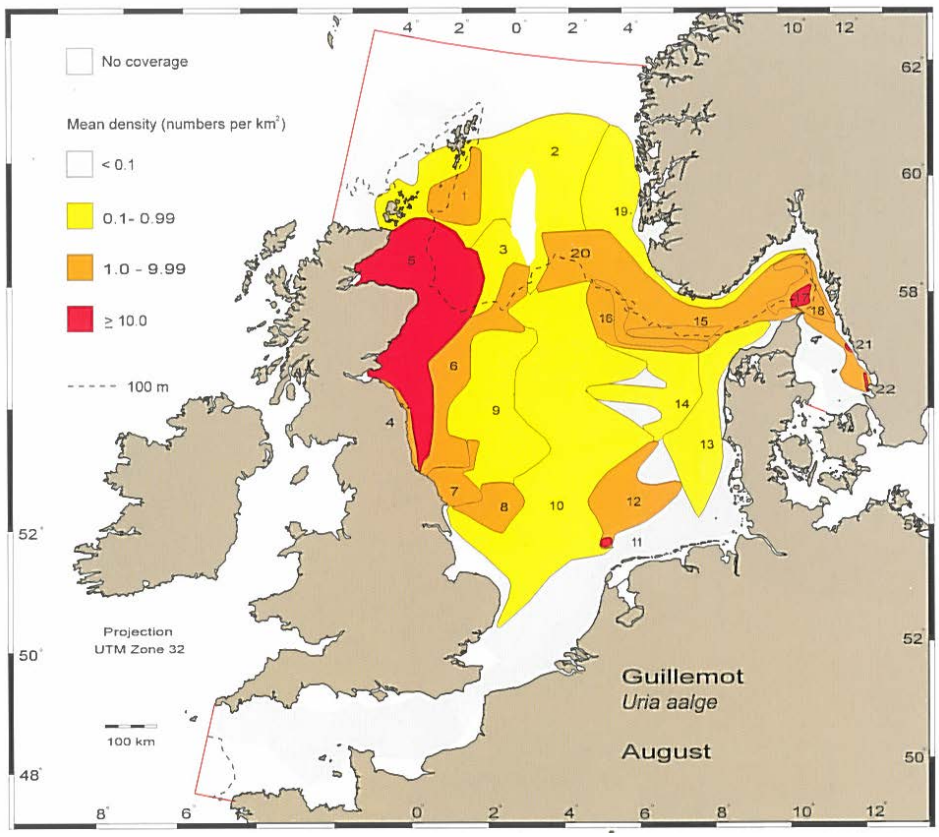


Figure 5-3 *Distribution and density of Guille mot (Uria aalge) in the North Sea, the Channel and the Kattegat in August 1980-1994 (from Skov et al. 1995)*

5.3 Data for mapping marine mammal areas

Data need to be collected on distribution of common marine mammals in the North Sea. That include:

- Coastal feeding grounds for otters
- Breeding, moulting and haul-out sites for Harbor seal and Grey seal.
- Cetacean distribution, sites known for breeding and feeding.

5.3.1 Possible sources of information for mammals

Various institutions and projects have available data on marine mammals in the North Sea. This includes distribution patterns, breeding grounds feeding grounds and known migration patterns. Potential sources of information include:

- JNCC Atlas of Cetacean distribution in north-west European water. An account and snapshot of the distribution of all cetacean species in the waters off north-west Europe. http://jncc.defra.gov.uk/page-2713 (Example of map shown in Figure 3-1).

- Scans II project. EU Life project with the aim to determine the absolute abundance of small cetacean populations in the North Sea. http://biology.st-andrews.ac.uk/scans2/

- CODA project. Similar to Scans II, but focus on common dolphin, bottlenose dolphin, fin whale, deep diving whales and other cetaceans in offshore waters of the European Atlantic. http://biology.st-andrews.ac.uk/coda/

- NAMMCO, The North Atlantic Marine Mammal Commission. An international body for cooperation on the conservation, management and study of marine mammals in the North Atlantic.

