OSPAR COMMISSION

Strategic Support for the OSPAR Regional Economic and Social Analysis

Biodiversity Series

2013

OSPAR Convention

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the “OSPAR Convention”) was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. The Contracting Parties are Belgium, Denmark, the European Union, Finland, France, Germany, Iceland, Ireland, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom of Great Britain and Northern Ireland.

Convention OSPAR

La Convention pour la protection du milieu marin de l'Atlantique du Nord-Est, dite Convention OSPAR, a été ouverte à la signature à la réunion ministérielle des anciennes Commissions d'Oslo et de Paris, à Paris le 22 septembre 1992. La Convention est entrée en vigueur le 25 mars 1998. Les parties contractantes sont : l'Allemagne, la Belgique, le Danemark, l’Espagne, la Finlande, la France, l’Irlande, l’Islande, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni de Grande Bretagne et d’Irlande du Nord, la Suède, la Suisse et l’Union européenne.

Acknowledgement

This report is submitted by eftec on behalf of a consortium also involving

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Summary

This is the final report from an eftec (Economics for the Environment Consultancy)-led project for OSPAR to produce an Economic and Social Analysis (ESA) report for the OSPAR region. This is intended to deliver, in relation to the ESA, the requirement in the Marine Strategy Framework Directive (MSFD) that Member States' work is coordinated across marine regions or sub-regions.

The timing of this report was planned for when final ESA material was expected to be available from the majority of countries. However, the ESA data used from different countries were in a variety of stages of development (from being complete some time ago to still being planned and developed). Some information to input to the analysis was actually available from all 12 OSPAR countries[1] from which it was sought. This provides a sufficient evidence base to assess the compatibility of data across countries, and produce an OSPAR region ESA report.

As well as general comparisons and collation of the contents of the ESA reports, the work has looked at two sectors (Ports and Shipping, and Leisure and Tourism) in more detail. These sectors were chosen due to their presence in all coastal countries, relative lack of controversial issues, and the different ESA issues they would highlight. The most important differences are: Ports and Shipping is recognised in industrial classifications, and the Ports are at discrete locations, while Leisure and Tourism is harder to measure through existing data sets and a diffuse activity. In addition to this sectoral comparison, four case studies have allowed investigation of the comparability of specific areas of detail within the ESA reports.

OSPAR Overview ESA Data

The purpose of this report is help coordinate ESA analysis across the OSPAR region and as a result the focus of the work is on the differences that limit the extent of this coordination. However, there are also some areas with compatibility between data, such most countries using the Marine Accounts Approach and reporting employment figures for key sectors.

Many of the differences observed relate to how this information will subsequently be used to inform MSFD implementation, for example through links with GES or on pressures in the marine environment. These uses represent the next challenges for ESA in the OSPAR region, but were not a core part of the ESA initial assessment. Therefore it is unsurprising that all countries do not yet have a unified approach.

ESA data for the OSPAR region only are summarised in Tables S1 and S2. The data available indicate marine economic activity with turnover of €435 billion, employing 2.46 million people. The highest contribution to turnover comes from oil and gas, the second from ports and shipping. The third highest is from renewable energy, but GVA in this sector is relatively low - it should be recognised that many investments in this sector are not yet generating energy.

[1] While there are 15 members countries in OSPAR, three (Luxembourg, Switzerland and Finland) are excluded from this analysis for not having coastlines and EEZs in the region.

Table S1: OSPAR Region ESA Data Overview

Sector	Turnover	GVA	Employment	Notes on Data
Commercial Sea Fisheries	€4 bn	€558 m	75,000	Data from 11 countries, range of years and definitions
Tourism and Recreation	€21 bn		1.3 m	Incomplete data from 11 countries
Ports and Shipping	€149 bn	€47 bn	306,000	Incomplete data from 10 countries, range of definitions
Aquaculture	€3 bn	€706 m	42,200	Incomplete data from 9 countries, range of definitions (some include aquaculture)
Oil and Gas	€174 bn	€6.2 bn	717,000	Incomplete data from 9 countries
Renewable Energy	€83 bn	€4.6 bn	14,200	Incomplete data from 9 countries
Aggregate Extraction	€1.1 bn	€330 m	6,050	Incomplete data from 6 countries
Summary	**€435 bn**	**€60 bn**	**2,460,000**	Incomplete data and a range of definitions lie behind the data.

In a well-defined sector like ports and shipping, there are some common features in the country data, so a reasonable estimate of the scale of OSPAR region economic activity is possible. However, it remains an estimate subject to caveats. In a less well-defined sector (*e.g*. leisure and tourism), there is great heterogeneity of data, and while some information can be collated, the collated OSPAR region data is weak.

Table S2: OSPAR ESA Data Overview by Sea-Region

OSPAR Region	Turnover	GVA	Employment
II	€354 bn	€27.5 bn	1.34m
III	€5.9 bn	€671 m	
IV	€3.0 bn	€6.5 bn	31,000
NOTE: total impacts are lower than in Table S1 because not all data can be allocated to an OSPAR Sea Region.			

Although the data can be broken down by OSPAR sea-regions, the data becomes less robust at this level, due to uncertainties in divisions of data between regions and missing data having a greater influence on the figures.

The collation of ESA material for this report has identified several potential barriers that reduce the accuracy of a collated OSPAR-region ESA report and restrict its potential future usefulness to inform marine management measures:

- The different methods (approaches) as well as the variations on methods used will hinder the comparability of country data across the OSPAR Region. This is most relevant with regards to the:
    - limited number of sectors covered in the majority of countries' ESA reports;
    - approaches selected to determine the costs of degradation;
    - lack of uniform business-as-usual scenarios; and
    - variable approaches to analysing environmental impacts.
- Different types of data (*i.e*. monetary, quantitative, and qualitative) will pose difficulties to creating a harmonised assessment. Moreover, varying quantitative/economic data types such as turnover and value added are also not directly comparable. The OSPAR region ESA report

will therefore need to make clear the different units of data used by different countries, and this will limit the ability to produce OSPAR-wide statistics;

- The use of different reference years or time series for economic data will hinder the compatibility of country data. There are economic approaches to correct these disparities (*e.g*. using deflators, purchasing power parity adjustments), but these may not be able to address problems such as the influence of major events. Whether the data are referenced before or after 2008 could be an issue, as the economic crisis in that year significantly impacted economic activities (*e.g*. shipping). Similarly, the use of different forecasting horizons renders comparisons (*e.g*. for costs of degradation) difficult;
- The coverage of economic sectors in the country ESA reports differ significantly, with a wide range of sectors defined, only three of which (commercial sea fisheries, Ports and shipping, and recreation) are common to all countries. Some sectors are included in the majority of countries with understandable absences in others. Some sectors' omissions from some country reports, however, reflect important differences in how countries choose to classify their activities.

These factors mean that, while an OSPAR region ESA report has been compiled, it has limitations in terms of comparability of methods and data-years, and gaps from unavailable data that restrict its usefulness as a basis for analysis of potential MSFD implementation options.

Improving Consistency and Comparability of Data

A series of recommendations are made in Section 6.3 to improve the consistency in OSPAR countries' ESA data that would enable a more comprehensive report to be compiled. The approaches taken need to consider requirements across all sectors, and bear in mind the limited resources available for, and opportunity costs of, undertaking any additional work. The recommendations start with simple actions to improve the presentation and interpretation of existing data (*e.g*. reporting formats); cover different ways of adjusting national information to improve OSPAR-region data collation (*e.g*. links to MSFD descriptors); and also identify options for coordination on methodological (*e.g*. definitions used by national statistical offices) and technical (*e.g*. shared expert judgement) levels. Finally, survey work, of the type described in the Baltic (see Section 4.1) could be developed across the OSPAR region. This could provide valuable information about particular aspects of the ESA which lack consistent data, such as marine tourism and leisure. It could also be costly to organise, not least due to the difficulties of implementing a survey in a consistent manner and with sufficient sample sizes in numerous countries.

The ideal long-term situation is for ESA reports to use consistent definitions of marine sectors and activities in order to allow accurate analysis of potential changes to marine management in order to implement the MSFD. Assessing which ESA data gaps are most critical to OSPAR will depend on priorities for MSFD implementation, and the costs of addressing them, both of which may vary depending on the timescale adopted.

Récapitulatif

Le présent rapport est le rapport définitif d'un projet piloté par Economics for the Environment Consultancy (eftec) à l'intention d'OSPAR afin d'élaborer un rapport sur l'analyse socio-économique (ESA) de la zone maritime OSPAR. Il s'agit de réaliser l'un des impératifs de la Directive cadre « stratégie pour le milieu marin » (MSFD), en ce qui concerne l'ESA, à savoir que les travaux des Etats membres soient coordonnés entre les régions et sous-régions marines.

La réalisation de ce rapport a été prévue pour coïncider avec la disponibilité des éléments définitifs de l'ESA communiqués par la majorité des Parties contractantes. Les données de l'ESA, provenant de diverses Parties contractantes, sont cependant à divers stades de développement (certaines ayant été achevées il y a un certain temps, d'autres étant encore en cours de développement). Certaines informations contribuant à l'analyse ont été communiquées par douze Parties contractantes OSPAR[2] qui avaient été sollicitées. Ces informations constituent une base suffisante de preuves permettant d'évaluer la compatibilité des données entre les Parties contractantes et de réaliser le rapport sur l'ESA de la zone maritime OSPAR.

Les travaux ont porté non seulement sur des comparaisons générales et la compilation du texte des rapports sur l'ESA mais ont considéré également deux secteurs (ports et navigation et loisirs et tourisme) de manière plus approfondie. Ces secteurs ont été choisis car ils sont présents dans tous les pays côtiers, ils ne font relativement pas l'objet de controverses et ils permettent de mettre en évidence diverses questions de l'ESA. Les différences les plus importantes sont les suivantes: le secteur ports et navigation est pris en compte dans les classifications industrielles, et les ports sont des endroits discrets, alors que les loisirs et tourisme représentent un secteur plus difficile à évaluer sur la base des séries de données existantes et il s'agit d'une activité diffuse. En plus de cette comparaison sectorielle, quatre études de cas ont permis d'envisager de manière approfondie la comparabilité d'aspects spécifiques des rapports sur l'ESA.

Données récapitulatives OSPAR sur l'ESA

Le présent rapport a pour but de faciliter la coordination de l'ESA dans l'ensemble de la zone maritime OSPAR et les travaux se focalisent donc sur les différences qui limitent le degré de coordination. Il existe cependant des domaines pour lesquels les données sont compatibles, dans le cas par exemple de la plupart des Parties contractantes utilisant l'approche « Marine accounts » et notifiant les chiffres de l'emploi dans les secteurs essentiels.

Nombre de différences relevées portent sur la manière dont ces informations seront ensuite exploitées pour informer la mise en œuvre de la MSFD, en établissant par exemple des liens avec le GES ou les pressions exercées sur le milieu marin. L'exploitation de ces informations représente le prochain défi auquel doit faire face l'ESA dans la zone maritime OSPAR, mais ne constitue par la partie essentielle de l'évaluation préliminaire de l'ESA. Il n'est donc pas surprenant que toutes les Parties contractantes ne possèdent pas encore une approche harmonisée.

Les données de l'ESA pour la zone maritime OSPAR ne sont résumées que dans les tableaux S1 et S2. Les données disponibles indiquent que l'activité économique marine a un chiffre d'affaires de 435 milliards d'euros et emploie 2,46 millions de personnes. La plus importante contribution au chiffre d'affaires est celle du secteur pétrolier et gazier et la seconde est celle du secteur des ports et de la navigation. Au troisième rang se trouve l'énergie renouvelable, mais la VAB est relativement faible dans ce secteur – il faut reconnaitre que de nombreux investissements dans ce secteur ne produisent pas encore d'énergie.

[2] Quinze pays sont Parties contractantes à la Convention OSPAR mais trois d'entre elles (Luxembourg, Suisse et Finlande) sont exclues de cette analyse car elles ne possèdent pas de littoral ou de ZEE dans la zone maritime OSPAR.

Tableau S1: Récapitulatif des données de l'ESA pour la zone maritime OSPAR.

Secteur	Chiffre d'affaires €	VAB €	Emploi	Notes sur les données
Pêche commerciale en mer	4 milliards	558 millions	75 000	Données de 11 pays, éventail d'années et de définitions
Tourisme et loisirs	21 milliards		1,3 million	Données incomplètes de 11 pays
Ports et navigation	149 milliards	47 milliards	306 000	Données incomplètes de 10 pays, éventail de définitions
Aquaculture	3 milliards	706 millions	42 200	Données incomplètes de 9 pays, éventail de définitions (certaines comprennent l'aquaculture)
Pétrole et gaz	174 milliards	6,2 milliards	717 000	Données incomplètes de 9 pays
Energie renouvelable	83 milliards	4,6 milliards	14 200	Données incomplètes de 9 pays
Extraction d'agrégat	1,1 milliard	330 millions	6 050	Données incomplètes de 6 pays
Totaux	**435 milliards**	**60 milliards**	**2,46 millions**	Données incomplètes et un éventail de définition sous-jacentes aux données.

Dans le cas d'un secteur bien défini comme les ports et la navigation, les données communiquées par les Parties contractantes présentent des caractéristiques communes, il est donc possible d'estimer l'ampleur des activités économiques dans la zone maritime OSPAR. Il s'agit cependant d'estimations faisant l'objet de réserves. Dans le cas d'un secteur moins bien défini (loisirs et tourisme par exemple), les données sont très hétérogènes, et celles recueillies pour la zone maritime OSPAR sont faibles bien que l'on obtienne certaines informations.

Tableau S2: Récapitulatif des données de l'ESA OSPAR par Région OSPAR

Région OSPAR	Chiffre d'affaires €	VAB €	Emploi
II	354 milliards	27,5 milliards	1,34 million
III	5,9 milliards	671 millions	
IV	3,0 milliards	6,5 milliards	31 000
NOTE: Le total des impacts est inférieur à celui du tableau S1 car toutes les données ne peuvent pas être attribuées à une Région OSPAR.			

Les données peuvent être réparties par sous-région OSPAR mais elles sont alors moins solides car la répartition par région présente des incertitudes et les données manquantes ont une plus grande influence sur les statistiques.

Le recueil d'éléments de l'ESA pour la réalisation du présent rapport a permis de déterminer plusieurs problèmes potentiels qui en réduisent l'exactitude et limitent son utilité future potentielle s'agissant d'informer des mesures de gestion marine

- les diverses méthodes (approches) ainsi que les variations de méthodes utilisées entravent la comparabilité des données des Parties contractantes dans l'ensemble de la zone maritime OSPAR. Ceci est plus pertinent dans le cas:

  - d'un nombre limité de secteurs couverts dans la majorité des rapports de l'ESA élaborés par chaque Partie contractante;
  - des approches sélectionnées afin de déterminer le coût de la dégradation;
  - de l'absence de scénario homogène de maintien de statu quo; et
  - d'approches variables appliquées à l'analyse des impacts environnementaux.

- des types différents de données (c'est-à-dire monétaires, quantitatives et qualitatives) rendront difficile la réalisation d'une évaluation harmonisée. De plus, des types de données quantitatives/économiques variables, telles que celles portant sur le chiffre d'affaires et la valeur ajoutée ne sont pas directement comparables. Le rapport de l'ESA sur la zone maritime OSPAR devra donc préciser les diverses unités de données utilisées par les diverses Parties contractantes, ce qui limitera les possibilités d'obtenir des statistiques à l'échelle d'OSPAR ;
- l'utilisation d'années de référence ou de séries temporelles différentes pour les données économiques limitera la compatibilité des données des Parties contractantes. Il existe des approches économiques permettant de corriger ces différences (par exemple en utilisant des déflateurs, en réalisant des ajustements de la parité du pouvoir d'achat) mais elles risquent de ne pas pouvoir résoudre des problèmes tels que l'influence d'évènements majeurs. Le fait que les données portent sur la période avant ou après 2008 est important, car la crise économique de cette année-là a eu un impact significatif sur les activités économiques (la navigation par exemple). De même, l'utilisation d'horizons de prévision différents rend toute comparaison difficile (pour le coût de la dégradation par exemple) ;
- la couverture des secteurs économiques dans les rapports des Parties contractantes sur l'ESA varie énormément. Un éventail étendu de secteurs sont définis mais seuls trois d'entre eux (pêche commerciale en mer, ports et navigation et loisirs) sont communs à toutes les Parties contractantes. Certains secteurs sont couverts par la majorité des Parties contractantes, alors qu'il est parfaitement clair que d'autres ne le sont pas. L'omission de certains secteurs des rapports de certaines Parties contractante reflète cependant des différences importantes quant à la méthode de classification de leurs activités.

Le rapport sur l'ESA de la zone maritime OSPAR a été compilé mais il est donc limité sur le plan de la comparabilité des méthodes et des années sur lesquelles portent les données et des lacunes dues à des données non disponibles ce qui affecte la possibilité de l'utiliser comme base pour l'analyse des options potentielles de mise en œuvre de la MSFD.

Amélioration de la cohérence et de la compatibilité des données

La Section 6.3 comporte une série de recommandations visant à améliorer la cohérence des données des Parties contractantes OSPAR pour l'ESA qui permettraient de compiler un rapport plus exhaustif. Les approches appliquées devront envisager les impératifs de tous les secteurs et prendre en compte les ressources limitées disponibles et le coût des possibilités de travaux supplémentaires éventuels. Les recommandations préconisent tout d'abord de simples mesures permettant d'améliorer la présentation et l'interprétation des données existantes (formulaires de notification par exemple); elles offrent différentes méthodes permettant d'adapter les informations nationales afin d'améliorer le recueil des données sur la zone maritime OSPAR (par exemple liens avec les descripteurs de la MSFD); et déterminent également des options pour une coordination au niveau méthodologique (par exemple définitions utilisées par les bureaux nationaux de statistique) et technique (par exemple jugement d'expert commun). On pourrait enfin développer dans l'ensemble de la zone maritime OSPAR des travaux d'étude, du type décrit pour la Baltique (voir la Section 4.1). Ceci permettrait d'obtenir des informations précieuses sur des aspects particuliers de l'ESA sur lesquels on ne dispose

pas de données cohérentes, il s'agit en particulier du tourisme et des loisirs marins. L'organisation de cette démarche pourrait également être onéreuse notamment en raison des difficultés que présente la mise en œuvre d'une étude cohérente et disposant de tailles d'échantillons suffisantes dans de nombreuses Parties contractantes.

Une situation à long terme idéale consiste à s'assurer que les rapports sur l'ESA utilisent des définitions cohérentes des secteurs et activités marins afin de permettre une analyse exacte des modifications potentielles de la gestion marine afin de mettre en œuvre la MSFD. L'évaluation des lacunes dans les données de l'ESA les plus essentielles dépendra des priorités de la mise en œuvre de la MSFD, et du coût des travaux correspondants, ces deux démarches risquant de varier selon le calendrier adopté.

1. Introduction

This introduction describes the purpose of this study. It lays out the man economic and social analysis methods used in the national information from which information is drawn. The study scope and approach are then described.

Following this introduction, the report is organised in six further sections. The remainder of this Section describes the scope and approach of the project. Section 2 describes economic and social analysis methods used in countries across the OSPAR region. Results are presented comparing the quantitative data in country ESA reports in Section 3, with more detailed analysis of the Ports and Shipping, and Leisure and Tourism sectors in Section 4. Section 5 presents qualitative comparisons of ESA information. Section 6 discusses the results and gives some recommendations for improving the consistency and comparability of data in the country ESA reports.

Annexes contain country information compiled in producing this report, and maps of the OSPAR region.

1.1 Purpose of ESA Overview Report

The purpose of the ESA Overview Report is to present an OSPAR regional overview of national information on use of marine waters and the Cost of Degradation. This report aims to deliver the requirement placed on the OSPAR region's EU countries by the MSFD to coordinate their response. It will help put countries' data in context, both in relation to the scale of regional activity (*e.g*. what % of OSPAR activity occurs in the country), and in comparison to other countries' data across the OSPAR region (*e.g*. is what are its strengths and weaknesses compared to those of other countries?).

The Marine Strategy Framework Directive (MSFD) requires Member States to develop strategies to achieve Good Environmental Status (GES) in marine waters by 2020. The Directive integrates socio-economic analysis into this objective, requiring an Economic and Social Analysis (ESA) as part of the initial assessment that was due in July 2012. This initial assessment provides a basis for developing programmes of measures to be implemented from 2015. The ESA supports: consideration of the socio-economic effects of choosing targets; cost-effectiveness analysis and cost-benefit analysis of measures; economic incentives to support GES; and determining exemptions where costs are disproportionate. These and other technical terms arising in the Directive are discussed in COWI (2010a).