- Common Wadden Sea Secretariat. Joint cooperation between DK, D and NL on Wadden Sea ecosystem. Data available on harbor seal, grey seal and harbor porpoise distribution in the area. http://www.waddensea-secretariat.org/monitoring-tmap/topics/marine-mammals

- EMOD net. European Marine Observation and Data network. http://www.emodnet-biology.eu/portal/index.php

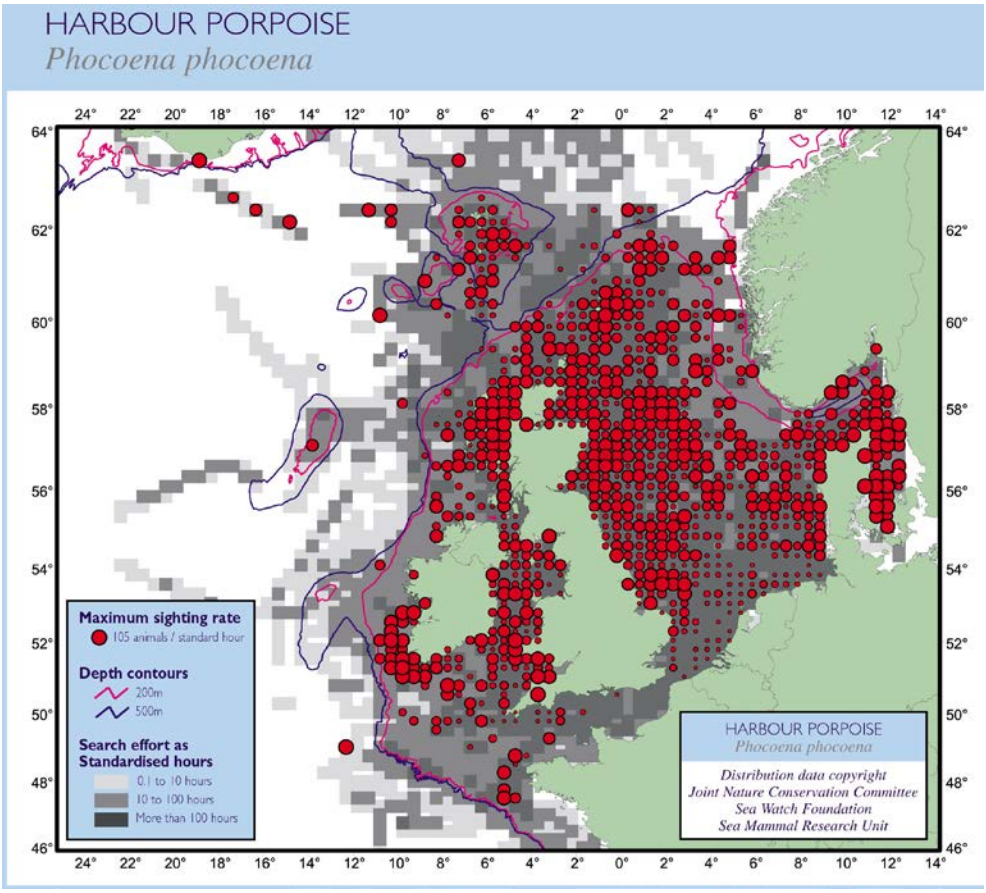


Figure 5-4 Distribution of Harbour porpoise (from JNCC Atlas of Cetacean distribution in north-west European water.)

5.4 Data for mapping of spawning and nursery areas for fish

The spawning and nursery areas for the most important commercial exploited fish species in the BA area shall be mapped, including the following species:

- Herring (*Clupea harengus*)
- Sprat (*Sprattus sprattus*)
- Cod (*Gadus morhua*)
- Haddock (*Melanogrammus aeglefinus*)
- Whiting (*Merlangius merlangus*)
- Blue whiting (*Micromesistius poutassou*)
- Norway pout (*Trisopterus esmarkii*)
- Saithe (*Pollachius virens*)
- European hake (*Merlucchius merlucchius*)
- Horse mackerel (*Trachurus trachurus*)
- Sandeels (*Ammodytes marinus*)
- Mackerel (*Scomber scombrus*)
- Plaice (*Pleuronectes platessa*)
- Sole (Solea sole)

For each of these species maps of location of spawning and nursery areas must be provided, similar to the two examples below (Figure 3-5 and Figure 3-6).

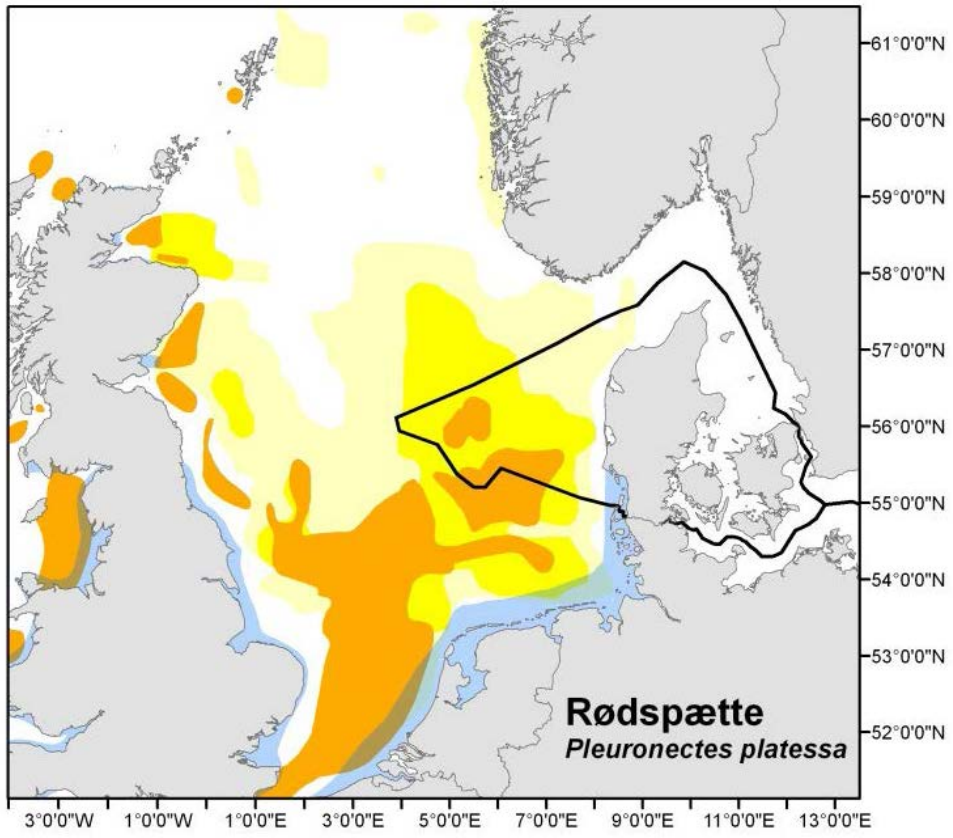


Figure 5-5 *Known spawning and nursery areas for plaice (Pleuronectes platessa) in the North Sea. Orange colour indicates areas with relatively large concentrations of plaice eggs. Yellow colour indicates areas with relatively few eggs. Blue colour indicates nursery areas From the Danish basis analysis for the implementation of the EU Marine strategy Directive (from Warnar et al 2012).*