The ESAs must be prepared not simply for Member States' waters, but also to be as consistent as possible across marine regions and sub-regions. The area covered by OSPAR[3] is roughly equivalent to one of the four marine regions specified in the MSFD, namely the North East Atlantic Ocean. The aim of this project is to increase the usefulness to OSPAR countries of undertaking the ESA. It does this by:

i. Supporting cooperation between OSPAR countries, to ensure that the ESAs produced by each are as coordinated and comparable as possible, within the time and resource constraints they face; and

ii. Based on the country ESA reports, compiling an OSPAR-regional overview analysis of the uses of OSPAR marine waters and the costs of their degradation. This analysis will support subsequent decision-making in the OSPAR region and in relation to the MSFD.

[3] The Oslo-Paris Convention for the Protection of the Marine Environment of the North-East Atlantic. There are 15 member Governments: Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

The project also provides an opportunity for 'learning by doing' through iterations of gathering and analysis of data, and the process of OSPAR countries sharing their experiences.

In fulfilling these aims the project also seeks to further develop understanding of the economic and social impacts, across the OSPAR region, of the use of the marine environment in the context of the MSFD. This will help direct the outputs of the ESA process to support the ongoing implementation of the MSFD in the OSPAR region. In doing so it may provide lessons which can inform approaches adopted by other Member States across Europe and developed under other international sea conventions covering other marine regions and sub-regions specified under the MSFD.

Data is collated across the region and compared, with a discussion on data availability and crucial data gaps, particularly in relation to key data to support the subsequent socio-economic requirements of the Directive. Key requirements for the OSPAR ESA outputs to support are:

- Cost Effectiveness Analysis for agreed objectives;
- Cost Benefit Analysis of new measures and in areas of conflict (*e.g*. consideration of disproportionate costs), possibly alongside Multi-criteria Analysis; and
- Economic modelling, in particular to help analysis of future impacts of management policies on economic sectors using the marine environment.

1.2 Scope

The scope of the report is limited to the material covered in the country ESA reports, and use of existing comparable information sources. Primary research to determine the comparability of national data sets not included in country ESA reports is considered outside the scope of this project.

The geographical scope for the project is the area covered by the OSPAR Convention. It is subdivided into five sea areas extending into the mid-Atlantic and Arctic. Four of these are similar to those in the North East Atlantic Ocean marine region specified in the MSFD, within which four sub-regions are defined[4]. These equate broadly to four of the five sea regions within OSPAR (Arctic Waters are not covered in the MSFD, or in this report). These areas are shown in the Maps in Annex 5.

In the context of this project, the significance of the differences between the OSPAR sea regions and the MSFD sub-regions is judged to be minor. It is a less significant factor in trying to compile an OSPAR ESA report than other sources of inaccuracy in compiling an OSPAR region ESA report, such as the lack of compatibility between countries' definitions of marine data.

Within the OSPAR sea regions, analysis can be broken down to country level, and to sea-regions within countries. Therefore there are at least four levels of geographical scale of interest to the study: OSPAR/EU marine region; EU marine sub-regions; national; and sub-national. The OSPAR region overview data in Section 3 is broken down by these boundaries wherever possible.

1.3 Study Approach

The work to compile OSPAR region information was divided between the study team by assigning lead partners to different areas of analysis. There are six areas of work in total, and the partners responsible for leading on each area were as follows:

- Task 1 (Analysis of typologies) and 3 (Assess availability and comparability of data):

[4] These are: (i) the Greater North Sea, including the Kattegat, and the English Channel; (ii) the Celtic Seas; (iii) the Bay of Biscay and the Iberian Coast; (iv) the Atlantic Ocean, the Macaronesian biogeographic region, being the waters surrounding the Azores, Madeira and the Canary Islands.

  - Social – *Enveco;*
  - Economic – *Ecologic;*
  - Environmental – *Acteon.*
- Task 2 (Detailed sector analysis of Ports and Shipping) – *ABPmer;*
- Option B (Detailed sector analysis of Leisure and Tourism) – *Enveco;*
- Option C (Spatial Analysis) – *ABPmer.*

Out of the 15 OSPAR contracting parties, two (Luxembourg and Switzerland) are landlocked and therefore were not considered a priority in the project. Following discussion with their MSFD team, it was also decided to exclude Finland from the analysis. While Finland covers catchments that drain into OSPAR waters (Barents Sea), it only has coastline, and therefore exclusive economic zone, in the Baltic. These three countries were therefore omitted from the analysis. Table 1.1 sets out information gathered from the remaining 12 countries by the study for this report. Iceland and Norway are not members of the EU. However, Norway has provided the required information from national initiatives and Iceland has advised the team that information can be drawn from previous research.

Table 1.1: Provision of data from OSPAR countries

Member State	Source of ESA Information
Belgium	Final ESA
Denmark	Consultation document with ESA
France	Draft ESA
Germany	Final ESA
Iceland	Reports containing ESA information
Ireland	Economic reports that will be basis of ESA
Netherlands	Final ESA
Norway	Second Draft ESA
Portugal	Marine Strategy for Continental Subdivision
Spain	Draft ESA
Sweden	Consultation Draft ESA
UK	Consultation Draft ESA
Finland	*Excluded – do not have EEZ in OSPAR seas*
Luxembourg	
Switzerland	

Gathering documents has required one to one communication with several countries. They have been generally cooperative and helpful, and where specific data collection issues have arisen they have been dealt with via the OSPAR secretariat.

Handling the different languages of the draft ESA reports presented a challenge for the project. The UK, Ireland, Belgium, Sweden, and the Netherlands reported in English and the remaining countries reported in their official language. While lead partners for each area of work could analyse their own areas for English language reports and information, the use of the countries' official languages necessitated a further division of work between the partners according to their different language capabilities. Each partner was therefore responsible for extracting information to inform all tasks from the non-English reports for which they had language capabilities.

The division of work over areas as well as countries required a structure to ensure consistency in analysis and reporting. Proformas were therefore developed to ensure that important information for each Task was extracted from each country report by the relevant partner in the Study Team. They included questions to ensure that the analysis covers definitions of key terms in the MSFD ESA, such as 'human activities', the cost of degradation, and key aspects of the ESA, such as the baselines used. The Proformas were tested with one draft ESA report before being used across the study team.

Despite complexities stemming from much of the information used having to be translated from several different languages by different people, an OSPAR overview ESA report has been compiled that reflects the compatibility in the available country data.

2. Economic and Social Analysis Methods Used Across the OSPAR Region

This Section summarises the coverage of the country ESA reports in terms of the data availability and methods used. Draft economic and social analysis information was collected for 12 countries (Belgium, Denmark, France, Germany, Iceland, Ireland, Netherlands, Norway, Portugal, Spain, Sweden and the UK) (as of February 2013). The level of detail in the information available is variable, with some countries' evidence bases being fairly rich and others providing less detail in some areas.

The countries' ESA reports are mainly based on sector analyses of human activities using and/or affecting marine resources. The social and the economic analyses are interlinked in most of the reports, and hence the geographical coverage of the social analyses is the same as for the environmental and economic analyses, *i.e*. the areas of countries' territorial waters within the OSPAR II, OSPAR III, OSPAR IV and OSPAR V sea-regions (see Figure 1 in Annex 5).

In order to compile data for different OSPAR sea-regions, the country data must be broken down according to sea-regions in their waters. The overlaps between the boundaries of national waters and the OSPAR sea-regions are presented in Figure 6 in Annex 5. The figure shows inconsistencies with all the boundaries. Some of these are smaller in that they only affect some of the countries' waters in a regional sea (*e.g*. the northern boundary of the Greater North Sea bisects Norway's waters). The bigger issue relates to the boundary of the Wider Atlantic OSPAR regional sea with the Biscay and Iberian and Celtic Regional Seas, which spatially divides in two the relevant marine waters of the UK, Ireland, Spain and Portugal.

The data are presented here under broad economic themes of:

- Type and coverage of data;
- Economic methods used in the ESA;
- Baseline and timing of information;
- Spatial boundaries.

The integration and overlaps between the economic, social and environmental aspects of the ESA reports means that these issues are considered together in several of the subsections below. The coverage of social and environmental issues is considered explicitly in Section 5.

2.1 Type and Coverage of Data

Both quantitative and qualitative information is used to describe and assess the economic components within the ESAs. While market data are used by all countries for the economic assessment (*e.g*. turnover, value added, employment, etc.), the specific types of such data differ between countries as well as between economic activities.

Table 1 in Annex 1 shows that data collection for economic activities varies significantly between countries. In all instances, countries gathered data from a broad range of sources, including, for example, national and European statistics databases, European and national reports, industry reports and scientific papers. The frequency with which each sector has been reported in OSPAR ESA reports is shown in Table 2.1.

Table 2.1: Coverage of economic activities in OSPAR countries ESA reports

Number of OSPAR countries that include this activity in their ESA reports	Activities
11	Commercial sea fisheries Recreation & Tourism
10	Ports and shipping
9	Aquaculture Oil and gas Renewable energy
6	Aggregate extraction Submarine cable setting and maintenance
4	Military
3	Fish processing industry Research Gas storage Disposal
2	Dredging Shipbuilding Water abstraction Agriculture Downstream supply chain Flood erosion control
1	Upstream supply chain Wrecks and wreck salvage Education

2.2 Economic Methods Used in the ESA

The Marine Strategy Framework Directive (MSFD) Working Group on Economic and Social Assessment (WG ESA) produced a Guidance Document (EC, 2010) that outlines several methods for Member States to consider when conducting the economic and social analysis required by the MSFD. Methods are given in the guidance document both to assess the use of marine waters and to assess the costs of their degradation (the welfare forgone, reflecting the reduction in value of the ecosystem services provided compared to an un-degraded condition). Member States are not bound to use these methods.

For the economic and social analysis of the use of marine waters, the following two approaches are described:

- The ecosystem services approach; and
- The marine water accounts approach.

For the analysis of the cost of degradation, the following three approaches are proposed:

- The Ecosystem goods and services (EGS) approach[5],;

[5] This is analogous to the 'ecosystem services approach'.

- The Thematic approach;
- The Cost-based approach.

The social and economic analysis required by the MSFD under these methods can be delivered using established socio-economic tools (eftec , 2010). Much of the analysis requires market-based economic data (*i.e*. based on market prices). This is reflected in the emphasis on quantitative data in this OSPAR region overview report.

Table 2.2 outlines the approaches selected by Member States with regards to the requirements of the MSFD. For the assessment of the use of marine waters, Member States clearly favour the Marine Water Accounts Approach, with only Sweden selecting the Ecosystem Services Approach. Nine out of eleven countries selected the Marine Water Accounts Approach, with data collected for different marine sectors and activities (*e.g*. shipping, fishing, oil and gas extraction, recreation etc.). France used a variation to the Marine Water Accounts approach, extending sectoral descriptions to cover policy and environmental regulations, and for some sectors the interrelations between marine waters and maritime sectors.

Sweden, on the other hand, uses the Ecosystem Services Approach to assess the use of their marine waters. They give values for ecosystem services, alongside economic and industry data, including data for both intermediate services (*e.g*. biogeochemical cycling, diversity, etc.) and final services (*e.g*. space/waterways, food, genetic resources etc.).

A greater variation of method selection was identified for the assessment of costs of degradation. For this assessment, Belgium, France and Germany selected the Thematic Approach, while Denmark, Portugal, the Netherlands and Spain chose the Cost Based Approach and Sweden and the UK favoured the Ecosystem Services Approach. Belgium carried out a variance based on the Thematic Approach involving an expert workshop to identify the actual costs of marine degradation incurred per sector and split these costs into four categories: prevention costs, mitigation costs, governance costs and opportunity costs.

No approach to, or results from, the costs of degradation assessment have been identified for Ireland or Norway. Data on the costs of degradation are in most countries based on a combination of different quantitative and qualitative information. The Netherlands, Spain and the UK provide the costs of degradation in monetary values (also including qualitative descriptions), while Denmark only uses qualitative descriptions. In Sweden, a mixture of qualitative and quantitative descriptions was used to describe the costs of degradation, but the details vary depending on the report (reports were produced for different themes). It appears that no two countries are using exactly the same approach to assessing the costs of degradation in terms of methods and sources of data.

Table 2.2: Economic methods used in the ESAs					
Country	**Approach to use of marine waters**		**Approach to costs of degradation**		
	Marine Water Accounts Approach	**Ecosystem Services Approach**	**Thematic Approach**	**Cost Based Approach**	**Ecosystem Services Approach**
Belgium[a]	✔		✔		
Denmark	✔			✔	
France[b]	✔		✔		
Germany	✔		✔		
Ireland	✔				✔
Netherlands	✔			✔	
Norway[c]	✔				
Portugal	✔			✔	
Spain	✔			✔	
Sweden		✔			✔
UK[d]	✔				✔

Notes: a) Belgium used a slight variation to the Thematic Approach to assess the costs of degradation. b) France used a variation of the Marine Water Accounts Approach to assess the use of marine waters. c) In Norway the Marine Water Accounts Approach is only identified for commercial (including aquaculture) and leisure fisheries, and the petroleum industry. No approach was indicated for the assessment of costs of degradation. d) in the UK, ecosystem services analysis supported the marine accounts approach.

Non-market information is used in many of the countries, but to various degrees. France provides qualitative descriptions and non-monetary data across different themes (*e.g*. coastline artificialisation). The UK uses non-market data in the form of qualitative descriptions of potential benefits to reaching GES targets and a summary of ecosystem services. Norway uses non-market data to describe ecosystem services. Sweden provides only qualitative descriptions, while Ireland uses non-market valuations in the form of a case study. Denmark uses non-market data from a single study (for oil). The Netherlands makes reference to non-market values as a concept, but does not explicitly use them.

2.3 Baseline and Timing of Information

According to WG-ESA's guidance document[6], a baseline scenario, or a Business As Usual (BAU) scenario, 'describes the anticipated evolution in the environmental, social, economic and legislative situation in a marine environment over a certain time horizon in the absence of the policy under consideration (*i.e*. if the MSFD is not implemented)'. In other words, a baseline scenario (when no new policy action is taken as a result of the MSFD) and its outcomes are compared against various other scenarios (*i.e*. the implications of different potential MSFD policy measures) and their outcomes to project how the marine environment might evolve over time.

6 Working Group on Economic and Social Assessment (2010): Economic and social analysis for the initial assessment for the Marine Strategy Framework Directive: a guidance document, a non-legally binding document, December 2010.

Baseline scenarios are an important element for countries seeking to define costs of degradation and establish a programme of measures to achieve GES. For several countries, the BAU scenario is limited to predicting the economic development of different sectors, without providing links to environmental aspects. One country has developed a more detailed analysis of BAU with regards to reaching GES.

Linking a BAU prediction to environmental outcomes can be important for the ESA and MSFD, in particular for fisheries (both as an economic sector and closely linked to indicators for the status of fish stocks), but also more generally, since environmental conditions are not static. Only one country has developed a more detailed analysis of BAU with regards to reaching GES.

The comparative analysis of the OSPAR regions ESA reports in Table 2.3 shows that baseline scenarios are used only to a limited degree. Belgium, Denmark, Norway, Sweden and the UK all use projections or take steps to provide scenarios of potential future outcomes, but different timescales and assumptions are used for the projections. BOX 2.1 describes the UK approach in more detail. However, most projections cover trends for uses or economic sectors rather than impacts or GES indicators. Germany, Ireland, France, the Netherlands, Portugal and Spain do not include baselines or make projections in their ESA reports. However, at least some of these countries (*e.g*. Netherlands) produced such information in other documents – this reflects the difficulty of collating information for an ESA overview report from countries when it is published in different places.

Table 2.3: Examples of Country Baseline Approaches

Country	Timeframe	Approach
Belgium	2020	In the draft ESA report, Belgium identifies the uses of marine waters, and provides a projection as to how these uses could change over time, based on stakeholder/expert opinion. Belgium also provides qualitative data (per sector a list of characteristics that influence the use of the marine waters) and quantify where possible.
Denmark	2020	Compares the current environmental situation against the 2020 scenario
France	Not indicated	Some indications of current and projected future use are provided per topic (*i.e*. related to specific economic sector), but not directly linked to the descriptors. No projection related to environmental issues.
Norway	2030 for sector specific scenarios and long-range pollution, and 2050-2100 for climate related scenarios (climate change and ocean acidification)	Provides two scenarios for the fisheries and the aquaculture sectors: one which assumes no significant changes (BAU) and one that assumes reduced environmental impacts from the sector Provides one (BAU) scenario for pollution from the oil and petroleum industry Provides one scenario (BAU) for renewable energy (*i.e*. economic forecast) Provides one scenario (BAU) for the impact on the sea due to land-based activities Provides two scenarios each for long-range pollution, climate change and ocean acidification
Sweden	2020 and 2050	Provides trends for GES indicators related to marine litter if policy instruments are implemented Describes BAU for selected GES indicators and associated ecosystem services in relation to the development of the tourism and leisure sector

UK	2020 and 2030	Provides a baseline scenario for each GES descriptor to compare policy options

The time-periods used for the BAU scenarios vary considerably, with countries each using up to three of the following five future time-periods: 2030, 2040, 2050 and 2100 (for climate change scenarios). Comparisons from the MSFD BAU to baselines used in other policies are rare, but sometimes links were made to the Common Fisheries Policy, Water Framework Directive, Habitats and Birds Directives and/or the Environmental Impact Assessment Directive.

BOX 2.1: ***Baseline Example: The UK***

The UK provides a baseline scenario for each GES descriptor to compare policy options. The UK, in its initial assessment and proposal for measures[7], proposes either one or two policy options with differing levels of uncertainty for achieving GES. A baseline scenario, 'Option 0', describes the expected outcome should no action be taken. The study provides a baseline scenario that describes the potential state of the UK's marine environment in 2020 and 2030 based on current environmental trends and existing policy drivers. The costs and benefits of the two options for achieving GES targets are then compared to the baseline scenario.

The baseline scenario used in the UK is based on a study[8] carried out for the UK Government by consultants and receiving input from a range of experts. To develop the BAU baseline, the study first developed and described a framework for the BAU scenario assessment and researched and developed components of the framework by: identifying a list of ecosystem services and illustrating links with components; identifying key drivers and their linkages with the use of marine water use and how drivers might influence GES; and identifying environmental pressures that arise from uses of marine waters and described them in terms of their current spatial and temporal characteristics. It then prioritised the environmental pressures using the information on drivers and their known spatial and temporal data, and then described changes in the pressures as a result (and mapped these changes when possible). Next, the sensitivity for the relevant components of each GES descriptor to each of the pressures was assessed (and mapped when possible). The study then assessed the consequent change in environmental state as a result of the information on pressures and components of GES, from which the impacts on the state of ecosystem services was deduced. Finally, the findings and key aspects identified were reported (ABPmer (2011) Business as Usual Report). The study did not take into account the interaction between different socio-economic sectors.

2.4 Spatial Boundaries

The geographic scope of data collected differs in the country assessments. For example, some countries explicitly refer to their Exclusive Economic Zones (EEZs) (*e.g*. Denmark, Germany, Ireland, the Netherlands, and Sweden). Other countries (*e.g*. France, Norway, and the UK) only refer to specific bodies of water.

[7] HM Government, 2012: Marine Strategy Frame Directive consultation: UK Initial Assessment and Proposals for Good Environmental Status, Impact Assessment, March 2012.

[8] ABPmer Business as Usual Report 2011, 'Business as Usual Projections of the Marine Environment: to Inform the Implementation of the Marine Strategy Framework Directive', ABPmer 2012 http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=17775&FromSearch=Y&Publisher=1&SearchText=ME5104&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description

Portugal's report refers only to its Continental subdivision which is included in area IV - Bay of Biscay and Iberian Coast. Spain separated its ESAs into five separate regions, two of which are in the OSPAR region. The Spanish report refers to these regions as the 'North Atlantic' and 'South Atlantic' within their waters, and they correspond to administrative boundaries of Spanish Autonomous Regions. In some cases the geographic scope of data collected may vary depending upon activities, for example, in Belgium fisheries data extends beyond the geographic scope used for other activities. In Sweden, an aggregated report combining EEZs, and therefore data, in both the North Sea and Baltic Sea is used.

As discussed at the start of this Section, the geographic scope of data across the OSPAR region is complex due to different national and sea-region boundaries. The overlaps between the boundaries of national waters and the OSPAR regional seas are presented in Figure 6 in Annex 5. If country ESA data are not already subdivided according to regional seas, assumptions will need to be made as to the applicability of data across regional seas. In some cases, this is straightforward. For example ports activity can be assumed to occur in coastal waters rather than the wider Atlantic. In other cases, such as pelagic fisheries, such a decision is not as clear cut.

Most important to this are the countries with the biggest division of their waters between different OSPAR sea-regions; the UK (Greater North Sea and Celtic Sea) and France (Greater North Sea, Celtic Sea and Biscay & Iberian Coast). Both UK and French data are divided between sea-regions. Swedish data are divided between the OSPAR region and the Baltic.