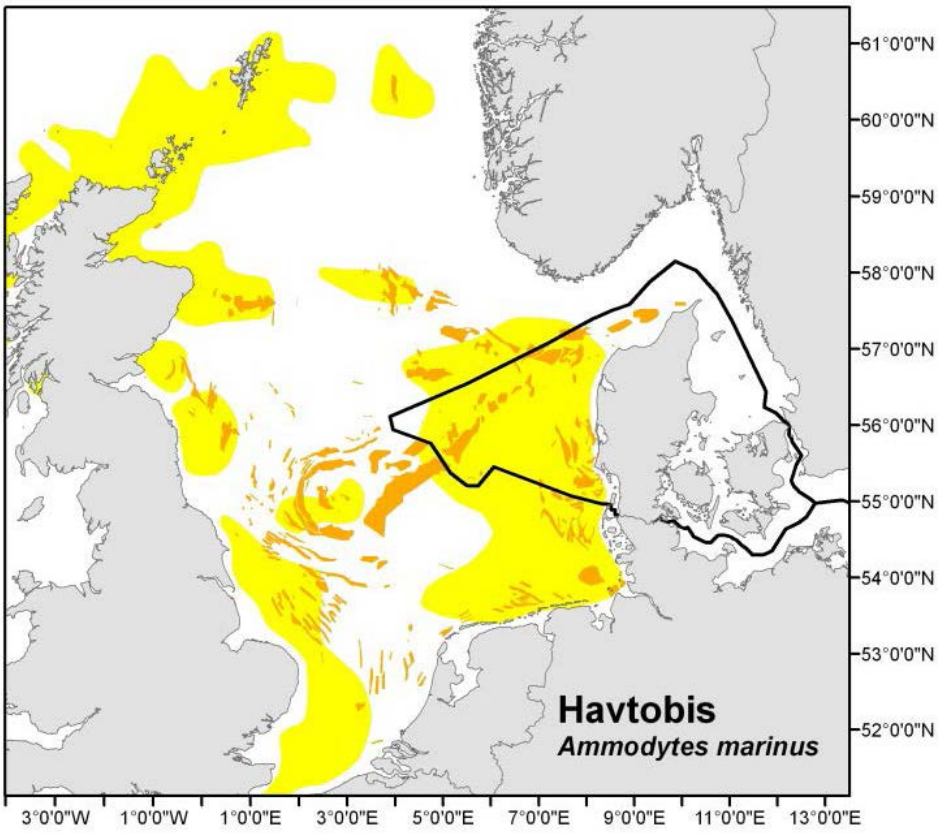


Figure 5-6 *Known spawning and nursery areas for sandeel (Ammodytes marinus) in the North Sea. For sandeel spawning and nursery areas are found at the same sites. Orange colour indicates most important areas. Yellow colour indicates less important areas. From the Danish basisanalysis for the implementation of the EU Marine strategy Directive (from Warnar et al 2012).*

5.4.1 Possible sources of information on spawning and nursery areas for fish

Available data

ICES maintain a large database which includes data on fish eggs and larvae from various international surveys. Fish egg and fish larvae data have been collected in the ICES community for a long time for use in stock assessments and management of stocks and spawning areas. The collection of the data is generally organized by ICES coordinated international survey expert groups. The data are stored in a database at ICES Data Centre. The database contains haul information data as well as the raw data on eggs and larvae. Currently, the database contains the data outlined in Table 3-5.

Table 3-5 Data on fish eggs and fish larvae stored in the database at ICES datacentre

Surveys	Purpose of survey
North Sea cod and plaice egg surveys (2004, 2009)	The survey is aimed at studying cod and plaice spawning grounds by means of egg distribution in the North Sea. Data for other relevant species are also found (i.e. egss of whiting, haddock, Norway pout, long rough dab and larvae of sandeel and herring) The program was steered by the WGEGGS until 2012 and is currently steered by WGEGGS2 (Working Group on North Sea Cod and Plaice Egg Surveys in the North Sea)
Atlantic eel (Anguilla anguilla and A. rostrata) surveys (1902-2007)-Not relevant for BeAware II	The dataset includes data gathered from various surveys conducted in different times in North Atlantic. The surveys were focused on different stages of eel larvae and the spawning area in the Sargasso Sea. The ICES group in charge of the eel larvae data is WGEEL.
The International Herring Larvae Surveys (1967-present)	The ICES programme of international herring larval surveys in the North Sea and adjacent areas is in operation since 1967. The main purpose of this programme is to provide quantitative estimates of herring larval abundance, which are used as a relative index of changes of the herring spawning-stock biomass in the assessment. The collection of the herring larvae data is the responsibility of WGIPS.
Mackerel and horse mackerel eggs	A survey is carried out every 3 years in the north eastern Atlantic. The year after the Atlantic survey, a mackerel egg survey is conducted in the North Sea. The survey creates a basis for the stock assessment of Atlantic and North Sea mackerel and management plan for Atlantic horse mackerel. The group responsible for the survey is WGMEGS (The working group on mackerel and horse mackerel egg surveys)

Available reports

Results and analyses of the North Sea cod and plaice egg surveys (WGEGGS and WGEGGS2) can be found in EG's reports on the ICES website and papers published in various scientific journals including:

- ICES. 2010. Report of the Working Group on North Sea Cod and Plaice Egg Surveys in the North Sea (WGEGGS), 9–11 November 2010, ICES Headquarters, Copenhagen. ICES CM 2010/SSGESST:23. 29 pp.
- Fox, C. J., Taylor, M., Dickey-Collas, M., Fossum, P., Kraus, G., Rohlf, N., Munk, P., et al. (2008). Mapping the spawning grounds of North Sea cod (Gadus morhua) by direct and indirect means. Proceedings of the Royal Society B: Biological Sciences, 275: 1543-1548.
- Taylor, N., Fox, C. J., Bolle, L., Dickey-Collas, M., Fossum, P., Kraus, G., Munk, P., et al. (2007). Results of the spring 2004 North Sea ichthyoplankton surveys. The distribution of fish eggs and larvae from the international ichthyoplankton survey. 60 pp pp.

- Munk, P., Fox, C. J., Bolle, L. J., Damme, C. J. G. v., Fossum, P., and Kraus, G. (2009). Spawning of North Sea fishes linked to hydrographic features. Fisheries Oceanography, 18: 458-469.

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- Nash, R. D. M., Wright, P. J., Matejusova, I., Dimitrov, S. P., O'Sullivan, M., Augley, J., and Höffle, H. (2012). Spawning location of Norway pout (Trisopterus esmarkii Nilsson) in the North Sea. ICES Journal of Marine Science: Journal du Conseil, 69: 1338-1346.

In addition several other reports and papers are available that contain maps of spawning and nursery areas for fish in the North Sea and adjacent waters. Some are presented in Table 3-6.

Table 3-6 Additional report and papers that contain maps of spawning and nursery areas for fish in the North Sea and adjacent waters.

Reference	Information on spawning and nursery ground for fish
Ellis et al 2012	Contain maps of spawning and nursery areas around the British Isles for: herring, cod, whiting, blue whiting, European hake, horse mackerel, sandeels, mackerel, plaice, sole
Warnar et al 2012.	Contain maps of spawning and nursery areas for Cod, whiting, haddock, saithe, herring, sprat, sandeel, mackerel, plaice, sole
Worsøe et al 2002	Contain maps of spawning and nursery areas for Cod, whiting, haddock, saithe, herring, sprat, sandeel, mackerel, plaice, sole
Cefas 2001	Contain maps of spawning areas for: Whiting, cod, haddock, saithe, Norway pout, plaice, sole, herring, sandeel, mackerel and sprat
Cefas 1998	Contain maps of spawning and nursery areas for: Mackerel, herring, cod, haddock,whiting, saithe, plaice , sole, Norway pout, blue whiting, sandeels, sprat, Norway lobster
Lee & Ramster 1981	Contain maps of spawning areas for: Plaice, sole,cod, haddock,saithe, whiting, sprat, Norway pout, blue whiting, herring, mackerel

5.5 Protected areas

The location of the following protected areas shall be mapped

- EC Habitat and Birds Directive sites (SACs and SPAs) (Natura 2000)

- RAMSAR Convention sites

- OSPAR Convention sites

5.6 Data for socioeconomic features

5.6.1 Data to be collected

Bonn Agreement and COWI will collect the following data on socioeconomic features:

- Location of offshore fisheries and coastal fisheries (data on fishing effort for different species in ICES statistical squares. Alternatively value of catch of different species in ICES squares)
- Location of fishing harbours
- Location of tourism activity
- Location of densely populated town and communities
- Location of ports
- Location of cruise liner stops
- Location of mineral extraction areas
- Locations of wind farms