3. Quantitative OSPAR Economic and Social Analysis

This Section presents the first collated report of OSPAR ESA data. Quantitative data on economic sectors are presented in Section 3.1. Information on costs of degradation is in Section 3.2.

3.1 OSPAR overview ESA Data

The Sectors covered in this collation of data are those where activity is reported for enough countries to give a reasonable picture of activity in the OSPAR region (see Table 2.1) namely:

- Commercial sea fisheries;
- Recreation & Tourism Ports and shipping;
- Aquaculture;
- Oil and gas;
- Renewable energy;
- Aggregate extraction;
- Submarine cable setting and maintenance.

For each area of activity, quantitative data is presented for each country, and is summarised by OSPAR sea-region and for the OSPAR region as a whole. The OSPAR regions covered are:

- OSPAR II – Channel and North Sea;
- OSPAR III - South part of Celtic Sea;
- OSPAR IV - Bay of Biscay.

OSPAR Region I (Arctic Waters) is not covered, as it is outside the geographical boundaries of the Directive. OSPAR region V, the Wider Atlantic, is not distinguished in most data, and has relatively low levels of economic activity in most sectors (although there are exceptions to this, *e.g.* shipping traffic

and fishing). Moreover, data for the country waters that extend into the Wide Atlantic, unsurprisingly, does not differentiate between activity in the region and in adjacent regions.

The three OSPAR regions covered correspond to three of the regions identified within the in the North-east Atlantic Ocean under Article 4 of the MSFD:

(i) the Greater North Sea, including the Kattegat, and the English Channel;

(ii) the Celtic Seas;

(iii) the Bay of Biscay and the Iberian Coast.

The Atlantic Ocean is also identified under Article 4 of the MSFD, but as stated above, is not distinguished in the socio-economic data identified. Activities in the Atlantic (*i.e*. in both OSPAR region V and the Atlantic Ocean MSFD region) are assumed to be reflected in the data for adjacent regions.

There are significant caveats that apply to all the data in the Tables: the data represent high-level estimates of economic activity. All have a degree of inaccuracy, which in some cases is significant. These are discussed in more detail elsewhere in this report (see Section 2), but can be summarised as:

- Differences in methods and approaches (*e.g*. the inclusion of land-based activities);
- Data that can be summed are an incomplete total for the region;
- Differences in temporal scales;
- Lack of information on whether employment figures are full-time, part time or full-time equivalent;
- Different assumptions about spatial data scale, and
- Interpolation, extrapolation and estimates of figures, in particular for OSPAR sea-region figures and employment data.

The year of the data and units, which vary widely, are noted. Financial data in presented in € at 2012 prices. More detail of the country information used are presented, along with details on methods behind the data, in the proformas in Annexes 1 - 4. Due to incomplete breakdowns, the data for the OSPAR seas II, III and IV do not sum to the regional total.

Table 3.1: OSPAR Region ESA Data Summary

Area	Summary of Data	Notes on Data
Commercial Sea Fisheries		
Total	€4.1 bn turnover €558 m GVA 75,000 employment	Data from 11 countries, not all report turnover or GVA. Some countries include indirect employment. Spain does not report employment.
OSPAR II	€2 bn turnover	
OSPAR III	€472 m turnover	
OSPAR IV	€1 bn turnover	

Tourism and Recreation		
Total	€21 bn turnover, plus €6 bn GVA, plus €19.8 bn contribution to GDP. 1.3 m employment	Data from 11 countries, not all report turnover or employment. Exclude indirect employment
OSPAR II	€14 bn turnover 299,400 employment	
OSPAR III	€944 m turnover	
OSPAR IV	€6 bn GVA, plus €19.8 bn contribution to GDP. 1 m employment	

Ports and Shipping		
Total	306,000 employment €47 bn GVA €149 bn turnover	Data from 10 countries, some included indirect employment and some countries report on full-time equivalent employment. Not all countries reported on GVA
OSPAR II	305,000 employment €47 bn GVA €89 bn production value	
OSPAR III	€330 m GVA €2 bn production value	
OSPAR IV	€150 m GVA	

Aquaculture		
Total	€3 bn turnover 42,200 employment €706 m GVA	Data from 9 countries, not all have reported on turnover, employment or GVA. Some countries have included aquaculture in Commercial sea fisheries
OSPAR II	€516 m turnover 3,100 employment €222 m GVA	
OSPAR III	€337 m turnover 2,000 employment €169 m GVA	
OSPAR IV	€2 bn turnover 31,200 employment €315 m GVA	

Oil and Gas		
Total	€174 bn turnover	Data from 9 countries. Not all countries have reported on employment, GVA or turnover
	717,000 employment	
	€6.2bn GVA	
OSPAR II	€170 bn turnover 716,000 employment €6 bn GVA	
OSPAR III	€4 bn turnover €137 m GVA	
OSPAR IV	No data reported	

Renewable Energy		
Total	€83 bn turnover	Data from 9 countries, some countries did not report on turnover, employment or GVA and several countries provided no data.
	14,200 employment	
	€4.6 bn GVA	
OSPAR II	€76 bn turnover 14,100 employment €160 m GVA	
OSPAR III	€106 m turnover €34 m GVA	
OSPAR IV	No data reported	

Aggregate Extraction		
Total	€1.1 bn turnover	Data from 6 countries, several countries do not report on turnover, employment or GVA. For some countries there are no data recorded.
	6,050 employment	
	€330 m GVA	
OSPAR II	€1 bn turnover 4,100 employment €286 m GVA	
OSPAR III	€14 m turnover €1 m GVA	
OSPAR IV	€47 m turnover 190 employment €20 m GVA	

The data shown in Table 3.1 provide the best summary of socio-economic activity in the OSPAR region that can be compiled from country ESA reports. However, as noted above, the data have significant caveats. For one sector, submarine cable setting and maintenance, although data are reported by six countries, economic figures cannot be collated for this sector.

The data from Table 3.1 are summarised for the OSPAR region only (not sea-regions) in Table 3.2. The data available indicate a total value of all marine activities with turnover of €355bn, employing 2.46 million people. The highest contribution to turnover comes from oil and gas. The second highest is from renewable energy, which reflects current construction activity. Current GVA in renewable energy is relatively low, but it should be recognised that many investments in this sector are not yet generating energy.

Table 3.2: OSPAR Region ESA Data Overview by Sector				
Sector	**Turnover**	**GVA**	**Employment**	**Notes on Data**
Commercial Sea Fisheries	€4 bn	€558 m	75,000	Data from 11 countries, range of years and definitions
Tourism and Recreation	€21 bn		1.3 m	Incomplete data from 11 countries
Ports and Shipping	€149 bn	€47 bn	306,000	Incomplete data from 10 countries, range of definitions
Aquaculture	€3 bn	€706 m	42,200	Incomplete data from 9 countries, range of definitions (some include aquaculture)
Oil and Gas	€174 bn	€6.2 bn	717,000	Incomplete data from 9 countries
Renewable Energy	€83 bn	€4.6 bn	14,200	Incomplete data from 9 countries
Aggregate Extraction	€1.1 bn	€330 m	6,050	Incomplete data from 6 countries
Summary	**€435 bn**	**€60 bn**	**2,460,000**	Incomplete data and a range of definitions lie behind the data.
Note: as data is incomplete in some sectors, comparisons may be misleading.				

Table 3.2: OSPAR ESA Data Overview by Sea-Region			
OSPAR Region	**Turnover**	**GVA**	**Employment**
II	€274 bn	€9.5 bn	1.34m
III	€5.9 bn	€671 m	
IV	€3.0 bn	€6.5 bn	31,000
NOTE: total impacts are lower than in Table 3.1 because not all data can be allocated to an OSPAR Sea Region.			

3.2 Overview of cost of degradation evidence

The methods used to compile cost of degradation (CoD) data were described in Section 2.2. This revealed significant differences that restrict comparability between countries and compilation of overview data for the OSAPR region. Nevertheless, OSPAR data are summarised in Table 3.3, and a more detailed description of CoD information is provided, in relation to marine litter.

The cost of degradation data that are available are limited to just four countries. Furthermore, due to the uncertainties in estimating the costs of degradation, the data for those countries are not necessarily complete. The different methods used by different countries mean that the values presented cannot be added. It is also important to note that the cost-based approach only produces an estimate of value when it is based on observed actions (rather than hypothetical costs of activities).

Given the lack of data on CoD, the results are not broken down by sea-region.

Table 3.3: Overview of OSPAR Cost of Degradation Data				
Country	**OSPAR sea**	**Data (Euros in 2012 prices)**	**Year**	**Notes on Data**
Belgium	OSPAR II	Unknown; no quantitative figure given		Costs of degradation based on costs of measures and total funding received from EU funds, concept of degradation implicitly applied to GES.
Denmark	OSPAR II	Unknown; no quantitative figure given		Due to the high level of uncertainty, the cost of degradation if the sea environment continues to deteriorate to 2020 is not quantitatively estimated, but described in qualitative terms.
France	OSPAR II OSPAR III OSPAR IV	Unknown; no quantitative figure given		Cost of environmental degradation declined in four categories: opportunity cost, mitigation cost, costs related to positive action in favour of the environment, transaction costs. Specific mention of Micro pollutants and oil slicks when talking about the cost of degradation
Germany	OSPAR II	Unknown		
Ireland	OSPAR III	Unknown; no figure reported		
Netherlands	OSPAR II	€147 million per year	2012	Cost-based approach, calculated as total spending of different sectors to avoid degradation of the marine environment
Norway	OSPAR II	Unknown; no information on cost of degradation reported		
Portugal	OSPAR IV	Unknown; no quantitative figure given		Mainly qualitative using examples from scientific papers to demonstrate how the cost of degradation has been used in other parts of the world
Spain	OSPAR IV	€451 million	2009	Cost-based approach used with five administrative budgets. Cost estimates may be directly or indirectly related, as exact relevant amount of some policies could not be estimated.
Sweden	OSPAR II	Cleaning beaches: €0.6-€1 million per year Noise €58-104 per household/year Marine litter impacts: €0.74m/yr, collection €0.8m	(Litter: 2007 & 2010)	Marine litter: fouled propellers, blocked intake pipes, damaged nets and lost catch
UK	OSPAR II OSPAR III	Between €6-22 million, many other aspects of degradation are identified but unquantified	2012	The cost of degradation is the concept of degradation implicitly applied to GES; estimated by valuing the difference in societal welfare between the expected state of the environment if Good Environmental Status (GES) is achieved and the expected state of the marine environment under BAU.
Summary		**Substantial underestimate of €600m/yr**	**varied**	**Data from 4 countries represent a minority of the costs.**

3.2.1 Cost of degradation due to Marine Litter

The purpose of this small case study is to give an overview of how these approaches have been applied to analyse the cost of degradation linked to a common theme - marine litter.

Marine litter is an environmental problem that many countries bring up in their ESA reports (and this is one reason it has been chosen for this case study). Four countries' material are used as examples in order to illustrate the application of all three approaches to analysis of marine litter:

- Belgium (thematic approach);
- Netherlands (cost-based approach);
- Sweden (ecosystem service approach);
- UK (ecosystem service approach).

Belgium

The Belgian report uses a *thematic approach* to analysing the cost of degradation. The thematic approach is about assessing the current cost of degradation and involves the following steps (COM, 2010):

1. Define degradation themes, *e.g*. marine litter, chemical compounds etc.;
2. Define a reference condition, for example a condition where targets for good environmental status are achieved;
3. Describe in qualitative and, if possible, quantitative terms the difference between the reference condition and the present environmental status, *i.e*. the degradation of the marine environment, for all the degradation themes, and
4. Describe the consequences to human well-being of degradation of the marine environment, either qualitatively, quantitatively or in monetary terms.

In the Belgian report marine litter is identified as one of a number of "degradation themes". Some of the other listed themes are

i) micropollutants;

ii) oil spills and illegal discharge of hydrocarbons; and

iii) eutrophication.

In order to identify actual costs of marine degradation incurred per sector, an expert workshop was organized. The results of the expert opinion were then inserted for each sector. Four cost categories were identified; prevention costs, mitigation costs, governance cost and opportunity costs.

The problem of marine litter is described in the report by referring to a specific clean-up project ("Lenteprikkel", 2004-2008). Amounts of litter (kg), beach distance (km) and number of volunteers are presented, which gives a picture of current environmental status in relation to marine litter. The total cost of this specific marine litter clean-up project is estimated to around €14,000, which can be interpreted as the cost of degradation.

Netherlands

The Dutch report uses a *cost-based approach* to analysing the cost of degradation. The cost-based approach is about finding an estimate of the current cost of degradation using only existing quantitative data on costs of measures currently implemented to prevent degradation of the marine environment. The approach involves the following steps (COM, 2010):

1. Identify all current legislation that is intended to improve the marine environment;

2. Assess the costs of this legislation to the public and private sectors;
3. Assess the proportion of this legislation that can be justified on the basis of its effect on the marine environment (as opposed to health or on-shore environmental effects); and
4. Add together costs that are attributable to protecting the marine environment from all the different legislation you have assessed.

In the Netherlands report, an overview is presented of the current costs various sectors already incur for measures that contribute to an improvement of the marine environment. Five types of measures are classified; insurance, antifouling, emissions to air, ballast water treatment and marine litter. As for marine litter, beach cleaning is paid for by municipalities at a total cost of approximately €8.84 million per year, which can be interpreted as the cost of degradation due to litter in the Netherlands. The cost of voluntary action to remove marine litter is not included, which means that the presented total cost is probably an underestimate.

Sweden

The Swedish report uses an *ecosystem service approach* to analysing the cost of degradation. The ecosystem service approach is about identifying the ecosystem services, and associated benefits, which are potentially lost if the environment is negatively affected. The approach involves the following steps (COM, 2010):

1. Define GES using qualitative descriptors, list of elements and list of pressures;
2. Assess the environmental status in a Business As Usual (BAU) scenario;
3. Describe in qualitative and, if possible, quantitative terms the difference between the GES and the environmental status in the BAU scenario, *i.e*. the degradation of the marine environment; and
4. Describe the consequences to human well-being of degradation of the marine environment, either qualitatively, quantitatively or in monetary terms.

In the Swedish report it is argued that marine litter affects ecosystem services in two ways: 1) through its physical effect (*e.g*. on scenery), and 2) through the effect on ecosystem functions. The physical effect mainly affects *cultural ecosystem services*, such as recreation and the legacy of the sea. The effect through ecosystem functions potentially affects many or all other marine ecosystem services.

Marine litter leads to costs for beach cleaning efforts, fouled propellers, blocked intake pipes, damaged nets and destroyed catch, all of which can be measured with market data. The Swedish report also refers to two non-market valuation studies by Östberg *et al* (2010, 2011) which show that Swedes have a considerable willingness to pay for special consideration zones, focusing on less noise and marine litter, on the Swedish east and west coasts. The resulting economic value for the east and west coast was approximately SEK 500 and SEK 900 (€59 and €105) per household per year, respectively. A proportion of this value is due to reduced amounts of marine litter. This proportion is unknown, but is interpreted as the cost of degradation if marine litter cannot be avoided.

UK

The UK uses an *ecosystem services approach* to analysing the cost of degradation (for a brief general introduction to the approach see above discussion for Sweden). The UK report states that marine litter directly and indirectly affects ecosystem services and thus the benefits people get from the marine environment. Comparisons between the BAU scenario and proposed GES targets for litter are made showing that there will be benefits from reducing litter.

The estimated benefits of completely removing marine litter are £1.8-£1.9 billion over 10 years. In the UK report it is emphasised that since the GES targets for litter aims to reduce litter rather than

removing it altogether, the benefits of achieving GES will be a proportion of these values, and considerably lower. The UK also recognises the costs of the damage inflicted from litter to fishing vessels[9]. The figures clearly indicate that there will be benefits to addressing the problem of increasing marine litter, and consequently a cost of degradation if GES targets are not reached.

The four examples of information on costs of degradation due to marine litter take different approaches. Two report clean-up costs, while two report the impacts of the presence of marine litter on society.

4. More detailed analysis of two sectors

4.1 Approach

The purpose of this Section is to carry out a detailed sector analysis in order to learn lessons for future data coordination and joint analysis. It does this by looking into two sectors in more detail than is possible across all the sectors covered by the draft ESA reports. This allows investigation of parameters and issues involved in collating countries' draft economic evidence, such as:

- Measures of economic activity (GVA, GDP, turnover, employment, number of passengers, freight and number of containers, etc);
- The boundaries of the sector (*e.g.* in terms of upstream and downstream activity) and use of multipliers to estimate economic impacts within and beyond these boundaries;
- The social analysis of the sector in particular identification of the social groups dependent on the sector and their spatial distribution, and
- Treatment of the activity within the sector that occurs in international waters, outside of the exclusive economic areas.

The sectors chosen for this detailed analysis are the Ports and Shipping, and Leisure and Tourism sectors. The choice of the Ports and Shipping sector is based on a number of factors that make it a suitable case study to learn from analysis of, including but not limited to:

- It is a sector present in all the coastal parties to OSPAR, and therefore all those that will be submitting an ESA under the MSFD;
- Some aspects of the sector are subject to relatively stable and well understood regulatory regimes (*e.g.* ports), whereas a number of new initiatives are being introduced in relation to the regulation of shipping (*e.g.* ballast water controls, controls on greenhouse gases, sulphur and NOx). The contribution of shipping to background noise in the marine environment is also of interest in relation MSFD Descriptor 11;
- The regulation of the sector overlaps with the Water Framework Directive, for example, harbours are Heavily Modified Water Bodies, and possible policy measures may involve tackling pollution and invasive species issues;
- It is a relatively uncontroversial sector compared to some marine activities that can provoke very strong opinions amongst stakeholders (*e.g.* oil and gas extraction, marine wind farms);
- It has significant socio-economic impacts in itself and as a strategic sector within national and regional economies; and
- It has significant environmental impacts (*e.g.* marine dredging and disposal, noise), which are relatively well understood (*e.g.* unlike the environmental impacts of marine renewable energy

[9] See page 109 in:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69632/pb13860-marine-strategy-part1-20121220.pdf

generation, for which understanding is still developing and therefore comparisons would be restricted by uncertainty).

In contrast to Ports and Shipping, the Leisure and Tourism sector is less well defined as an economic sector in available statistics. It is therefore chosen as a case study to provide a contrast to Ports and Shipping, for example due to:

- Being an activity with a diffuse presence throughout the wider economy (*e.g*. made up of numerous Small and Medium Enterprises (SMEs)), the marine component of which is difficult to identify. Previous experience of Enveco for this sector for the Baltic Sea region reveals that official statistics tend to have a limited capacity to sort out different types of tourism and leisure despite their potentially very different economic, social and environmental impacts; and
- Having different patterns of social and economic activities. For example, every day and small-scale coastal leisure activities might be of great social and non-market economic value to people, but still have little impact on national economic statistics because such activities do not necessarily have an impact on the commercial tourism sector.

These factors typically make it difficult to get an overview of the extent of different tourism and leisure activities. For example, Enveco's work on the sector for the Baltic Sea region concluded that it was necessary to carry out a special survey to get internationally consistent data on the extent of recreational visits to the Baltic Sea. Such a survey was executed in 2010 (Söderqvist *et al*. 2010).

For these reasons, comparisons between OSPAR countries in each of the sectors chosen are likely to be of interest. While some aspects are likely to be reasonably 'neat' so that they illustrate issues of detailed comparison clearly, other aspects may have divergent approaches and the comparison can usefully reflect on these while seeking to promote greater harmonization where desirable.

4.2 Ports and shipping

The purpose of this Section is to provide more detailed analysis of the Ports and Shipping sector and to learn lessons for future data coordination and joint analysis.

4.2.1 Background

The Ports and Shipping sector has been selected for analysis as a relatively well-defined and important economic sector present in all the coastal OSPAR countries. The ports and shipping sector is therefore able to illustrate the extent of the use of spatial data and the granularity/spatial scale of such data, which is of particular interest for the sectoral analysis in the ESA. This is due to activity spatialisation being an essential part of developing an understanding of the pressure distribution and impacts in line with the Driver-Pressure-State-Impact-Response (DPSIR) approach. This Section describes the spatial data used by Contracting Parties, commenting on issues of consistency and any limitations associated with such information.

In addition this also identifies other parameters and issues involved in collating international economic evidence. The geographical scope of the analysis is for the OSPAR region, wherever possible broken down by the relevant OSPAR sea regions (see Figure 1 in Annex 5) and by OSPAR country wherever possible (see Figure 2).