5.6.2 Possible sources of information

Possible sources of information for socioeconomic features to be collected by Bonn Agreement/COWI include:

- For Fisheries (data on fishing effort for different species in ICES statistical squares. Alternatively value of catch of different species in ICES squares):
  - ICES database
  - MMO (2012). Evaluating the distribution, trends and value of inshore and offshore fisheries in England. A report produced for the Marine Management Organization. pp761. MMO Project No: 1011. ISBN: 978-1-909452-04-6. (Figure 5-7 shows an example of maps from this report).
- For tourism accommodations: EUROSTAT
- For Densely populated towns and communes: GISCO-EUROSTAT; http://www.citypopulation.de)
- For World heritage sites: UNESCO
- For Ports: World Port Index http://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_pageLabel=msi_portal_page_62&pubCode=0015

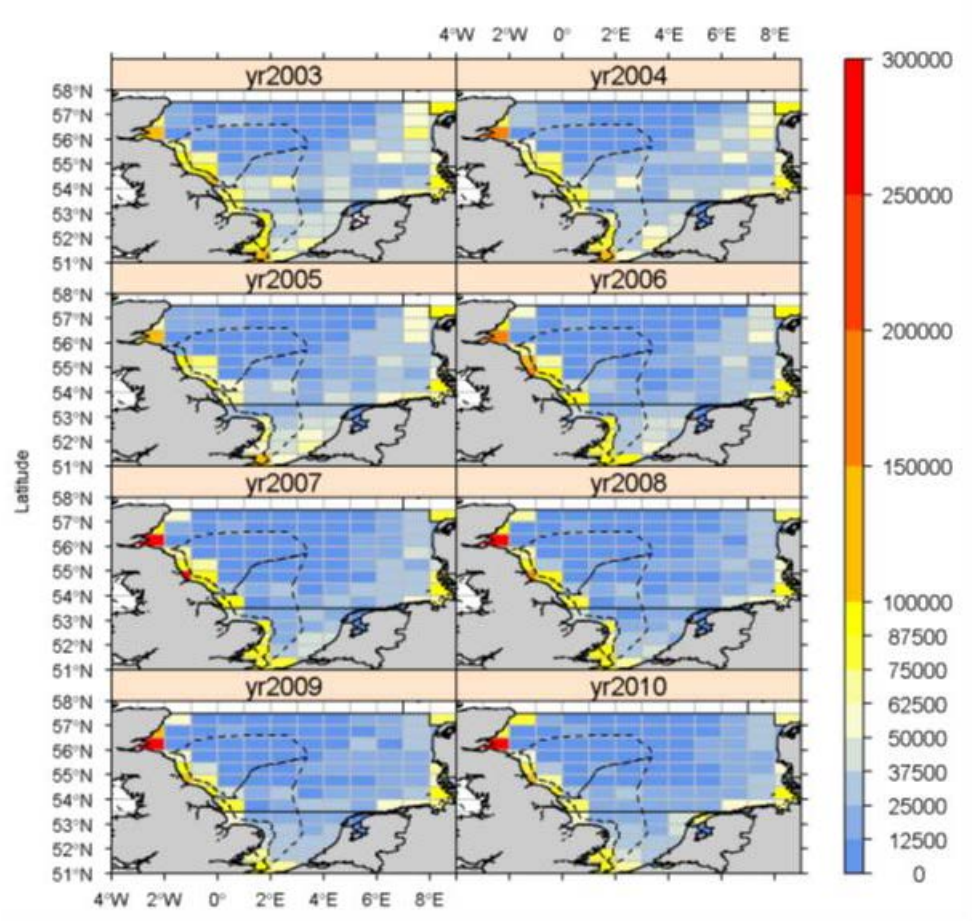

Figure 5-7 *Hours fished per year in different ICES squares in the North Sea by all countries during the period 2003-2010 (From MMO 2012).*

6 Checklist (to be used by Bonn Agreement and COWI)

The below checklist summarises the data collection requests from the previous chapters. Please note the symbols used in the checklist:

- o … required
- (o) … possibly required at a later stage (no action required at the moment)
- - … not required
- x … obtained

Below, a checklist for provision of the requested geographical information is provided.