4.2.2 Ports and shipping country ESA approaches

An overview of the types of information on Ports and Shipping activity within ESA reports is provided in Table 4.1. It identifies the broad categorisation of information presented within the ESA report:

- Spatial Data ('S-Data' in Table 5.2) refers to any Figures, Maps or spatial analysis contained within the ESA. It should be noted that data availability for an OSPAR overview report has not

been explicitly addressed. It is assumed that all information used to generate spatial data within individual ESA reports is the ownership of the country authoring the documents (or their subcontractors). Data sources which have been used for each ESA are identified in Table 6 in Annex 3;

- Where data is available in a tabulated or graph form, this has been identified as 'Data' in Table 4.2. Table 4.3 provides a view of the type and range of data presented in each of the ESA reports;
- Where topics are described in a qualitative sense, but not supported by either tabulated or graphed data, this has been identified as 'Qual' in Table 4.2. In some ESA reports, qualitative information may be highlighted with examples, this has been commented upon in Table 4.3 with more detailed information held within Annex 3.

Table 4.1: Source of ESA Ports and Shipping Information

Country	ESA Title / Status	Assessed
Belgium	Socio-Economic Analysis Of The Use Of Marine Waters And The Cost Of Degradation Of Marine Belgian Waters, Draft October 2011.	Yes
Denmark	Initial assessment (June 2012)	Yes (via project partner)
France	Initial Assessment/ESA for three OSPAR areas (II, III, IV). Available in French only.	Yes (via project partner)
Germany	Two part assessment. Initial assessment (Draft, October 2011). Available in German only.	Yes (via project partner)
Ireland	Ireland's Ocean Economy, December 2010. The available report does not represent Ireland's official ESA, it is noted that: 'This report goes some way towards the characterisation of the use of Irish coastal and offshore natural resources as required under the MSFD'.	Yes
Iceland	No relevant data obtained	No
Netherlands	Economic and social analyses for the Marine Strategy Framework Directive. Part 1: Initial Assessment. Preliminary report (December 2011), not finalised.	Yes
Norway	Management plans (2011) for different marine sectors used in the assessment. Norway is a non-EU member state and is not implementing MSFD.	Yes (via project partner)
Portugal	Marine Strategy for Continental Subdivision (2012) Chapters – Economic and Social Analysis: Shipping, Ports and Dredging.	Yes
Spain	Two part report - Demarcación Marina Noratlántica and Demarcación Marina Sudatlántica	Yes (via project partner)
Sweden	Initial assessment (Draft, 2011). Separate report Annex produced for the maritime sector: 'Analysis of the maritime sector - from drivers to impact on ecosystem services (2011)'.	Yes
United Kingdom	Charting Progress 2, Feeder Report: Productive Seas (UKMMAS, 2010).	Yes

Table 4.2 Type of Port/Terminal and Shipping information in ESA reports

	Belgium	Denmark	France	Germany	Ireland	Netherlands	Norway	Portugal	Spain	Sweden	UK
Ports-Terminals Descriptor	Data	Data	Data	Qual	Data	Data (S-Data*)	Qual	Data	Data	Data	S-Data
Ports-Terminals Employment	Data	Qual	Data	Qual	Data	Data (S-Data*)	Data	Data	Data	Data	Data
Ports-Terminal Emissions	Qual	Data	N	Qual	N	Qual	Data	Qual	N	Qual	Qual
Shipping - Descriptor	Data	Data	N	Qual	Data	S-Data	S-Data	Data	Data	S-Data	Data
Shipping - Marine Dredging/Disposal	S-Data	N	N	S-Data	N	Qual	N	Data	Qual	Data	S-Data
Shipping - Anchoring	N	N	N	N	N	N	Qual	Data	N	N	S-Data

Key (see Section 4.2.2 for explanation)

Spatial Data	S-Data	Quantitative Data	Data	No Information	N
Spatial Data Available in annexes referenced in ESA report	(S-Data*)	Qualitative Data	Qual		

Table 4.3 Brief description of Data and Information											
	Belgium	**Denmark**	**France**	**Germany**	**Ireland**	**Netherlands**	**Norway**	**Portugal**	**Spain**	**Sweden**	**UK**
Ports-Terminals Descriptor	Turnover (8 years, 2003 to 2010), total Belgium tonnages (6 years 2003 to 2008)	Total of 140 ports, (66 large ports with 98% of turnover), Value for 2010 of 87mil tonnes good, 1mil fish	8 Major ports (goods & passengers volume), split of ports into Goods Ports, Marinas.	Qualitative description of total tonnage	Qualitative data turnover (GVA) for 2007, tonnage (9 years, 2000 to 2009)	Data on tonnages (1 year, 2009) with projections for 2015, 2020, 2040.	Qualitative information on port categorisation	Quantitative information on ports (volume of goods, nº of passengers, marketed fish) 2010	Qualitative data on ownership and number of ports (Total of 46 state ports, 320 fishing ports, 355 marinas and 126,963 moorings)	Tonnages by cargo type (1 year, 2001)	Spatial data, size and distribution
Ports-Terminals Employment	Employment figures (6 years, 2003 to 2008) for Ports, Employment figures for Marine Aggregates	Estimate of 60,000 to 70,000 people work in or in connection to ports	Some data on Marina employment, Direct Port employment	Qualitative description of employment with examples	Data against GVA for one year(2007).	Data (3 separate years, 1995, 2000, 2007) categorised by harbour areas	Data (1 year, 2009) with projections for 2030	Quantitative information on ports (number of workers) 2010	Data (I year, 2009 - 35,000 job positions at the national level)	Data (1 year, 2009) including ports and water transport	Data from SIC codes (1 year, 2007)
Ports-Terminal Emissions	No information	Data on emissions and estimated cost of emissions	No information	Qualitative information only, no data	No information	Qualitative information	Data on emission values and projections for 2030	Information related with the international policy context.	No information	Qualitative information on effects of emission restrictions	Qualitative information

Table 4.3	Brief description of Data and Information										
	Belgium	**Denmark**	**France**	**Germany**	**Ireland**	**Netherlands**	**Norway**	**Portugal**	**Spain**	**Sweden**	**UK**
Shipping - Descriptor	Shipping tonnages data total Belgium tonnages (6 years 2003 to 2008), no vessel numbers	Quantitative description of turnover at DKK 32.6 billion.	No information	Qualitative description of shipping employment and vessel numbers with examples	Tonnage (9 years, 2000 to 2009) graphed. Cruise industry data (1 year, 2007) including GVA	Data on employment, sea lane usage displayed	AIS data used to derive spatial usage, qualitative information on tonnages	Quantitative information on shipping (tonnages, number of ships, number of passengers) 2010	Quantitative data (Tonnages, (number of ships, number of passengers) graphed. (1 year, 2009)	AIS data (spatial) used to derive sea area usage	Data on throughput tonnages (10 years, 1997 to 2007), ship calls (1 year, 2007) split by ship type
Shipping - Marine Dredging & Disposal	Graphed data (9 years, 1997 to 2005), spatial data for one year (2008), also beneficial use volumes	No information	No information	Spatial representation of disposal locations.	No information	Qualitative information on cost/value of dredging	No information	Quantitative information on dredge material and cost/volume of dredging, 2010 and 2009 respectively	Qualitative information on dredge material is found on the Pressures and Impacts Analysis	Data (5 years, 2005 to 2010)	Spatial dredge disposal, data (7 years, 2001 to 2007) number of licences issued against tonnages
Shipping - Anchoring	No information	No information	No information	No information	No information	No information	Qualitative reference	Quantitative information on anchoring docks (number) 2009/2010	No information	No information	Spatial data identify anchorage areas

4.2.3 Discussion

The following analysis summarises key points from the information in Tables 4.2 and 4.3.

- **Ports**

The descriptors used to classify ports and terminals differ across countries, typically ports are classified by the annual tonnage of cargo handled. Some countries (for example, the UK) have provided a breakdown of cargo type throughput, however most provide a summarised total tonnage. Some countries have identified turnover (for example, Belgium) as well as information on tonnage throughput. The use of tonnage provides a proxy for determining the activity level within ports, but it is difficult to match these activity levels in terms of shipping, as tonnage is not easily equated to shipping numbers. Ports which import/export large volumes of liquid cargos (oils and gas) may have relatively large tonnage throughputs, but comparatively small shipping movement volumes compared to ports dealing with predominantly passenger traffic.

In terms of data availability, most ports have provided data on Ports and Terminal activity, only two countries (Portugal, the UK) has provided a spatial breakdown of port location, which is further split into major ports and smaller ports, with major ports being those handling 1 million tonnes or more a year. Time periods used for data vary across countries; typically only one year of data on tonnage throughput is presented. One country, the Netherlands, included a future projection, showing predicted tonnages for 2015, 2020 and 2040.

Employment data for Ports and Terminals is the most widely collected, documented and presented data set. Most countries have presented employment data and GVA. Sources of data used are typically national statistics which introduce other difficulties where data is grouped by municipality or regional boundaries and are not always compatible with boundaries used elsewhere within the ESA reports (for example, the Netherlands which uses different boundaries for employment and port descriptors). In addition, the industry codes used to identify employment in the relevant sectors are not always sufficiently precise such that other forms of employment may be included in some of the statistics. Future projections for employment to 2030 are presented for two countries (the Netherlands and Norway).

In some country ESA reports, the data presented for Ports also includes other adjacent sectors, such as other water transport and associated logistics, or vertically related sectors. These include downstream activities such as shipping, and upstream activities such as ship building.

- **Shipping**

Shipping information within country ESA reports is very variable. Descriptors for the sector include shipping movement numbers (derived mainly from Automatic Identification System (AIS) data – for example, in Norway and Sweden) or from ship call records (for example, UK). Belgium classifies shipping via tonnages and number of vessels calling at Belgian ports. This sector provides the greatest use of spatial data, generally in the form of AIS data plots or gridded intensity areas derived from shipping movement data.

- **Pressures**

Most countries have identified activities that can give rise to significant environmental pressures, for example; dredge disposal records (which could indicate the potential for smothering of seabed at disposal sites), location of anchorages (which could indicate areas subject to seabed disturbance), ship collision with large marine life and underwater noise. However, few countries appear to have in place a systematic framework for identifying relevant activities and their associated environmental pressures. Some countries have provided spatial data on the location of activities that potentially give rise to specific pressures.

Half of the countries provide either tabulated data, or spatially referenced data on dredge and disposal activities. Three countries provide long term data sets covering volumes of material deposited, for example in Belgium, Sweden and the UK, whereas Germany and the UK provide spatially referenced data sets identifying disposal grounds.

In respect of Emissions from Ports (and Shipping) information is addressed mainly qualitatively, with commentary about the role of regulation. Some Countries refer to the changes to SOx and NOx emission standards with reference to Emission Control Areas and the expected effects on shipping operators. Norway is the only country which presents air quality emissions data.

4.3 Leisure and tourism

The purpose of this Section is to carry out a detailed analysis of the Leisure and Tourism sector and to provide insights for future analysis of ESA reports.

4.3.1 Introduction

This Section aims to give a broad picture of the marine tourism and leisure sector, conclude if and how country comparisons can be made, and if not, give recommendations on what could be done in order to achieve such comparisons.

The issues discussed in this Section are: i) definitions of the concept of marine tourism and leisure, ii) extent of use of marine waters for tourism and leisure, iii) links between marine tourism and environmental factors, iv) links between marine tourism and social factors, v) cost of degradation of the marine environment related to marine tourism and leisure and vi) compatibility of data - discussion and recommendations.

More specifically, the purpose of the Section is to show in some detail:

- what different types of marine tourism and leisure activities there are in the OSPAR countries;
- which types of data are used for describing use of marine waters; and
- at which geographical scales these descriptions take place.

Based on this, it will become evident whether or not OSPAR-wide conclusions regarding marine tourism and leisure are possible to make today.

Altogether, the analysis builds upon ten country ESA-reports that contain information on marine tourism and leisure. It is important to note that there is a big difference as to the level of detail in the information provided by these country reports. Not all of the reports contain specific information on the issues discussed here, but they all provide some information which makes a lowest common denominator comparison of marine tourism and leisure activities possible. These comparisons (*i.e.* what type of economic, social and environmental information is in common in all (or the majority) of the countries), can for example give an idea of which:

- Marine tourism sectors and individual recreation activities are shared across OSPAR;

- Types of market economic data are in common; and
- Which ways to describe the cost of degradation of the environment due to marine tourism and recreation are most common.

In addition to summary tables presenting results and giving an OSPAR-wide picture, illustrative concrete examples from the individual country reports are also provided to highlight key points from the analysis.

4.3.2 Definitions of marine tourism and leisure

Although marine tourism and leisure is discussed, or at least mentioned, in all of the ten reports examined for this analysis, few provide general definitions of the concept. Marine tourism and leisure is usually defined through the tourism sector and individual recreation activities, but also from a geographical perspective.

Looking at the definitions of marine tourism and leisure used in country ESA reports shows that:

- Marine tourism and leisure activities are mentioned in all of the reports;
- A large number of sectors involved in tourism and leisure are presented in the reports, *e.g.* linked to marine transportation, accommodation and water-based tourism;
- Recreation activities identified regularly include swimming, diving, sailing, nature-watching and fishing; and
- The geographical scale most often used in the reports is sub-national.

The Tables in Annex 2 show how the countries have framed the sectors and activities involved in marine tourism and leisure, and show that there is significant variation. Some countries do not classify activities in terms of sectors, for example Germany who separates marine tourism and leisure into overnight and day guests. Other countries use several sectors, for example the UK names 15 sectors, and many of these sectors are ones involving both marine and terrestrial activity (*e.g*. catering), while others are linked to marine tourism and leisure through supply chains (*e.g*. boat building). Across the country ESA information, what seems to be the most common denominator in terms of subgroups/ types/sectors of marine tourism and leisure are: i) different kinds of accommodation and ii) marine transportation. Half the countries mention these two subgroups of marine tourism.

A majority of the countries (eight of ten) also identify lists of marine recreation activities. These again vary substantially in length (between 4 and 19 activities listed). In terms of individual recreation activities, swimming and bathing are most commonly listed. Other important activities listed by the countries are diving and fishing. The Belgium and UK reports provide very detailed overviews of recreational activity. The Belgium report divides recreation activities into three different categories: i) non-motorized recreation (no engine involved), ii) motorized recreation (intensive use of an engine is involved) and iii) angling at sea. Table 4.4 below summarises a list of identified recreational activities in the UK, and also gives a picture of the proportion of each activity undertaken at the coast.

Table 4.4. Recreational Activities UK (Source: UK ESA report)			
	Number of participants in UK	**Proportion of activity undertaken at the coast (%)**	**Estimated number of participants on the coast (thousands)**
Surfing	517,686	100	518
Kayaking	801,895	42	337
Small boat sailing / racing	624,463	58	362
Power boating	252,777	80	202
Personal watercraft	143,332	64	92
Motor boating/cruising	497,217	45	224
Yacht cruising and racing	439,493	74	326
Scuba diving	270,982	70	190
Outdoor swimming	4,768,750	60	2,861
Waterski/Wakeboard	235,076	41	96
Wind-surfing	169,621	58	98
Kite-surfing	66,553	93	62
Total			**5,368**

There is also some variation is in the geographical scales at which information is reported by countries, with some reports being national, and others sub-national in scale, as shown in Table 4.5.

Table 4.5. Geographical scale(s) by which the leisure and tourism use of marine waters is described	
Country	**Geographical scale(s) used**
Belgium	Sub-national
Denmark	Sub-national
France	Mainly sub-national and national, but also local
Germany	Sub-national
Ireland	Sub-national, national
Netherlands	Sub-national
Norway	Sub-national
Portugal	Sub-national
Spain	National, regional (autonomous community) and/or marine demarcation level
Sweden	Sub-national, national
UK	Sub-national, national, local

Even if all descriptions were at the same geographical scale (*e.g*. sub-national), a common and accurate geographical OPSAR definition of marine tourism and leisure would probably still not be feasible. This is due to the great variation of geographical conditions in the countries, in terms of country size, length of coastlines, situation of major cities etc,

In theory a common definition could be made for the concept of “marine tourism and leisure” as for example: “all visits taking place, and all existing accommodation facilities, restaurants and marinas, 5 km or less from the coast”. However, for some countries a more reasonable distance would be 2 km, or 1 km. It is difficult to find a practically definition of the geographical extent of leisure and tourism associated with the marine environment.

An example of this is in the definitions of marine tourism in Denmark and Sweden. In the Danish report coastal tourism is defined as “overnight stays taking place outside the biggest cities of Denmark”. For Denmark, which is considerably smaller than Sweden, it is assumed that the majority of these tourists use the sea in one or another way. In Sweden, which is geographically larger and more diverse, a more specific geographical definition is necessary. Thus in the Swedish report marine tourism and leisure is analysed by the use of geographical maximum and minimum definitions. While the maximum definition is likely to result in an overestimate of tourism sectors in relation to their association with marine recreation and the minimum definition is likely to result in an underestimate, it is useful to derive a range from the maximum and minimum definitions instead of a point estimate. This approach captures at least some of the uncertainty of geographically defining marine tourism.

4.3.3 Measuring tourism and leisure use of narine waters

The countries have applied different approaches to describe the use of marine waters by marine tourism and leisure. The most common types of data used for describing use are:

i) number of same-day and overnight visits;

ii) number of passengers; and

iii) number of boats.

More specific types of data include numbers of divers (Netherlands) and the number of beaches with a blue flag (France). Comparisons across the ten countries are hence difficult since data types used are diverse and not defined exactly the same way in the different countries (see Annex 2 for lists of data types).

The market economic value of marine tourism and leisure is reflected by data such as employment, turnover, added value and expenditures, as shown in Table 4.6.

Table 4.6. Market economic value of marine tourism and leisure – types of data

Country	Types of data for marine tourism and leisure
Belgium	Turnover, investments, total, indirect and indirect added value, gross expenditures
Denmark	Turnover, expenditures
France	Employment, expenditures (very specific data)
Germany	No quantitative information
Ireland	Turnover, expenditures, GVA
Netherlands	Employment, value added, expenses
Norway	GDP, expenditures
Portugal	GVA (coastal tourism, nautica, and total).
Spain	GVA, employment
Sweden	Employment, turnover
UK	Turnover, expenditures, GVA, employment, income from coastal towns

It is noted that the different terms in Table 4.6 may often refer to the same data (*e.g*. expenditure, expenses). However, this project has not been able to investigate the data concerned to verify whether this is the case for all the data listed. Even with these established economic terms, there are no data types that are consistently available across all the country reports examined. Furthermore, the activities included in the definition of the sector are inconsistent (as described in Section 4.3.2).

It is clear that marine tourism and leisure is not defined and measured the same way across the countries. If the concept of marine tourism was defined by common definitions (*e.g*. employment and turnover in accommodation 5 km or less from the coast) in all the countries, data comparisons at a regional scale would naturally be a lot easier. The available comparisons of information (where the differences in data are small enough to allow valid comparisons) from countries that can be made in an OSPAR overview ESA report include:

- Turnover in:
    - Same-day visits (Belgium, Sweden);
    - Cruising industry (Ireland, Denmark);
    - Leisure boating (Denmark, UK);
- Value added in:
    - Hotel and restaurant sector (Netherlands, UK);
- Employment in:
    - Coastal tourism (Denmark, Sweden, Ireland, Netherlands)

Half (five of ten) of the reports provide market economic data on individual recreation activities, but there is little consistency about which activities (see Table 4.7 below). With a few exceptions, available data cover a very small number of issues within the range of activities involved in marine tourism and leisure. It is probably the case that accurate information on many specific tourism and leisure activities can only be obtained through primary survey work.

Table 4.7. Data provided for individual marine tourism and leisure activities

Country	Data used
Belgium	Yes, data on marina, beach clubs and water sports
Denmark	No data
France	Yes, specific information regarding sea-bathing, being at the beach, sailing, recreational fishing.
Germany	No data
Ireland	No data
Netherlands	Yes, on recreational angling
Norway	No data
Spain	No data
Sweden	Partly, by referring to “Baltic Survey”
UK	Yes, for many activities

Table 4.8 below shows an example from the UK of the breakdown of different kinds of market economic data for individual marine recreation activities.

Table 4.8. Participation (million) and turnover and expenditure (million £) of recreational activities			
Activity	**Participation**	**Turnover**	**Expenditures**
Leisure boating	1.2 (2007)	1840 (2006/07)	
Surfing	0.5 (2007)	200 (2007)	
Marine wildlife watching		9.3 (1998, Scotland)	
Recreational fishing	0.8 (2007)		538 (2003, England and Wales)
			141 (2008, Scotland)
			7.4 (2007, Northern Ireland)
Total		**Est. 2,700**	

Just a few of the country ESA reports refer to the non-market economic value of marine tourism and leisure (*e.g*. Sweden, Ireland and Denmark), but again approaches are not consistent. The Danish report refers to one non-market study of recreational fisheries (COWI, 2010b) whereas the Swedish report deals with quite a large number of non-market studies in the Baltic Sea and the Swedish part of the North Sea, focusing on a wide range of issues such as eutrophication, recreational fisheries, marine litter etc. (important sources of knowledge are SEPA (2008, 2009).