Table 4-1 *Checklist of the requested GIS map /information.*

Nr	Indicator	Status of data collection										
		BE	DE	DK	FR	IE	NL	NO	SE	UK	Secr.	Remarks
1	Exposed rocky shores and reefs (<20m; >20m)											
2	Sheltered rocky shores and reefs (<20m; >20m)											
3	Littoral chalk communities											
4	Sandy beaches											
5	Shingle beaches											
6	Muddy beaches											
7	Tidal sand and mud flats											
8	Salt marshes											
9	Estuaries											
10	Large shallow inlets and bays											
11	Coastal lagoons (open to the sea)											
12	Underwater sandbanks (<20m; >20m)											
13	Biogenic reefs (<20m; >20m)											
14	Maerl beds											
15	Eelgrass meadows											
16	Wintering birds (incl. foraging areas)											
17	Staging birds (incl. foraging areas)											
18	Breeding birds (incl. foraging areas)											
19	Moulting birds (incl. foraging areas)											
20	Otters											
21	Seals											
22	Whales											
23	Spawning areas for fish											
24	Nursery areas for fish											
25	Protected areas											

Ad 1 and 2: Including large scale coherent artificial reefs (e.g. harbour jetties)

7 Time schedule

The following time schedule is developed to establish the updated inventory database and the data needed to carry out the risk analysis. The various activities or actions of the time schedule are listed chronologically in Table 5-1.

Table 5-1 Actions and activities in the time schedule.

Phase	Milestone	Deadline
Request	COWI submits Data Request Note to BA	02-06-2014
	BA distributes Data Request Note to Partners	10-06-2014
National data	1. submission of national data by Partners to COWI	07-07-2014
	COWI submits aggregated national data to BA & partners for acceptance, requests to partners regarding potential gaps	01-08-2014
	2. submission of accept by Partners or additional national data from Partners to COWI	22-08-2014
	COWI submits national data to BA	22-09-2014
Central data	1. submission of central data by BA to COWI	01-08-2014
	COWI submits central data to BA and partners for acceptance, requests to BA & Partners regarding potential gaps	15-08-2014
	2. submission of accept by BA and Partners or additional central or national data by BA & Partners to COWI	01-09-2014
	COWI submits data (GIS maps) to BA & Partners	22-09-2014
Workshop	Workshop on Ranking	11/12-09-2014
	Update inventory database	16-10-2014

8 References

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Munk, P., Fox, C. J., Bolle, L. J., Damme, C. J. G. v., Fossum, P., and Kraus, G. (2009). Spawning of North Sea fishes linked to hydrographic features. Fisheries Oceanography, 18: 458-469.

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Appendix A Excel spreadsheet for collection of Response Equipment data

Screen shot of the distributed Excel sheet for collection of vessel data:

Country	Name of vessel	Location (Local Port/Airport)	Latitude (Decimal degrees)	Longitude (Decimal degrees)	Length (m)	Width (m)	Max speed (knots)	Cruising speed (knots)	Draught (m)	Call signal
0										
0										
0										
0										

Table continued:

Recovery system	Recovery rate	Storage capacity (Tonnes)	Towing capacity (Tonnes)	Lightering (Yes/No)	Boom type	Boom length (m)	Response time (hh:mm)

Table continued:

Response time used for scenarios (hh:mm)	Remarks	Image (filename)

Screen shot of the distributed Excel sheet for collection of dispersant equipment data:

Country	Name/ID of	Name of dispersant	Location	Latitude	Longitude	Dispersant stock	Operational radius	Mobilisation time	Cruising speed
	plane/vessel		(Airport/Port)	(Decimal degrees)	(Decimal degrees)	(Tonnes)	(km)	(hh:mm)	(knots)
0									
0									
0									
0									