4.3.4 Links between marine tourism and environmental and social factors

Most of the country reports are clear about the importance of marine tourism and leisure for local economies and well-being of people, although this is not always described quantitatively. The reports also discuss the link between marine tourism and negative environmental impacts, such as physical disturbances, eutrophication, marine litter and alien species. However, marine tourism's dependence on the marine environment is rarely mentioned.

The approaches used by the countries to link marine tourism and the environment are summarised in the Table 4.9 below. Note that some country reports discuss more than one approach and also that the level of detail is very varied in the reports. Some countries mention or list ecosystem services and GES descriptors in general, and others carry out more thorough analyses of links between marine tourism and leisure and GES descriptors and indicators as well as ecosystem services.

Table 4.9 shows that within the ten countries:

- Three discuss (to varying degrees) the links between marine tourism and environmental factors in terms of GES descriptors and indicators as well as ecosystem services;
- Two discuss it in terms of GES only;
- Two discuss it in terms of ecosystem services only; and
- Three countries do not discuss this or adopt their own approach using neither of these methods.

Table 4.9. Summary of country approaches to link marine tourism and environmental factors			
	GES	**Ecosystem services**	**Other ways**
Belgium	**X**	**X**	
Denmark	**X**		
France			**X**
Germany	**X**		
Ireland		**X**	
Netherlands			**X**
Norway		**X**	
Spain			**X**
Sweden	X	**X**	
UK	**X**	**X**	

Again, it can be concluded that there is no consistency in how the countries have dealt with the issue. The Table must thus be interpreted with care since the countries have provided very varying levels of detail in their analyses and also because the discussion regarding environmental factors has not always been specifically linked to marine tourism. The Table gives a flavour of the approaches chosen by the countries. One conclusion is that most countries have adopted the GES and/or ecosystem services approach, and that these two seem an equally attractive basis for analysing the links between tourism and the environment.

The available data on marine leisure and tourism are linked to social values in different ways in the different draft country reports, as shown in Table 4.10.

Table 4.10. Social value of marine tourism and leisure – types of data	
Country	**Social data on marine tourism and leisure**
Belgium	No specific discussion, no employment figures linked to marine tourism and leisure are presented.
Denmark	No specific discussion, employment figures linked to marine tourism are presented. The total number of employed in the tourism sector of Denmark is estimated to be around 61.000 people.
France	Not available
Germany	It claims that tourism is important for local economies, as much of what is spent by tourists goes directly to pay employees. And that this has a distributional effect on the region's economy.
Ireland	In the report it is stated that "cultural marine tourism" offers opportunities for rural development in the less developed coastal regions of the country and offers an alternative to fishing communities wishing to diversify into other marine based activities. Employment figures (overseas and domestic) linked to marine tourism and leisure are presented, *e.g*. employment in hotels, restaurants, entertainment etc.

Netherlands	The Netherlands have carried out a number of studies to get information on the social importance of the North Sea. Employment figures linked to marine tourism and leisure are also presented. The report describes a baseline measurement of the social importance of the North Sea for coastal residents, fishermen and recreational users in the Netherlands. The social importance of the North Sea refers to the relationship or connection between these users on the one hand and the North Sea and the marine environment on the other hand. Based on the scores of roughly twenty indicators, the current social importance of the North Sea can be marked as 'average' on the measurement scale applied. The North Sea is of major social importance if the North Sea and its beaches remain relatively accessible for groups of users now and in the future. If the accessibility, environmental quality, safety and experience of the North Sea were to deteriorate or decrease, this would have a negative effect on its social importance. The direct employment in the tourism and leisure sector is estimated at 80,000 jobs, the indirect employment at about 30,000 jobs (NRIT, 2003). However, it is unclear to which extent these figures are linked to coastal tourism.
Norway	No specific discussion, employment figures linked to marine tourism and leisure are presented. The total employment in the tourism industry was 58 000 people in 2007, in the counties bordering to the North Sea and Skagerrak.
Spain	No specific discussion, employment figures linked to marine tourism and leisure are presented. The reports state that the tourism sector employs around 11% of the economically active population in Spain and that marine recreation represented 0,13% of the total GVA of the country and was related to approximately 15,000 job positions in 2007.
Sweden	No specific discussion, employment figures linked to marine tourism and leisure are presented. The total employment in the identified marine tourism sectors are 38 878 - 53 466 people, depending on whether the MAX or MIN definition of marine tourism is used (Resurs, 2011).
UK	No specific discussion but in the underlying feeder report the authors present data about how the social value of marine tourism is distributed in eight different regions in the UK. Certain activities and uses of the marine environment have benefits that are hard to quantify. For example, a better understanding is needed of the contribution that marine activities make to social values, such as upholding cultural traditions in local fishing communities. It is argued that evidence on the cultural and historic values of the marine environment is patchy and to some extent dependent on information from extractive industries. Employment figures linked to marine tourism and leisure are not presented in the final ESA-report (2012). The UK approach relies on economic data to form a proxy for more social impacts. However, actual employment data is not included in the final ESA-report but in the underlying feeder report.

4.3.5 Cost of degradation related to marine tourism and leisure

Most countries identify how degradation of the marine environment is linked to marine tourism and leisure, for example in relation to by physical disturbances, alien species and eutrophication. There are some common themes in the information available from countries, for example litter is mentioned in relation to marine recreation in four of ten country reports. However, as well as differences in what is covered, it is also approached differently in different countries. While some report information based on pressures (*e.g*. disturbance, contaminants), others cover impacts (*e.g*. loss of biodiversity). Therefore the information available on this issue is very heterogeneous and the likelihood of being able to combine country data is low.

In COM (2010) three different approaches are described for analysing the cost of degradation: 1) the ecosystem service approach, 2) the thematic approach and 3) the cost-based approach. According to COM (2010:35) the cost of degradation is generally about the following (although these are not essential steps of analysis):

- Defining good environmental status (GES) using qualitative descriptors, list of elements and list of pressures;
- Assessing the environmental status in a business-as-usual (BAU) scenario;
- Describing in qualitative and, if possible, quantitative terms the difference between the GES and the environmental status in the BAU scenario. This difference defines the degradation of the marine environment at a particular point in time;
- Describing the consequences to human well-being of degradation of the marine environment, either qualitatively, quantitatively or in monetary terms. These consequences are the cost of degradation.

As GES had not been defined in quantitative terms at the time when the ESA reports were written (and reviewed), there is no doubt that this task (following the steps in the list above) has been a challenge for the countries. One clear result from the review of country reports is that very few countries discuss specifically the cost of degradation of the marine environment due to marine tourism and leisure.

Table 4.11 below shows that of the ten reports reviewed:

- Seven have not approached and/or estimated the cost of degradation linked to marine tourism and leisure specifically;
- Two have discussed it in terms of what would be lost if BAU continues instead of GES being reached; and
- One has applied a cost-based approach.

Table 4.11. Approach to cost of degradation related to marine tourism and leisure			
Country	**Approach to costs of degradation**		
	No approach specifically linked to marine tourism	**"What would be lost if BAU is reached instead of GES"**	**Cost-based approach**
Belgium	✔		
Denmark	✔		
France	✔		
Germany	✔		
Ireland	✔		
Netherlands[a]			✔
Norway	✔		
Spain	✔		
Sweden[b]		✔	
UK[c]		✔	
[a]= Partly linked to marine tourism and leisure by focusing on marine litter. [b]= Specifically linked to marine tourism and leisure (ecosystem service approach). [c]=Partly linked to marine tourism and leisure by focusing on marine litter (ecosystem service approach).			

4.3.6 Compatibility of Data - Discussion and Recommendations

Overall, the comparability and compatibility of marine tourism and leisure data across the OSPAR region is, judging by the reports examined, not strong enough to enable clear regional reporting of collated information. There are obviously ways that this could be addressed through using common headings to report relevant data. However, the costs of potentially re- organizing national information sets to do this need to be recognized.

Some comparisons are possible using lowest common denominator existing data for a subset of countries, but the types of data found in the ESA reports are generally so heterogeneous that credible OSPAR-wide conclusions based on such data would not be feasible. This Section presents a few recommendations of what would likely be needed in order to achieve a regional OSPAR-analysis of marine tourism and leisure. The level of ambition is of course up to the individual countries to decide since improving compatibility and comparability will imply costs.

Two steps are suggested that are expected to be lower cost, and offer the best options for first steps to improve data compatibility, should this be desired:

1. Firstly, before any classifications are considered, the differences between sectors and activities, and pressure and impacts should be discussed, so that the approaches countries adopt can be more easily compared and differences understood. This will enable approaches used, and the data they generate, to be identified and compared more easily;
2. Secondly, where the same or similar data is reported, it could be described in the same way using common terminology.

These points are suggestions around which to start discussions about improving data compatibility, should countries wish to do so. Obviously the approach taken needs to be consistent and to consider requirements across all sectors not just those in tourism and leisure.

More detailed steps towards consistency of data could include:

3. Introducing some consistency in describing the way marine tourism and leisure data is defined. For example, marine accommodation can be defined by distance from the sea – countries can make clear how they define the sea and what distance they use (even if they use different distances);
4. Reformulating data to fit standard definitions of the most common marine tourism and leisure activities. This would require agreement on standard definitions. This could be a costly undertaking, but having agreed standard definitions could be useful for countries who have not yet compiled their ESA reports, and for all countries in the longer term to guide future work delivering the MSFD (*e.g*. future rounds of reporting);
5. Survey work, of the type described in the Baltic (see Section 4.1) could be developed across the OSPAR region. This could provide valuable information about marine tourism and leisure, and other subjects of MSFD analysis, but would also be costly to organise, not least due to the difficulties of implementing a survey in a consistent manner in numerous countries.

5. Qualitative OSPAR Economic and Social Analysis

This Section examines some qualitative aspects of the ESA reports, and how country data can be combined across the OSPAR region, in more detail. It covers social analysis, the role of the environment including use of non-market data, and looks in detail at the ecosystem goods and services approach applied in Sweden.

The economic data in each country ESA report are complemented by different environmental and social data. This Section looks at the use of these types of data and their links to the economic data. The purpose of a social analysis in the context of the ESA-reports can, for example, be to provide information on: i) the potential impacts of environmental changes or suggested policy actions; ii) the societal response to such changes; and/or iii) the specific distribution of effects amongst stakeholders. This information could be useful to feed into future economic analysis to support the MSFD's implementation. Similarly environmental information can also put the economic impacts in context, and give greater insight into impacts.

5.1 Social analysis

The review of the country ESA reports carried out in this project shows that the basic method of DPSIR[10], where D (drivers), I (Impact), but in particular R for "response", is important in a social analysis which often deals with governance and management response. The review shows that most of the countries give information on this 'response', reflecting existing legislation, policies and regulation which affect the marine sectors and other human activities.

All countries present data on employment, which reflects previous coordination of approaches in the European working group on ESA; its guidance document describes the social analysis as the social

[10] Note that a recent suggested update to this approach is to use DPSWR, where 'W' represents 'welfare' in order to distinguish the socio-economic focus of this element from scientific/environmental interpretations of impact ('I') (Prof. Kerry Turner, pers com, Feb 2013).

aspect of the socioeconomic analysis, represented by 'employment' and the distribution of effects (presented by the different sectors described). This resulted in presentation of employment numbers by all countries and also distributional issues reflected by description of the various sectors. Further to this most countries did provide some other analysis, which was not coordinated, so unsurprisingly has greater variation.

More specific *governance mappings* of individual sectors are included in the reports of Belgium, Sweden and UK. These analyses illustrate the existing legislative frames for stakeholders and actors who use marine resources, and sometimes also indicate the complexity and possible clashes and contradictions among existing and new policies.

Furthermore, the sector analyses conducted in the country reports provide a kind of *stakeholder mapping* that covers economic interests linked to marine resources. The types of data frequently used illustrate the economic interests of stakeholders (*e.g*. turnover, GVA and employment). Employment is a parameter which has both a social and economic dimension and is something that all countries have provided data for (see Box 5.1).

The countries have different approaches on whether to treat the social analysis separately from the economic analysis. Some countries have conducted studies on stakeholders or citizens (public) perception of the marine resources in general, or the impacts of the implementation of the MSFD in particular (see Box 5.2). The reviewed country reports do not specifically discuss how social aspects are linked to cost of degradation and GES.

The countries' social analyses are similar in that they all use data on employment, but at a more detailed level there are differences in approaches between countries. A common understanding of "social aspects" or "social analysis" does not appear to exist, and this is likely to restrict detailed comparison of social aspects across the countries in this project.

Box 5.1. Illustrative example of employment data

This box presents an illustrative example of employment data provided in the country reports. All countries present data on employment and/or other economic parameters, sometimes for a large number of economic sectors (up to 17 sectors, see Table 1 in Annex 2). The three most common sectors are i) commercial fisheries, ii) ports & shipping and iii) tourism and leisure (see comparisons in Table 3.1). Since special studies are carried out within this project focusing on the latter two sectors (Sections 4.2 and 4.3), the example in this box is on commercial fisheries.

The Table below summarises existing employment data, linked to commercial fisheries, presented by a small sample of countries. It shows differences in the definitions of the sector, geographical scales used and data years, which reduces the accuracy of combining data on employment in commercial fisheries across the OSPAR region.

Country	Definition	Geographical scale	Data year	Employment
Denmark	Commercial fisheries Aquaculture	National National	2010 2012	3,681 152
Ireland	Sea fisheries Aquaculture	National National	2007 2007	2,200 1,981
The Netherlands	Commercial fisheries incl. aquaculture	Sub-national	2007	200
Norway	Commercial fisheries incl. aquaculture	Sub-national	2010	2,940

Box 5.2. Specific studies focusing on social aspects of the marine environment

A few of the ESA reports present results from studies focusing directly at citizen and stakeholder opinions and perceptions of marine issues. This box describes the different approaches used:

- The Belgian sector analysis is partly based on a stakeholder workshop organized in May 2011. At the workshop invited stakeholders, affected by the MSFD, discussed the future for using marine resources.
- The Dutch report includes the study 'Experiencing the North Sea: a quantitative consultation under Dutch citizens on the North Sea' (TNS NIPO, 2011). The survey was conducted with 600 citizens who had the chance to express their knowledge of and affinity with the North Sea. Some of the results show that the Dutch citizens are not aware of the potential problems of the North Sea. However when informed half of them stated that they were willing to pay for improvements of the environment of the North Sea (not quantitative measurements, only Y/N question).
- The Swedish report on marine litter involves a survey among Swedish organizations such as national authorities, municipalities, industries, NGOs etc. which are affected by or cause marine litter. The main purpose of the survey was to gather data on the status and the costs of marine litter. However, the organisations were also asked to indicate how GES will affect marine litter. This is a rare example of social aspects being specifically linked to a GES descriptor.

Other examples of social analysis (not based on citizen/stakeholder opinions) are provided in the report from the Netherlands (*e.g.* a media analysis in which the importance of the North Sea for the Dutch people is studied). Finally, the UK report "Productive Seas" (UKMMAS, 2010) presents a comprehensive chapter on management of marine resources and existing involvement of the public and other stakeholders. This report also includes education and research in the sector analysis.

5.2 Other environmental analysis methods used in the ESA

This Section summarises some other environmental analysis methods used in different ESA reports. The differences in country approaches mean that, in general, this information cannot be usefully summarised at OSPAR region level.

5.2.1 The role of the environment in the ESA

As reflected in their title, ESAs can be expected to focus on the analysis of economic and social aspects of the marine environment. The role of the natural environment in these documents depends largely on the chosen approach for the analysis (see Table 2.2). However, links to natural environment information are important to inform the implementation of the MSFD.

In general terms, if the ecosystems goods and services (EGS) approach is chosen for the analysis, environmental aspects will constitute an important part of the ESA. The EGS approach is mentioned in all the country reports to some extent (see Box 5.3). In other cases, the environmental part may be more limited, and is often found in the part of the initial assessment which looks specifically at Good Environmental Status as well as at pressures and impacts. Part of the following essential differences between country reports are hence potentially due to the different choices of where to present the analysis made in the different countries.

The types of environmental data provided differ between the reports. Information was not obtained from Iceland, but out of the 11 countries assessed:

- Six countries provide quantitative (and qualitative) data;

- Four countries only provide qualitative data (but sometime reference is made to a "Pressures and impacts report" regarding quantitative data related to environment: *e.g*. the case for France and Belgium);
- One country (Spain) does not refer directly to environmental issues in the qualitative ESA information received to date.

Environmental information (whether quantitative or qualitative), are given per use, per driving force (EGS approach) or per thematic issue (environmental measures), as shown in Table 5.1. The Swedish ecosystem goods and services approach is described in more detail in Section 5.2.2.

Box 5.3. Use of the Ecosystems Approach

The ecosystems goods and services (EGS) approach is mentioned in all the country reports examined, but developed at different levels. Sometimes EGS are quantified (through indicators). In other cases they are just listed (sometimes in association with specific uses of marine resources). Several reports mention that quantification of EGS was not possible due to insufficient availability of data and lack of time.

The variety of different approaches on EGS taken by the countries examined can be summarised as:

i. Quantified (at least partially);

ii. Described and linked to uses of marine resources;

iii. Described and linked to themes (in the assessment of the cost of degradation);

iv. Listed but not directly linked with uses or themes, and

v. Not mentioned.

Environmental issues are also dealt with through:

- Pressures and impacts associated with marine uses (or through a global DPSIR approach), either directly in the report or indirectly with a reference to the pressures and impacts reports; and
- Description and assessment of the costs of environmental measures (*e.g*. France, Netherlands).

Table 5.1. How are Environmental Data Introduced in the ESA?

Type of environmental data	Countries	Approach developed to introduce environmental data in the ESA
Qualitative	France, Netherlands, Belgium, (Ireland[11])	Through EGS related to uses of marine waters Through qualitative description of environmental measures (and costs) to reduce the cost of degradation
Quantitative	Germany, Sweden, Norway, UK, Denmark, Portugal	Through ecosystem services approach / GES descriptors and indicators / target objectives / status Pressures and impact of uses
Not specified / not yet available	Spain	–

[11] Note that in the case of the Irish ESA, environmental information is limited to a general list of EGS.

Data are provided for territorial waters; depending on economic sector and country, local or regional information is also given. In general, data are very heterogeneous. Information, which is more specifically related to environmental issues is often incomplete, partial or even isolated (*i.e*. very local).

The data used are mainly primary, but also sometimes modelled data are used, depending on the theme/sector and country. Government reports and national data related to the marine environment exist and are utilised in the ESAs. As mentioned above, the availability of quantitative environmental data is variable (depending on the theme/sector and country), but most often lacking.

The temporal scale of the data provided is very different in the different countries. Some countries provide all data for a single year (but which year is different between the countries), while others provide data from different years. Also, some annual data are provided in a time-series, sometimes going back to 1995. Most of the economic data provided about environmental impacts are market data. Non-market data can be found in one benefits assessment concerning the reduction of litter on beaches (UK).

The environmental analysis in the ESAs is linked to the MSFD's good environmental status (GES) descriptors and indicators to different extents in the different country ESA documents. In some countries, no indication of links to GES could be identified, in others they are listed in detail. In other cases, some of the issues covered by the GES descriptors are mentioned in the text, but are not specifically referred to as part of GES. Some countries consider all 11 GES descriptors, whereas others concentrate on the most important ones in their case. Indicators of GES are only mentioned for a very small number of countries and only for a selected part of the descriptors.

5.2.2 The Swedish Ecosystem Goods and Services approach

In the Swedish ESA, the ecosystem goods and services (EGS) approach (Stål *et al*. 2011) is used for both the analysis of the use of marine waters and the cost of degradation (following COM, 2010). Both approaches are briefly described here, using the application to the maritime industries as an example (Stål *et al*. 2011).

For the analysis of the use of marine waters the approach presented in COM (2010) is followed by going through four steps. These steps are shown in Table 5.1, along with an illustration from maritime transport.

Table 5.2 shows a number of EGS that are provided by the marine ecosystems of the Baltic Sea and the Skagerrak. They are based on the four categories of provisioning (P), supporting (S), regulating (R) and cultural (C) ecosystem services (ES). Services in **bold** are those that the maritime sector is primarily affecting.

In the Swedish analysis the most affected EGS are then described one by one and their status assessed. The latter includes for example the indication whether the ES is in a good status, threatened, etc. in the Baltic Sea or the Skagerrak.

In the case of the analysis of the **cost of degradation**, the EGS approach uses the GES as its point of departure: analysis assesses what GES pressure indicators say about changes in supply of EGS. The results are presented in the form of individual tables for each of the maritime activities that consider how respective pressure indicators impact on the different EGS (positively or negatively). This assessment is then used for an outlook to 2020 and 2050 in a BAU scenario. In this outlook, the trends of pressures caused by maritime activities are used to assess changes in levels of EGS.

Table 5.1. Illustration of Use of Marine Waters Analysis Using EGS Approach	
Step in Analysis	**Illustration Based on Maritime Transport**
Identifying the most important types of pressure of the maritime sector on the marine environment.	In the case of the maritime transports, port activities related to sea transportation and sea-based wind power parks, the main pressure types identified are: physical damage, hazardous substances, invasive species and eutrophication.
Evaluating the impact of these pressures on the marine environment.	This is done by going through the list of ecosystem services (see below) and indicating whether an impact of the pressures on them is *e.g.* expected / documented / potential / decreasing etc.
Selecting those marine ecosystem services that are subject to the most evident impact.	
Defining the selected ecosystem services and the status of their contribution to human wellbeing.	

Table 5.2. Ecosystem Services Being Affected by Marine Industries in Sweden					
S1	Biogeochemical cycling	**R3**	**Eutrophication mitigation**	P6	Energy
S2	**Primary production**	**R4**	**Biological regulation**	P7	Space and waterways
S3	Food web dynamics	**R5**	**Regulation of hazardous substances**	**C1**	**Recreation**
S4	**Diversity**	**P1**	**Food**	**C2**	**Scenery**
S5	**Habitat**	**P2**	**Inedible goods**	C3	Science and education
S6	Resilience	**P3**	**Genetic resources**	C4	Cultural heritage
R1	**Climate and atmospheric regulation**	P4	Chemical resources	C5	Inspiration
R2	**Sediment retention**	P5	Ornamental resources	C6	The legacy of the sea

5.2.3 Non-market data

Non-market data is used in various ways in the countries' reporting. Only a few countries utilise quantitative non-market values, with the majority of countries using qualitative non-market data. There is no mention or use of non-market data in ESA reports from Norway, Spain and Belgium. Table 5.3 summarises the use of non-market data in each country report.

Quantitative non-market values

Three countries refer to quantitative non-market values:

- Sweden conducted an extensive literature review on the economic values of ecosystem services provided by the Baltic Sea and Skagerrak. The studies focused on a large range of themes such as eutrophication, recreational fisheries, and marine litter. A qualitative survey on the impacts of marine litter was also carried out.
- The Danish report does not use non-market data extensively, but refers in one instance to an existing study which uses stated preference to value the effects of an oil spill.

- Ireland also refers to a single study valuing ecosystem services provided by Galway Bay, but otherwise does not use non-market data extensively within its report.

Qualitative discussion on non-market values

France, United Kingdom and Germany discuss non-market values qualitatively, particularly in reference to recreational ecosystem services, but do not use quantitative value data.

The Netherlands and Portugal do not use non-market data in their reports, but The Netherlands references a stated preference study on reducing environmental problems in the North Sea and Portugal suggests using non-market valuation as a way of valuing demand.

Table 5.3. Use of Non-market data by country

Country	Use of non-market data
Denmark	Used a single study on willingness to pay per household with regards to recreational fisheries.
Ireland	Mostly qualitative. Includes value transfer study on Galway Bay which valued ecosystem services provided by the bay.
Sweden	Uses a large amount of studies for different issues, from valuing marine ecosystem services affected by oil spills in the Baltic Sea to eutrophication, marine litter and recreational fisheries.
France	Qualitative/non-monetary data, related to different themes: artificial modification of the coastline, state/public intervention at sea, national defence, environment protection, R&D, maritime training.
Germany	Qualitatively mentioned, *e.g*. ships provide aesthetic benefit to tourists who expect to see them at the coast, and nature and environment provide 'attractiveness factor' of coasts and therefore tourism.
United Kingdom	Qualitative information on potential benefits to reaching GES targets. Mentions UK National Ecosystem Assessment (UK NEA), but only uses qualitative data.
Netherlands	None used, but study using stated preference is mentioned in Annex on reducing environmental problems in the North Sea.
Portugal	None used
Norway	None used
Spain	None used
Belgium	None used

6. Discussion and Recommendations

6.1 Oveview of similarities in data

The purpose of this report is help coordinate ESA analysis across the OSPAR region. As a result the focus of the work is on the differences that limit the extent of this coordination, so the discussion covers many areas of inconsistency between data. However, there are also some areas with compatibility between data.

Despite the challenges there are several similarities in the county data:

- All but two countries have used the Marine Accounts Approach to gathering data;
- Sufficient data is available to provide a partial OSPAR regional ESA report;
- Most countries' social analysis reports employment figures for key sectors;

- In the leisure and tourism sector, all countries provide some information which makes a lowest common denominator comparison of marine tourism and leisure activities possible;
- In a relatively data-rich sector like ports and shipping, statistics enable detailed comparisons of data and documentation of activities.

Many of the differences observed relate to how information will subsequently be used to inform MSFD implementation, for example through links with GES or on pressures in the marine environment. These uses represent the next challenges for ESA in the OSPAR region, but were not a core part of the ESA initial assessment. Therefore, it is unsurprising that all countries do not yet have a unified approach.

6.2 Challenges in collating an OSPAR Region ESA report

Given the variations in the different aspects of the economic data (approach, activity, data type, and geographic scope), and methods described in the two sections above, there are clearly challenges in collating an OSPAR region ESA report. The data in the ESAs across the eleven countries are very heterogeneous. The structure of the economic assessment reports varies to a considerable degree, depending on the chosen approach for the use of marine waters and costs of degradation.

There are some similarities between countries in the way the economic activities are covered (*e.g.* analyses for eight sectors use OSPAR-wide data of some kind). There is greater variation in the way social and environmental issues are covered, and therefore while OSPAR-wide data can be presented on some topics (*e.g.* the cost of degradation, marine employment), inconsistencies between the countries restrict the ability to produce combined OSPAR information.

The key barriers to collating an OSPAR-region ESA report are:

- The different methods (approaches) as well as the variations within methods used. This is more relevant with regards to the approaches selected to determine the costs of degradation;
- Different types of data (*i.e.* both quantitative and qualitative) and varying quantitative/economic data types such as turnover vs value added are also not directly comparable;
- The different state of development of the ESAs at this stage hinders a complete assessment and the potential to collate an OSPAR Region report;
- Availability of data is variable according to countries and economic sectors or uses of marine resources, but generally incomplete and non-homogeneous, even at country level;
- The use of differing (or unclear) geographic coverage is significant challenge to collating data across the OSPAR Region and for areas of sea within this Region. For example, Sweden's ESA data include activities in the Baltic Sea;
- The use of different reference years or time series for economic data will hinder the compatibility of country data. This may be intensified when considering major events, such as the economic crisis of 2008. Whether the data are referenced before or after 2008 could be an issue, as the economic crisis significantly impacted economic activities (*e.g.* shipping). Similarly, the use of different forecasting horizons renders comparisons (*i.e.* of costs of degradation) difficult;
- There is a diversity of information provided, especially with regards to the business as usual (BAU) scenarios. Some reports do not provide any quantitative information related to environmental issues;
- Data reference points in time are different from one country to another.

As the environment is not the core of the ESA reports, it is mainly dealt with as a cross-cutting issue. Several reports (*e.g*. France, Belgium) refer to other parts of the initial assessment regarding environmental issues (esp. pressures and impacts dealing with the inter-relationship between uses and the environment). Also in the Dutch ESA, a reference to another report is made which is also part of the initial assessment and which analyses the environmental conditions in the Dutch part of the North Sea, as well as current uses and associated pressures on the ecosystem. Based only on the existing, individual ESAs it does not seem to be possible to propose a homogeneous approach for the consideration of the environment in an ESA at OSPAR level.

Despite these challenges there is sufficient data available (*e.g*. for the eight sectors that feature in six or more of the country reports, as in Table 3.1) to be able to produce an OSPAR region ESA report that covers sufficient variation in economic activities such that it would be a useful resource to support MSFD implementation in the OSPAR region.

6.3 Use of ESA data for the MSFD

There are many ways that the data compiled for this report can contribute to the analysis required by the MSFD. Firstly, the data can help support the next stages of thinking about MSFD implementation. In some cases, useful collated information is available. For example, in the ports and shipping sector, an improved understanding of the distribution of economic activity is obtained from collating OSPAR data. Combined with knowledge of vessel movements, this could be used to inform the broad design and understanding of impacts of potential management measures. In other cases, the analysis provides a better understanding of the gap in knowledge needed to inform design of potential measures.

Secondly, the MSFD may also require more complex analysis, for example of measures affecting several human activities or of the specific marginal impacts of measures. In this respect, the collated data is judged to be too limited to support useful analysis. For example:

- If there is a need to increase the protection of some marine biodiversity to implement the MSFD, such nature conservation measures may need to be considered across sub-regional seas, and could affect several OSPAR countries and numerous human activities. The ESA information reviewed would help give a more realistic understanding of where some integrated sub-regional sea analysis could start from. But the significant differences between country data means that this would involve substantial future work and be challenging. Even with further analytical efforts, it is not guaranteed that results with enough detail and/or certainty to support decision-making) could be produced;
- Alternatively there is the question of whether data could support analysis of marginal changes from a management measure in specific a sector. The Ports and Shipping sector has been considered in detail in this report as an example of a sector with a relative strong information set in OSPAR countries. The data collated in Section 5.2, would support some investigation of the impacts on a new management measure in this sector. For example, it would provide a broad understanding of the distribution of potentially affected activities. However, further work would be needed to compare the marginal impacts of different potential impacts.

Despite the attempts to collate ESA data in this report, the availability of coherent ESA OSPAR region data is not yet sufficient to support a detailed impact assessment of potential measures in many areas. While country data for this sector is broadly comparable, there are differences in the scope and definition of data. Therefore, to gain a detailed understanding of the transboundary effects of potential MSFD management measures, further work would be needed. The evidence collated in this report provides good base for scoping further analysis, and gives confidence that comparisons which can inform decisions with potential impacts on multiple countries are possible for this sector.

These examples highlight the variability between the available data, and that improvements would be needed in the compatability of country information to fully support the analysis of potential management measures with possible transboundary impacts under the Directive. This is line with the purpose of the ESA, which generally provides baseline information, but unsurprisingly does on its own enable cost-benefit or similar analysis of decisions on implementing the MSFD.

6.4 Recommendations for improving consistency and comparability of data

This Section makes recommendations on potential actions to improve consistency and comparability of national data, based on the analysis in this report, in particular insights from the review in Section 2 and the detailed analyses in Section 4.

These points are suggestions around which to start discussions about improving data compatibility, should countries wish to do so. Obviously the approach taken needs to be consistent and to consider requirements across all sectors, and bear in mind the limited resources available for, and opportunity costs of, undertaking any additional work.

A first action to improve the OSPAR ESA output is for countries to check mentions of them in this report (by searching for their country) and in Annexes 1 – 3 to ensure that this report accurately translates and collates their data (as described in Section 2). In particular, to check Table 1 in Annex 1, and to confirm that sectors that are not analysed are areas with zero activity, are covered elsewhere, or are genuine omissions.

The following suggestions are made to improve consistency and comparability of data, starting with gaining a better understanding of what the data presented by countries mean. they are presented in order of ease of implementation/least cost:

i. Countries can confirm negative results being taken forward to the OSPAR ESA report (*e.g*. that when countries do not report aggregates dredging data it is because there is no activity in their waters);
ii. The differences between sectors and activities, and pressure and impacts, in different countries could be discussed, so that the approaches countries adopt can be more easily compared and differences understood. This will enable approaches used, and the data they generate, to be identified and compared more easily;
iii. Adopt common terminology for the same or similar marine sectors and activities (*e.g*. navigation is described in different ways by different countries);
iv. Adopt a common format for reporting definitions of marine sectors and activities (*i.e*. share the parameters through which definitions are made). For example, marine tourism accommodation may often be described by distance to the coast. Countries could share the distances they each use, even if they are not the same, allowing data to be better compared;
v. Share information of the effort, usefulness and outputs of different approaches (*e.g*. using a BAU scenario, governance mapping, EGS analysis, links to descriptors) adopted for different parts of their country ESA work;
vi. Develop shared expert judgements and assumptions to enable consistent presentation of existing ESA material. While expert judgments are used very little (the main examples are Belgium's BAU scenario and Norway's division of land-based and coastal activity), common assumptions could be very useful in other areas, such as to organise geographical boundaries of information (*e.g*. making common assumptions to divide country data between OSPAR sea regions that they overlap);

vii. Standardise definitions of sectors used in ESA reports (*e.g*. whether to report Ports and Shipping together or separately, and whether to include upstream and downstream activities, like ship-building for shipping, and fish processing for fisheries);

viii. Reformulate data to fit standard definitions of the most common marine activities. This would require agreement on standard definitions (item iv above), which would be appropriate to organise through national statistical offices. This should seek to use (but not alter) standard Eurostat definitions;

ix. This could be a costly undertaking, particularly in the short-term. However, having agreed standard definitions could be useful for countries that have not yet compiled their ESA reports and for all countries in the longer term to guide future work delivering the MSFD (*e.g*. future rounds of reporting);

x. Survey work, of the type described in the Baltic (see Section 4.1) could be developed across the OSPAR region. This could provide valuable information about particular aspects of the ESA which lack consistent data, such as marine tourism and leisure. Data could be gathered on activities (*e.g*. coastal visitors), or qualitatively or quantitatively on values (*e.g*. which features of the coastal are most important/most valued). This could also be costly to organise, not least due to the difficulties of implementing a survey in a consistent manner in numerous countries.

The ideal long-term situation is for ESA reports to use consistent definitions of marine sectors and activities in order to allow accurate analysis of potential changes to marine management in order to implement the MSFD. The recommendations above can be developed as increments towards that goal, and proceed at different speeds for areas where common understanding of the economic and social implications of marine management are more or less critical.

Assessing which ESA data gaps are most critical to OSPAR will depend on priorities for MSFD implementation, and the extent of the pressures on the marine environment being addressed, and/or the influence of implementation measures, beyond national waters. The OSPAR ESA report will seek examples of these links from ESA data to implementation issues, based on MSFD descriptors where possible. The influence of Descriptor 10 (noise) on ports and shipping, and of Descriptor 11 (marine litter) on tourism and leisure, provide potential examples that would extend the analysis in this report.

Such examples could assist with the dissemination of the project's outputs through OSPAR, and across wider European marine management processes.

Determining the optimal regional actions to managing and collating ESA data can be guided by the criteria used to identify approaches for OSPAR in eftec (2010). These included consideration of the following issues, and the criteria shown in Annex 6:

- Complies with the minimum legal requirements of MSFD;
- Has the ability to compare the analysis between Member States;
- Is methodologically valid;
- Has links to DPSIR[12] and scenario analysis, and
- Is not obviously inefficient.

[12] DPSIR = Driver, State, Pressure, Impact, Response analysis framework.

References

COM (2010). Economic and social analysis for the initial assessment for the Marine Strategy Framework Directive: A guidance document. Non-legally binding. European Commission, DG Environment, Working Group on Economic and Social Assessment, 21 December 2010.

COWI (2010a) *Scoping study on the requirements for economic assessment in the Marine Strategy Framework Directive*. Report to European Commission DG Environment.

COWI (2010b). ROKR, JJD, E. Roth and AR. Kongens Lyngby, Danmark, Fødevareministeriet. Analyse af adfærd, motiver og præferencer blandt danske lystfiskere. Samfundsøkonomisk betydning af lystfiskeri i Danmark.

eftec (2010) OSPAR Regional Economic and Social Assessment for the Marine Strategy Framework Directive, report to Defra.

eftec (2011) *Handbook for Undertaking Socio-economic Analysis for the Marine Strategy Framework Directive: Practical Guidelines for Applied Analysis*. Report to Defra

EC (European Commission) (2010) *Working Group on Economic and Social Assessment, Economic and Social Analysis for the Initial Assessment for the Marine Strategy Framework Directive: A Guidance Document*. A non-legally binding document, 21 December 2010.

Milieu Ltd (2011) *Use of Industrial Monitoring Data for MSFD*. Final Report for the EC.

NRIT (2003) De economisch betekenis van toerisme en recreatie.

Östberg, K., Hasselström, L., Håkansson, C. (2010). Non-market valuation of the coastal environment – uniting political aims, ecological and economic knowledge. CERE Working Paper, 2010:10, Department of Economics, Umeå University.

Östberg, K., Håkansson, C., Hasselström, L., Boustedt, G. (2011). Benefit Transfer for Environmental Improvements in Coastal Areas: General vs. Specific Models. CERE Working Paper, 2011:2, Department of Economics, Umeå University.

UKMMAS (2010) Productive Seas Feeder Report, Charting Progress 2. UK.

Resurs AB (2011). Havsturismen i Sverige 2010: Ekonomiska och sysselsättningsmässiga effekter av turismen i och vid havsvatten i Sverige 2010. Resurs AB, Stockholm.

SEPA (2008). *The economic value of ecosystem services provided by the Baltic Sea and Skagerrak: Existing information and gaps of knowledge*. Report 5874, Swedish Environmental Protection Agency, Stockholm.

SEPA (2009). *What's in the sea for me? Ecosystem services provided by the Baltic Sea and the Skagerrak*. Report 5872, Swedish Environmental Protection Agency, Stockholm.

Stål *et al*. (2011) *Analysis of the maritime sector – from drivers to impact on ecosystem services*.

TNS NIPO (2011). *Beleving van de Noordzee: Een kwantitatieve consultatie onder Nederlandse burgers over de Noordzee*.

Annex 1. List of identified sectors

Table 1. Sectors for which employment and/or other economic data is provided	
Country	**Sectors**
Belgium	Commercial sea fisheries Fish processing industry Mariculture Wind energy Aggregate extraction Dredging and dredge disposal Commercial shipping Tourism Other activities (military exercises, historical ammunition zone, wrecks and wreck salvage, cables and pipelines)
Denmark	Commercial fisheries Aquaculture Shipping and ports Off-shore oil and gas Off-shore wind turbines Tourism and recreation Provision of raw material
France	Shipping and ports Maritime civil engineering Maritime financial services Shipbuilding Submarine cable setting and maintenance Marine aggregate extraction Electricity, oil and gas industry Professionnal fishing Aquaculture Commercialisation and processing of sea products Agriculture Industry Tourism Seaside activities and beach frequentation Recreational fishing Recreational navigation

Germany	Shipping Offshore wind energy Offshore oil and gas Marine resource extraction Pipelines and cables Commercial fisheries Tourism Runoff from agriculture Runoff from industry Runoff from sewage treatment Coastal protection Research Military
Iceland	Commercial sea fisheries Aquaculture Recreation / leisure and tourism
Ireland	Shipping and maritime transport Tourism and leisure International cruise industry Other marine services (ship surveying, boat sales, chandlery, and retail seafood) Commercial sea fisheries Aquaculture Seafood processing Oil and gas exploration and production Marine manufacturing Marine commerce High tech marine products and bio products Marine renewable energy
Netherlands	Oil and gas exploration Fisheries Sea shipping Sand and gravel extraction Wind energy Piping and cables Other sea-based human activities (*e.g*. carbon capture and storage, military activates, dredging) Seaports and recreational activities in the coastal zone
Norway	Commercial fisheries including aquaculture Recreational fisheries Petroleum industry Shipping Production of renewable energy

Portugal	Commercial fisheries Fish processing industry Aquaculture Shipping construction Port operations Shipping Tourism & leisure Extraction of salt Coastal defense
Spain	Wastewater disposal (agricultural, domestic and industrial) Fishing (commercial and recreational) and aquaculture Ports and maritime transport Recreational boating Oil and gas Tourism and recreation Desalinisation (Mediterranean only) Renewables (offshore wind and tidal, wave) Oil and gas Ship building
Sweden	Maritime transport Port activities Wind power parks Oil and gas extraction Carbon capture and storage (CCS) Pipelines and cables on the seafloor Wave and tidal power plants Commercial fisheries
UK	Aquaculture Coastal defence Defence – military Education Fisheries Leisure and recreation Maritime transport Mineral extraction Oil and gas Pipelines Power transmission Renewable energy Research and development Storage (of gases) Telecommunications Waste disposal Water abstraction

Annex 2. Results from proforma on marine tourism and leisure

Table 1. Country definitions of marine tourism and leisure	
Belgium	The concepts used in the Belgian report are “tourism” and “water recreation”. The Belgian report does not provide general or specific definitions of the concepts identified.
Denmark	A definition of coastal tourism used by Visit Denmark is referred to, *i.e*. “all the overnight stays taking place outside the biggest cities of Denmark”. It is assumed that the majority of these tourists use the sea in one or another way.
France	The concepts used in the French report are “tourism” and “marine tourism”. The French report does provide definitions of the concepts identified. Tourism= activities developed by people during their trips and visits, outside their living place, for leisure, business and other purposes. Marine tourism= tourism when it takes place in a coastal town or village.
Germany	The term tourism is used, as opposed to recreation, leisure etc. Tourism is understood as overnight accommodation, other hospitality and tourism related GVA. Tourism is only considered for the geographic North Sea area. There is no distinction between actual marine tourism and other tourism in the North Sea area, such as city tourism in Hamburg etc. There is no information on recreation and leisure other than related to tourism, *i.e*. no non-market values.
Ireland	The concepts used in the Irish report are “marine tourism and leisure” and “water-based tourism and leisure”. The Irish report does not provide a general or specific definition of these concepts, but points out that the definitions of marine-based industries differ across countries.
Netherlands	The concepts used in the Dutch report are “coastal recreation”, “tourism and recreation” and “tourism and recreation in the coastal area”. The Dutch report does not provide general or specific definitions of the concepts identified.
Norway	The Norwegian report concludes that it is a great challenge to describe the importance of tourism since it is not a sector according to the standards used for the national accounts and other economic statistics. Statistics Norway has therefore developed a satellite tool for tourism. The geographical scale is sub-national.
Portugal	The concept of marine tourism is organised in: coastal tourism (including bathing); nautica (including nautical tourism and education and training); cruises).
Spain	Both terms are used in the country reports for Spain and refer to different sectors. The term tourism refers to the overall tourism sector and the term marine recreation refers to sporting activities taking place in the marine environment.