Table continued:

Sprayed area/time	Speed durimg spraying	Storage capacity	Reload time (alt. airports)	National policy for oil dispersants
(m^2/hr)	(knots)	(Tonnes)	(hrs)	(filename/link to document)

Appendix B Example Excel spreadsheet for collection of information for specific scenarios

Class	Country	Scenario no.	Scenario name	Area name	Response effect Efficiency (0-1)	Initial investment (EUR)	Lifetime (Years)
Reference	0	1	2011: Existing Risk Reducing and Response Measures				
Reference	0	1	2011: Existing Risk Reducing and Response Measures				
Reference	0	1	2011: Existing Risk Reducing and Response Measures				
Reference	0	1	2011: Existing Risk Reducing and Response Measures				
Reference	0	1	2011: Existing Risk Reducing and Response Measures				
Reference	0	1	2011: Existing Risk Reducing and Response Measures				
Reference	0	1	2011: Existing Risk Reducing and Response Measures				
Reference	0	1	2011: Existing Risk Reducing and Response Measures				

Running costs (EUR/Year)	Total Costs (EUR/Year)	Shapefile name	Remarks
	#DIV/0!		
	#DIV/0!		
	#DIV/0!		
	#DIV/0!		
	#DIV/0!		
	#DIV/0!		
	#DIV/0!		
	#DIV/0!		

Appendix C Explanatory note for oil spills response equipment

Oil collection equipment

Column Header	**Format Example**	**Explanation**
Country	Auto filled from "Country:" in *Supply Ticksheet*	
Name of vessel	Ranger	Name of vessel
Location	Southampton	Local port
Latitude	60,1234	Latitude of "Location" in decimal degrees
Longitude	5,1234	Longitude of "Location" in decimal degrees
Length (m)	52	Vessel length in metres
Width (m)	12	Vessel width in metres
Max speed (knots)	15	Max vessel speed in knots
Cruising speed (knots)	8	Vessel cruising speed in knots
Draught (m)	3	Vessel draught in metres
Call signal		Radio ID
Recovery system	Sweeping arms	Short description of recovery system
Max. pump capacity (m3/hr)	5	Max. pump capacity (m3/hr)
Storage capacity (Tonnes)	20	On board capacity
Towing capacity (Tonnes)	50	Bollard pull
Additional storage capacity (Yes/No)	Yes	Additional tanker capacity for recovered oil

Boom type	Ro Clean	Boom type name
Boom length (m)	500	On board boom length
Response time (hh:mm)	10:00	Time from alarm to ship/plane leaving port
Response time used for scenarios (hh:mm)	12:00	Time from alarm to ship/plane leaving port used for scenarios
Remarks		Free text for additional information regarding the vessel
Image (filename)	Ranger.jpg	An image of the vessel

Dispersant Equipment Data

Column Header	**Format Example**	**Explanation**
Country	Auto filled from "Country:" in *Supply Ticksheet*	
Name of vessel		Name of vessel/aircraft used to disperse
Name of dispersant		Dispersant product name
Location	Southampton	Local Port/Airport
Latitude	60,1234	Latitude of "Location" in decimal degrees
Longitude	5,1234	Longitude of "Location" in decimal degrees
Dispersant stock (Tonnes)	10	Give the amount for each type
Operational radius (km)	500	How far away from the airport the plane can spray (a rounded distance)
Mobilisation time (hh:mm)	05:00	Time from alarm to aircraft being airborne (including decision time)
Cruising speed (knots)	200	Vessel cruising speed in knots (from airport to site)
Sprayed area/ time (m^2/hr)	10 000	Average time it will take to spray a square metre with dispersant
Speed during spraying (knots)	100	Speed during spraying (knots)
Storage tank capacity (Tonnes)	3	Capacity to store dispersants
National policy for oil dispersants (filename/link to document)	Filename	Text file with explanatory text describing the national regulation (policy) for application of dispersants (min water depth, season, oil type, spill size, waves (max/min)…..)