Sweden	The concept used in the Swedish report is “marine tourism and recreation”. Generally accepted definitions of “tourism” and “recreation” are provided by the World Tourism Organization (UNWTO). It is concluded in the Swedish report that there is no international generally accepted definition of “coastal tourism”. The Swedish report provides definitions of “marine tourism and recreation”. For some of the tourism sectors identified in the Swedish report, the link to marine recreation is clear (*e.g*. cruise-ship traffic in marine waters, national/international passenger ferry traffic in marine waters, leisure boating in marine waters). However, the link between other tourism sectors and marine recreation is weaker (holiday housing associated with marine recreation and commercial accommodation (*e.g*. hotels, camping sites, etc.) associated with marine recreation and same-day visits associated with marine recreation). Therefore, for these sectors, an approach is chosen of making a geographical delimitation by using two alternative geographical definitions for these sectors; one (called MAX) that is likely to result in an overestimate of the sectors in relation to their association with marine recreation and one (called MIN) that is likely to result in an underestimate. When describing the extent of these sectors, an interval derived from these two definitions is used instead of a point estimate.
UK	The concepts used in the UK-report are “Leisure and recreation” and “coastal tourism”. The UK-report does not provide general definitions of the concepts, but some specific definitions based on a) SIC 2007 for all economic activities associated with the marine environment, b) the authors working definition.

Table 2. Identified subgroups/types/sectors of marine recreation	
Belgium	Catering and retail industry Touristic-recreational and cultural activities Touristic accommodation Water recreation Marina
Denmark	Recreational fishing Leisure boating Cruise ship traffic
France	No specific subgroups of marine tourism
Germany	There is a separation into overnight and day guests.
Ireland	Water-based marine tourism and leisure International cruise industry
Netherlands	Accommodations (Beach resorts) Water sport and beach activities Supplying companies Sea shipping
Norway	Hotels and restaurants Leisure homes Recreational fishing

Portugal	Accommodations and Restaurants Travel agencies Leisure activities Recreational Activities Nautical sports Retail Educational activities
Spain	For the tourism sector no subgroups are mentioned in the reports.
Sweden	Cruise-ship traffic in marine waters International passenger ferry traffic in marine waters National passenger ferry traffic in marine waters Other commercial passenger transportation in marine waters Leisure boating in marine waters Holiday housing associated with marine recreation Commercial accommodation (*e.g.* hotels, camping sites, etc.) associated with marine recreations Same-day visits associated with marine recreation
UK	Construction of artificial surf reefs, marinas, moorings and slipways Manufacture of sports goods Building of pleasure and sporting boats Repair and maintenance of boats Operation of sports clubs Operation of recreational transport facilities (marinas, moorings) and beach facilities Renting and leasing of recreational and sports goods Renting of boats for fishing cruises Tourism accommodation and other services Cruising Maritime Transport Recreational sea angling (included under “Leisure and Recreation”)

Table 3. Identified marine tourism and leisure activities	
Belgium	
Non- motorized recreation (water activities where no engine is involved)	Windsurfing Kite-surfing, Sailing Wave surfing Rafting Sea kayak/canoe Parasailing Catamaran
Motorized recreation (water activities where the intensive use of an engine is involved)	Speed boats Water-ski Jet-ski Sailing Yachts Tour boats
Angling at sea:	Recreational fishery from a boat
Denmark	Sailing Swimming Fishing Walking
France	Marine recreation: Sea bathing and beach uses Recreational fishing Water sports and sailing
Germany	No specific activities, but note that the report makes reference to cross-benefits between shipping, fishing and tourism, *i.e*. tourists expect to see ships and local fishing.
Ireland	• **Angling** - Sea Angling from boats - Sea Angling from the Shore • **Watersports** - Sailing at Sea - Boating at Sea - Water Skiing/Jet Skiing - Surfing, Sail Boarding - Sea Kayaking - Scuba Diving/Snorkeling - Other Sea Sports • **Seaside/Resort Trips**

	- Swimming in the Sea - Bird Watching in Coastal Areas - Whale/Dolphin Watching - Visiting Coastal Natural Reserves - Other Trips to the Beach, Seaside and Islands
Netherlands	Windsurfing Recreational Angling Sailing Diving
Norway	No specific activities
Portugal	Sailing Kite-surfing Surfing Windsurfing Bodyboarding, skimboarding, longboarding, kneeboarding Diving Oaring, canoeing, kayak Sportive fishing Nautical charter Motonautica
Spain	For the marine recreation sector the following subgroups are identified: - Subaquatic activities - Water ski - Motor sports - Canoeing - Rowing - Sailing - Sports fishing
Sweden	Swimming Diving Windsurfing, water skiing Boating Fishing Being at the beach or seashore for walking, picnicking, sunbathing, visiting touristic or cultural sites, etc. Using water-based transportation

UK	Angling Sailing Boating Nature-watching Scuba diving Surfing Kayaking Swimming

Table 4. Types of data for describing use of marine waters	
Belgium	Turnover in constant prices Investments in constant prices Total, indirect and indirect added value Gross expenditures Number of companies in constant prices Touristic-recreational and cultural activities Number of attractions Number of visitors Number of day tourists Average expenditures per day tourist Direct turnover from day tourism Direct expenditures from short- and long-stay tourism Direct expenditures from short- and long-stay tourism per type of tourism Number of overnight stays Number of average night stayed
Denmark	Number of overnight stays Turnover (leisure boats and cruise ships) Number of boats

France	Employment Overnight stays, Available beds in hotels (submarine areas) Tourism expenses (coastal cities) Number of bathing areas Equipped sea-bathing areas Number of beaches with a blue flag Number of beaches with economic exploitation (leisure) Number of fishers according to type of recreational fishing (boat, foot, diving…) and frequency (regular, very regular, occasional) Total expenses of fishers (leisure) Number of licences and other titles to practice water sports and sailing Number of boats (engine/sailing boat/others) Number of places for leisure boats in harbours (rings)
Germany	Number of employees (in restaurants and accommodation) Number of overnight stays Gross revenue of overnight stays Number of day tourists Gross revenue from day tourists
Ireland	Number of calls to the three main ports Average passengers per port call Average expenditure per person Turnover in millions of € Direct & indirect GVA Total expenditure by cruise passengers Employment FTE/ Direct Employment FTE
Netherlands	Production value Employment (direct and indirect) Value added Average number of holidays Average length of stay Day trips Overnight stays Nights in total Visits of foreign tourists Number of yachts Number of boats Number of divers

Norway	The contribution of tourism to GDP, *e.g*. from hotels and restaurants, transports and cultural activities and entertainment. The share which should be linked to the coast and sea has not been possible to assess. Number of leisure homes at different distances from the coast Number of recreation days Information on recreational fishing, *e.g*. number of beds number of travel agencies
Portugal	GVA, available beds in hotels, number of overnights stays, number of beaches according ecological standards. Number of moorings (total and for km along the coast), number of yachtman's licences issued (2005-2012) and in force (2012).
Spain	For economic indicators, both sectors are described using GVA and employment figures and compared to the national and regional figures. For activity indicator, the tourism sector is described using the 'number of international tourists arriving in Spain' per year while the marine recreation sector is described using the annual 'number of licenses granted'. Additionally, the reports show the percentage of licenses granted and the percentage of existing marine sport clubs in relation to the regional and national figures.
Sweden	Number of calls Number of same-day visits Turnover in MSEK Number of hotels Employment ashore Number of cabin villages and hostels Number of camping sites Number of holiday houses Number of overnights stays Employment in full-time year-around employed Number of boats
UK	Turnover Expenditures GVA Number of visitors per year Number of domestic sea passengers Number of short-sea ferry passages Number of long-sea journey passengers Number of international sea passengers Number of jobs per year Income from coastal towns Participation

Table 5. Geographical scale(s) by which the use of marine waters is described	
Belgium	Sub-national
Denmark	Sub-national
France	Mainly sub-national and national, but also local
Germany	Sub-national
Ireland	Sub-national, national
Netherlands	Sub-national
Norway	Sub-national
Portugal	Sub-national continental coastal
Spain	National, regional (autonomous community) and/or marine demarcation level
Sweden	Sub-national, national
UK	Sub-national, national, local

Table 6. Main data sources	
Belgium	Trendrapport KiTS Kust 2004-2009 (Westtoer, 2009).
Denmark	VisitDenmark
France	?
Germany	?
Ireland	Failte Ireland figures Central Statistics office ESRI UCC Report
Netherlands	CBS, Statistics Netherlands Kenniscentrum (Kust) toerisme NRIT NBTC National Accounts Deltares NAMWA (National Accounting Matrix including Water Accounts)
Norway	Statistics Norway
Portugal	National Statistics Institute (INE) Shipping and Ports Administration (IPTM) Portuguese Environmental Agency (APA)
Spain	Official statistics?

Sweden	Official statistics Sweden TDB (Swedish Travel and Tourist Data Base) Agencies • Swedish Environmental Protection Agency • The Swedish Agency for Economic and Regional Growth • Swedish Transport Agency Economic models
UK	Seazone and the Royal Yachting Association Department of Tranports (Dft) Scottish and Welsh Transport Statistics Northern Ireland Government

Table 7. Information on reliability of the data	
Belgium	Partly discussed
Denmark	Yes, it is said that the figures are probably under-estimated since overnight stays on land are not included.
France	Yes, essentially in the part related to the cost of degradation: data is often localized and non-homogenous and cannot always be aggregated.
Germany	The report makes reference to data quality in regard to environmental monitoring and the need to validate and check data, for example through experts. No mention of socio-economic and tourism data quality.
Ireland	Partly discussed
Netherlands	Yes
Norway	Yes
Portugal	Yes
Spain	In certain occasions, the lack of disaggregated data for the sectors at the demarcation level has called for the use of distribution factors. These approximations were worked down from national or regional data based on; the employment figures of the demarcation for the specific sector; the share of total number of licenses granted for marine sports.
Sweden	Yes
UK	Yes

Table 8. Specific data on individual marine recreational activities	
Belgium	Yes, data on marina, beach clubs and water sports
Denmark	No data
France	Yes, specific information regarding sea-bathing, being at the beach, sailing, recreational fishing.
Germany	No data
Ireland	No data
Netherlands	Yes, on recreational angling

Norway	No data
Spain	The different sporting activities considered in the analysis are listed in the report, however the data is shown as aggregated for the marine recreation sector.
Sweden	Partly, by referring to "Baltic Survey"
UK	Yes, for many activities

Table 9. Market economic value of marine tourism and leisure – types of data	
Belgium	Turnover, investments, total, indirect and indirect added value, gross expenditures
Denmark	Turnover, expenditures
France	Employment, expenditures (very specific data)
Germany	There is no quantitative information on the total value. However, the report does state that tourism is one of the most important economic activities on the coast.
Ireland	Turnover, expenditures, GVA
Netherlands	Employment, value added, expenses
Norway	GDP, expenditures
Portugal	GVA
Spain	There is no mention of the total value (market and non-market) as the indicators are rather limited (*e.g*. no use of non-market data). Total GDP provided by tourism is provided, about 103 billion Euros for 2009
Sweden	Employment, turnover
UK	Turnover, expenditures, GVA, employment, income from coastal towns

Table 10. Non-market economic value of marine tourism and leisure – types of data	
Belgium	Partly discussed.
Denmark	In the Danish report is also referred to one existing non-market (WTP) study of recreational fisheries (COWI, 2010b).
France	Not available.
Germany	No
Ireland	The report refers to an existing benefit transfer analysis focusing on marine ecosystem services.
Netherlands	One representative survey carried out in 2011, question on WTP included. However, unclear if link to marine tourism.
Norway	No
Spain	No
Sweden	Existing Swedish/Nordic valuation studies with relevance to GES are presented.
UK	Partly discussed (for marine litter)

Table 11. Social value of marine tourism and leisure – types of data	
Belgium	No specific discussion, no employment figures linked to marine tourism and leisure are presented.
Denmark	No specific discussion, employment figures linked to marine tourism are presented. The total number of employed in the tourism sector of Denmark is estimated to be around 61.000 people.
France	Not available
Germany	It claims that tourism is important for local economies, as much of what is spent by tourists goes directly to pay employees. And that this has a distributional effect on the region's economy.
Ireland	In the report it is stated that "cultural marine tourism" offers opportunities for rural development in the less developed coastal regions of the country and offers an alternative to fishing communities wishing to diversify into other marine based activities. Employment figures (overseas and domestic) linked to marine tourism and leisure are presented, *e.g*. employment in hotels, restaurants, entertainment etc.
Netherlands	The Netherlands have carried out a number of studies to get information on the social importance of the North Sea. Employment figures linked to marine tourism and leisure are also presented. The report describes a baseline measurement of the social importance of the North Sea for coastal residents, fishermen and recreational users in the Netherlands. The social importance of the North Sea refers to the relationship or connection between these users on the one hand and the North Sea and the marine environment on the other hand. Based on the scores of roughly twenty indicators, the current social importance of the North Sea can be marked as 'average' on the measurement scale applied. The North Sea is of major social importance if the North Sea and its beaches remain relatively accessible for groups of users now and in the future. If the accessibility, environmental quality, safety and experience of the North Sea were to deteriorate or decrease, this would have a negative effect on its social importance. The direct employment in the tourism and leisure sector is estimated at 80,000 jobs, the indirect employment at about 30,000 jobs (NRIT, 2003). However, it is unclear to which extent these figures are linked to coastal tourism.
Norway	No specific discussion, employment figures linked to marine tourism and leisure are presented. The total employment in the tourism industry was 58 000 people in 2007, in the counties bordering to the North Sea and Skagerrak.
Spain	No specific discussion, employment figures linked to marine tourism and leisure are presented. The reports state that the tourism sector employs around 11% of the economically active population in Spain and that marine recreation represented 0,13% of the total GVA of the country and was related to approximately 15,000 job positions in 2007.
Sweden	No specific discussion, employment figures linked to marine tourism and leisure are presented. The total employment in the identified marine tourism sectors are 38 878 - 53 466 people, depending on whether the MAX or MIN definition of marine tourism is used (Resurs, 2011).

UK	No specific discussion but in the underlying feeder report the authors present data about how the social value of marine tourism is distributed in eight different regions in the UK. Certain activities and uses of the marine environment have benefits that are hard to quantify. For example, a better understanding is needed of the contribution that marine activities make to social values, such as upholding cultural traditions in local fishing communities. It is argued that evidence on the cultural and historic values of the marine environment is patchy and to some extent dependent on information from extractive industries. Employment figures linked to marine tourism and leisure are not presented in the final ESA-report (2012). The UK approach relies on economic data to form a proxy for more social impacts. However, actual employment data is not included in the final ESA-report but in the underlying feeder report.

Table 12. Summary of how marine tourism and leisure depends on and impacts the marine environment

Country	GES	Ecosystem services	Other ways
Belgium (Dependence is mentioned, but not analysed)	Pressures and impacts identified, but not specifically linked to tourism	Yes	
Denmark	D1, D6, D8, D11	No	
France	No	No	Partially, through description of legal context (rules): qualitative information. Impacts of degradation of the marine environment on leisure and tourism are listed in the 2nd part of the report. More precisely due to: -Marine litter (for instance, perception by tourists and beach users / source: survey at national level) ; - Introduction of pathogenic organism, eutrophication, micropollutants, oil pollution, invasive species, fishing resources losses, shellfish resources losses,
Germany			Qualitatively linked to GES descriptors. Tourism is included in the German description of cumulative impacts on the environment.
Ireland (Impact and dependence is not discussed)	No	Yes, EST are listed but not analyzed	

Netherlands	No	No	WLO-scenarios. Based upon the importance of the various sectors on and along the Dutch part of the North Sea a link with the environmental pressure on the North Sea for the different sectors can be determined.
Norway	No	Yes, ESS are listed but not analyzed	
Spain	Not discussed	Not discussed	Not discussed
Sweden (Dependence and impact presented in tables)	Yes D5, D8, D9, D10	Yes	
UK (Impact and dependence discussed)	Descriptors D2 and D10 are mentioned	Yes Specific for UK	

Table 13. Identification of degradation of the marine environment linked to marine tourism and leisure

Belgium	Marine litter Other physical disturbances
Denmark	In the report it is concluded that tourism and leisure have an impact on the economy and on the wellbeing of tourists, but that it can also contribute to the degradation of: • the local environment • biodiversity on land
France	Degradation of the marine environment linked to marine tourism and recreation is identified in the "Pressures and impacts report". However, it is only listed (no quantification).
Germany	Not yet, although Germany intends to provide costs of degradation separately for all economic activities in the final ESA.
Ireland	Not identified Discussions about sustainability

Netherlands	Beach litter CO2- emissions NOx-emissions Sub aquatic noise Ballast water Sulphur in fuel No consequences presented
Norway	Not discussed
Spain	Not discussed
Sweden	Eutrophication: Losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters Contamination: The main influence of the marine tourism sectors is on contaminants in the water and potentially in fish and seafood is through toxic anti-fouling boat paints Marine litter: Marine litter affects ecosystem services in two ways: 1) through its physical effect on *e.g*. scenery and 2) through the effect on ecosystem functions. The physical effect mainly affects cultural ecosystem services, such as recreation and the legacy of the sea.
UK	Marine wildlife disturbances Physical disturbance of seabed substrata and alterations to the local benthic habitat Sewage discharge Erosion and increase in suspended sediments Litter Introduction of non-native species

Table 14. Approach to cost of degradation related to marine tourism and leisure	
Belgium	Thematic approach, discussed in terms of "welfare gone". Costs, expenses and benefits related to the degradation of the marine environment are presented for a number of themes (*e.g*. marine litter, which is closely related to tourism and leisure). No specific discussion however provided for tourism and leisure.
Denmark	No quantifications are made
France	Has not been estimated
Germany	Germany plans to use the thematic approach
Ireland	No approach identified
Netherlands	Cost-based approach. The report presents an overview of the current costs the various sectors already incur for measures that contribute to an improvement of the marine environment. The cost of degradation (related to marine tourism and leisure) is linked to marine litter. Cost estimates are presented for municipalities' beach cleaning efforts.
Norway	Not discussed
Spain	Not discussed
Sweden	Ecosystem service approach. The approach is to discuss in terms of what would be lost if BAU is reached instead of GES. Quantitative findings from existing valuation studies linked to marine tourism and leisure are referred to in order to say something about what might be lost from a TEV-perspective.
UK	Ecosystem service approach. The discussion provided does not specifically focus on marine tourism and leisure, although the link to this sector is mentioned at least in the presentation of marine litter. The benefits of completely removing marine litter are estimated to at least £1.8bn-£1.9bn over 10 years. Although these figures are probably high, it is argued that they clearly indicate that there will be benefits to addressing the problem of increasing litter levels, for example through cultural ecosystem services such as recreation.

Annex 3: Country Data Quality Tables

Belgium		
ESA Report Version		Socio-economic analysis of the use of marine waters and the cost of degradation of Belgian marine waters (04.10.2011)
Geographic Coverage	OSPAR-area covered?	OSPAR II (Greater North Sea)
	Specify	The Belgian part of the North Sea (BPNS) has a coastline of approximately 66 km and a surface of about 3454 km^2.
Market Sector	Sector(s)?	Commercial sea fisheries, fish processing industry, mariculture, wind energy, aggregate extraction, dredging and dredge disposal, commercial shipping, research and tourism and other activities (military exercises, historical ammunition zone, wrecks and wreck salvage, cables and pipelines)
	Kind of data?	Turnover, added value, employment, budget, number of companies, activity/industry specific data (*e.g*. vessel capacity, fish landings, accommodation for tourists), and 'per cent' share (*i.e*. for port size).
	Main data source?	National government reports, scientific reports, EU and UN reports
Links to main questions for ESA Assessment	Links to GES?	Through an overview table (qualitative) of ecosystem services
	How was use of marine waters described?	The use of marine waters is described according to the ecosystem goods and services concept (qualitative), and linked to the socio-economic uses (qualitative/quantitative) which are derived from the ecosystem.
	How was cost of degradation described?	Costs of degradation are centred on prevention, mitigation and governance costs (*i.e*. not lost opportunity). Quantified descriptions/costs are provided for limited activities. For example, for the fishing industry, cost of degradation is described as the (monetary) sum of the Financial Instrument for Fisheries Guidance (FIFG) and the European Fisheries Fund (EFF). Or the costs of marine litter projects, are also provided in monetary terms. Other costs identified (only described) include costs of the Environmental Impact Assessment to private sector, costs of dismantling wind farms, governance costs, monitoring costs, inspection of extraction activities, anti-turbidity systems, permits for dumping dredged material at sea, monitoring and research programmes, induction of non-indigenous organisms through ships' ballast water and associated sediments, oil spill: double hulls in tankers, discharge and disposal of wastes from ships including sewage and litter: port reception facilities, discharge and disposal of wastes from ships including sewage and litter: 'fishing for litter', pollution and physical impact through loss of ships and cargo, pollution by oil and hazardous or toxic substances from incidental, operational and illegal discharges, other pressures (cold ironing, technical evolution, emission control area).

Ports	Ports and Terminals	ESA Description/Definition	Top four ports turnover in presented 2003 to 2010 - Ostend, Ghent, Zeebrugge, Antwerp. Tonnages present for all four ports combined – 2003 to 2008. The port of Antwerp generates the largest share: 71% or ca. 189 million tonnes in 2008, the port of Zeebrugge contributed 16% or 42 million tonnes, the port of Ghent 10% or 27 million tonnes and the Port of Ostend 3 % or 8.5 million tonnes.
	Ports and Terminals	Employment	Employment data for 2003 to 2008 presented.
	Ports and Terminals	Emissions	Shipping emissions commentary, no data on current levels/quality.
	Movements of goods and passengers on and off vessels	Throughput of goods and passengers	No data
	Maintenance Dredge / Disposal	Dredge material volumes and disposal site(s)	Graphed data (9 years, 1997 to 2005), spatial data for one year (2008), also beneficial use volumes. Maintenance dredge volumes presented (graphed) 50,000 to 100,000 used for beneficial use, remainder disposed of at sea. Sites named, coordinates not provided. Volumes for data 1991-2000 resolved back to total port turnover. Dredge employment information included. For aggregates dredging, data for 1976 to 2010 aggregate volume extracted data, employment in this sector 1998 to 2002.
Shipping	Shipping volume/Number	Transport of goods and passengers	2003 to 2008 shipping presented in tonnage and percentage (no vessel numbers).
	Anchoring	Location of anchorages (formal, informal, mooring buoys)	No data

Denmark			
ESA Report Version			Initial assessment (June 2012)
Geographic Coverage		OSPAR-area covered?	OSPAR II (Greater North Sea)
		Specify	Danish parts of the North sea and Baltic Sea. The North Sea is defined as Kattegat and other parts of the North Sea. Kattegat is defined as the area between Skagen and the northernmost coast of Sjælland.
Market Sector		Sector(s)?	Commercial fisheries, aquaculture, shipping and ports, off-shore oil and gas, wind farms, tourism and leisure, provision of raw material.
		Kind of data?	Turnover, employment
		Main data source?	Existing data (for example HELCOM NEFCO), no primary studies
Links to main questions for ESA Assessment		Links to GES?	It is described how the importance of marine sectors affect all the 11 indicators of GES.
		How was use of marine waters described?	Quantitative description of how the sea is used.
		How was cost of degradation described?	Due to the high level of uncertainty, the cost of degradation if the sea environment continues to deteriorate to 2020 is not quantitatively estimated, but described in qualitative terms.
Ports	Ports and Terminals	ESA Description/Definition	**Commercial Ports -** The total number of ports in Denmark is approximately 140. The 66 largest ports have 98% of the total turnover of goods. In 2010 the total turnover was 87 million tonnes of goods and 1 million tonnes of fish. Today 2% of foreign trade takes place by railway, 18% by roads and 80% by shipping. Less than 20% of domestic transports take place on sea. **Leisure boat ports -** There are in total approximately 320 leisure boat ports in Denmark and around 57.000 leisure boats/ berths in these ports, of which 57% are sail boats and 43% are motor boats. Typically, each port employs 1-5 people.
	Ports and Terminals	Employment	It is estimated that between 60,000 to 70,000 people work in or in connection to ports.
	Ports and Terminals	Emissions	Emissions of chemicals and oil as well as CO_2, SO_2, NOx and fine particles PM2.5. In 2011 the size of these emissions from shipping around Denmark were 7,8 million tonnes of CO_2, 41.000 tonnes of SO_2 and173.000 tonnes of NOx. The costs for these emissions in sea areas are: 85 DKK/kg for SO_2, 64 DKK for NOx and 137 DKK/kg for fine particles.
	Movements of goods and passengers on and off vessels	Throughput of goods and passengers	23 million passengers travelled to and from Denmark in 2010, via Danish ports. The ports also constitute an important part of domestic infrastructure, not least communication to small Danish islands. In 2010, 10 million people travelled between Danish ports. In total around 23 000 goods ships call at Danish ports every year. In addition to this, 500 000 calls of ferries are made every year.
	Maintenance Dredge / Disposal	Dredge material volumes and disposal site(s)	No information

Shipping	Shipping volume/Number	Transport of goods and passengers	- The estimated total turnover of the shipping industry in Danish waters is DKK 32,6 billion. - In 2009, 10,000 people were employed in the shipping industry.
	Anchoring	Location of anchorages (formal, informal, mooring buoys)	No information

France		
ESA Report Version		Initial Assessment/ESA for 3 areas (sea OSPAR area, one report each) (+ methodological note = "Guide technique en vue de la réalisation des projets d'analyse", 2010)
Geographic Coverage	OSPAR-area covered?	OSPAR II (Greater North Sea), OSPAR III (Celtic Seas), OSPAR IV (Bay of Biscay and Iberian Coast)
	Specify	II - Channel and North sea : from the "Pointe du Raz" to the French/Belgium border III - South part of the Celtic Seas, west of Brittany IV - Bay of Biscay
Market Sector	Sector(s)?	Environmental data are essentially mobilised in the approach to the cost of degradation. Qualitative description of environmental measures and their assumed costs. No quantitative figures on descriptors or indicators.
	Kind of data?	Shipping and ports, maritime civil engineering, maritime financial services, shipbuilding, submarine cable setting and maintenance, marine aggregate extraction? Electricity, oil and gas industry, professional fishing, aquaculture, commercialisation and processing of sea products, agriculture, industry, tourism, seaside activities and beach frequentation, recreational fishing.
	Multipliers used?	Volume, turnover, added value, direct and indirect employment, number of companies, specific sect oral approach (length of cables, number of vessel).
	Main data source?	National statistics Local data, sector-based statistics, water agency
Links to main questions for ESA Assessment	Links to GES?	No links with GES in the part of ESA report related to use of marine waters. In the second part of the report, degradation is implicitly understood referring to GES. The list of themes developed to analyse the cost of degradation has been inspired from the descriptors. However some thematic contributions written to prepare the ESA report, deal with the dependence of activities with GES.
	How was use of marine waters described?	Mix of qualitative and quantitative information : - Description of the economic sector using waters (through diverse sources of information : national/local) ; - Policy and environmental rules (law) applying to the sector considered ; - For some sectors : interrelations between marine waters and economic sectors using marine waters (benefits/pressure). (however this point is mainly mentioned in the "pressure and impact analysis")
	How was cost of degradation described?	Cost of environmental degradation declined in four categories: opportunity cost, mitigation cost, costs related to positive action in favour of the environment, transaction costs.

Ports	Ports and Terminals	ESA Description/Definition	8 major ports (Bordeaux, Calais, Dunkerque, Le Havre, La Rochelle, Nantes Saint-Nazaire, Marseille and Rouen) are identified, based on a criteria of volume (goods traffic volume); however there is no precise definition of what a « major port » is (no threshold is given).
	Ports and Terminals	Employment	Quantitative data
	Ports and Terminals	Emissions	To be confirmed
	Movements of goods and passengers on and off vessels	Throughput of goods and passengers	Ports and shipping are dealt with in a single chapter of the French ESA reports (3 reports are related to 3 different OSPAR areas). Figures related to traffic are given per port or at national/subregional levels but only for goods and passengers entering or going out of the ports. In the chapter, both trading ports and marinas are mentioned (but more details about trading ports). National indicators and figures regarding traffic in the ports (entering and going out) are given for (1) goods traffic and (2) passenger traffic. Quantitative data (estimation through national statistics) at the national level (including the Mediterranean ports – outside OSPAR area) is provided for: - Volume (traffic): goods / passengers - Employment: direct / indirect / induced - Specific figures are provided for the port handling sector (still at the national level): turnover and direct employment. - Trading ports: figures related to goods and passengers traffic for the main ports and by type of goods. - Marina: number, employment (direct and indirect), turnover.
	Maintenance Dredge / Disposal	Dredge material volumes and disposal site(s)	Mentioned in the context of legal requirements for port dredging only.
Shipping	Shipping volume/Number	Transport of goods and passengers	No figures specifically related to shipping. Figures are given for volume dealt with by the French ports (see above), with a possible distinction between goods and passenger traffic, and per marine sub-region: (1) Channel and north sea; (2) Celtic sea; (3) Bay of Biscay (and 4- Mediterranean – but out of OSPAR area).
	Anchoring	Location of anchorages (formal, informal, mooring buoys)	Marina berths only mentioned, no information on anchorages.

Germany		
ESA Report Version		Initial assessment (Draft, 2011)
Geographic Coverage	OSPAR-area covered?	OSPAR II (Greater North Sea)
	Specify	The German part (EEZ) of the North Sea, *i.e*. 41,300 km² between the German mainland of the States of Lower Saxony, Hamburg and Schleswig-Holstein and the Dogger Bank, framed by the exclusive economic zones of Denmark, The Netherlands and the UK.
Market Sector	Sector(s)?	GES descriptors and indicators targets objectives, status
	Kind of data?	Shipping Offshore wind energy Offshore oil and gas Marine resource extraction Pipelines and cables Commercial fisheries Tourism Runoff from agriculture Runoff from industry Runoff from sewage treatment Coastal protection Research Military
	Multipliers used?	Physical data on activities (sector/industry data (*e.g*. weight of goods handled, MW produced, number of installations, number of visitors)), employment, impacts, turnover, investment (forecasted), gross value added, depending on data availability
	Main data source?	National statistics, government reports, financial sector reports (Nord/LB)
Links to main questions for ESA Assessment	Links to GES?	Through impacts of services
	How was use of marine waters described?	Both in quantitative and qualitative terms
	How was cost of degradation described?	No estimate due to lack of data

Ports	Ports and Terminals	ESA Description/Definition	No breakdown provided in the ESA regarding port/terminal size or capacity. No regional subdivisions of ports/terminals used. The report states about 26% of all imports and exports pass through maritime ports. In 2010, around 219 m tonnes passed through German North Sea ports.
	Ports and Terminals	Employment	The ESA report provides qualitative information only, with examples, such as: there are 360 shipping (freight and passenger) companies operating on the German North Sea with 18,000 people employed with social benefits.
	Ports and Terminals	Emissions	Qualitative information, no data general information on pollutants, not broken down to economic activities. Shipping emissions are characterised qualitatively and MARPOL is mentioned.
	Movements of goods and passengers on and off vessels (and associated storage of goods)	Throughput of goods and passengers	The report makes reference to data quality in regard to environmental monitoring and the need to validate and check data, for example through experts. No mention of socio-economic data quality. The ESA mentions increasing competition for use of marine space and refers both to shipping – including ports – and marine protected areas. A map shows details of the competing uses including Natura2000. Environmental pressures mentioned in regard to shipping include: emissions of pollutants, noise (also specifically mentioned in regard to pressures on whales), introduction of invasive species through the ballast water, oil and chemical discharges, oil spills from ship wrecks (mentioned in regard to affects on both ecosystems and tourism), anchoring, illegal discharge of waste (mentioned in regard to impacts on beach aesthetics and tourism), pollutant and oil pressures on sea birds, as well as chase effects.
	Maintenance Dredge / Disposal	Dredge material volumes and disposal site(s)	Information about dredging is contained in the environmental description of pressures, not in the economic analysis. It includes a quantification (19-45 million tonnes per year), but not per economic activity. There are 34-43 disposal locations (total area 20-29km²). Data presented spatially on ESA Report maps.
Shipping	Shipping volume/Number	Transport of goods and passengers	Traffic information is qualitative only and mentions main shipping routes, especially the separated seaways and the near-port areas. No economic data available, only other sector relevant information is provided. For example, there are 360 shipping (freight and passenger) companies operating on the German North Sea with 18,000 people employed with social benefits. A growth to 295 m tonnes freight is projected for the year 2011 in the report (report was published 14.10.2011). It is also stated in the report – although not the economic assessment - that for the year 2005 over 65,000 ships with a length of over 50 meters traversed the German North Sea. In addition, the report states that 'shipping has a very high economic and social meaning'.
	Anchoring	Location of anchorages (formal, informal, mooring buoys)	No information

Ireland			
ESA Report Version			Ireland's Ocean Economy (December, 2010)
Geographic Coverage		OSPAR-area covered?	OSPAR III (Celtic Seas)
		Specify	The report refers to the seas surrounding Ireland (EEZ), this includes the Irish Sea to the east between Ireland and the UK, and also the Celtic Sea extending west from Ireland.
Market Sector		Sector(s)?	Only economic information on the economic sectors, no relationship to the environment provided. One small chapter on ecosystem goods and services which provides a general list of EGS and a case study for economic evaluation of EGS in one site.
		Kind of data?	Shipping and maritime transport, tourism and leisure, international cruise industry, other marine services (ship surveying, boat sales, chandlery, and retail seafood), commercial sea fisheries, aquaculture, seafood processing, oil and gas exploration and production, marine manufacturing, marine commerce, high tech marine products and bio products, marine renewable energy
		Multipliers used?	Direct GVA, % GDP, turnover, direct and indirect GVA, employment, employment FTE, industry data (*e.g*. value of exports, average expenditure per person, number of vessels, landings).
		Main data source?	National reports, national statistics sources, SEMRO Company Survey (University of Galway), scientific reports.
Links to main questions for ESA Assessment		Links to GES?	No
		How was use of marine waters described?	Qualitative and quantitative description using socio-economic values
		How was cost of degradation described?	No estimate made
Ports	Ports and Terminals	ESA Description/Definition	Overview only, one page summary, in 2007 the ocean economy had a turnover of €3.4 billion, of which €1.44 billion was direct Gross Value Added - reader pointed to further study, see note. Shipping and Maritime services grouped together with turnover/GDP for 2007. The majority of shipping activity occurs around the nine commercial ports on the coast of Ireland; Cork, Drogheda, Dublin, Dundalk, Dun Laoghaire, Galway, New Ross, Foynes and Wicklow. Total tonnage for all Irish ports shown for 2000 to 2009. Note: For an in depth analysis of Ireland's Coastal Economy the interested reader should examine Hynes, S. and Farrelly, N. (2010). A Socio-Economic Profile of Coastal Regions in Ireland, SEMRU Working Paper 10-WP-SEMRU-02.
	Ports and Terminals	Employment	Shipping employed 1,149 individuals in 2007 while related Port and Maritime Logistics services employed 1,045 individuals. Turnover and employment presented figures for 2003 and 2007 with GVA.
	Ports and Terminals	Emissions	No information

	Movements of goods and passengers on and off vessels (and associated storage of goods)	Throughput of goods and passengers	2000 to 2009 tonnages graphed, turnover and employment increased significantly between 2003 and 2007 in the shipping and maritime category. Turnover increased by 52% and employment by 9%.
	Maintenance Dredge / Disposal	Dredge material volumes and disposal site(s)	No information
Shipping	Shipping volume/Number	Transport of goods and passengers	Shipping included in 'Shipping and Maritime Industry' - Cruise industry individually listed. Information for 2007 a total of 130 liners docked at Irish ports carrying 102,000 passengers. Port of Cork estimated that the average spend per disembarking cruise passenger was €443.5 in 2007 which equates to an estimated €45.3 million in total cruise liner related expenditure in Ireland.
	Anchoring	Location of anchorages (formal, informal, mooring buoys)	No information

Netherlands			
ESA Report Version			Economic and social analyses for the Marine Strategy Framework Directive. Part 1: Initial Assessment. (Draft, December 2011)
Geographic Coverage		OSPAR-area covered?	OSPAR II (Greater North Sea)
		Specify	The 'Dutch North Sea', activities taking place on the Dutch Continental Shelf (DCS). The DCS extends into the North Sea where it meets the UK EEZ, and is bordered by the German EEZ to the north/east and Belgian EEZ to south/west. The Wadden Sea is not included within the assessments for the MSFD, as it was included in the Water Framework Directive.
Market Sector		Sector(s)?	Qualitative description of environmental measures and their assumed costs. No quantitative figures on descriptors or indicators.
		Kind of data?	Oil and gas exploration, fisheries, sea shipping, sand and gravel extraction, wind energy, piping and cables, other sea-based human activities (*e.g*. carbon capture and storage, military activates, dredging), seaports and recreational activities in the coastal zone.
		Multipliers used?	Turnover (called production value), value added, employment.
		Main data source?	National statistics office (Statistics Netherlands), national government reports (Ministry of Economic Affairs, etc.), contracted studies, scientific reports.
Links to main questions for ESA Assessment		Links to GES?	It is not linked to GES.
		How was use of marine waters described?	Qualitative and quantitative (*i.e*. economic importance of activities in monetary terms).
		How was cost of degradation described?	A mix, monetary value (*e.g*. costs of measures, cost of mitigation) and qualitative (*i.e*. potential loss of resources). The costs of the measures taken on land are not taken into account for this study.
Ports	Ports and Terminals	ESA Description/Definition	Sea ports grouped against regional areas and municipalities. No quantification of the number, size or grouping of sea ports.
	Ports and Terminals	Employment	1995, 2000, 2007 tabulated employment figures and Value Added (Million Euros) for Dutch zones (ie, Rotterdam, Amsterdam, Ijmuiden cluster etc)
	Ports and Terminals	Emissions	Commentary on the Environmental Ship Index and how the Port of Rotterdam's reward ships when they comply or meet lower than current International Maritime Organization (IMO) emission standards. Sulphur emission standards mentioned and NOx Emission Control Areas (NECAs) effects.

	Movements of goods and passengers on and off vessels	Throughput of goods and passengers	Throughput Tonnage for 2009 tabulated, with projections for 2015, 2020 and 2040. The economic development of seaports is mainly dependent on world trade. In the long term, the Port Authority of Rotterdam expects an annual throughput of 575-740 million tonnes in 2030. Port of Rotterdam tonnages for half year 2010 commented on, with comparison to 2009 and 2008. Cost of preventative measures for avoiding degradation to the Marine Environment :(Insurance costs, Contributions to the International Oil Pollution Compensation Fund, TBT-free anti-fouling materials, Ballast water treatment facilities, Port reception facilities for waste). The average annual costs involved are calculated in the ESA as approximately € 17.2m.
	Maintenance Dredge / Disposal	Dredge material volumes and disposal site(s)	Qualitative information only describing current dredge situation. The dredging measures, to prevent degradation of the marine environment, are primarily related to the storage of contaminated dredged material on land instead of spreading the dredged materials at sea. The average annual storage/operational cost is approximately € 30m. About 30mln m3 of material is dredged every year from all Dutch seaports and seaways. About 2mln m3 of dredged material exceeding certain chemical criteria has to be disposed of in confined (land-based) sites (in the case of Rotterdam: the Slufter). However, most of the dredged material (about 28m. m3) is returned to the North Sea. The costs of processing the contaminated dredged material is estimated to be around €20 per m3. Economic importance of Aggregate sector presented. Tabulated data for 1995, 2000, 2005, 2007 employment and Value Added in sector. Aggregate grounds shown on report Figure. Current demand shown against expected demand up to 2030.
Shipping	Shipping volume/Number	Transport of goods and passengers	Economic importance of the shipping industry is linked to the Dutch seaports. 2007 tabulised values for Production, Value Added an Employment. Gridded view of sea lane usage. Tabulated data for 1995, 2000, 2005, 2007 employment and Value Added in shipping sector.
	Anchoring	Location of anchorages (formal, informal)	No Information

Norway			
ESA Report Version			Section 3 - Management plans (2011) for different marine sectors used in the assessment. Norway is a non-EU member state and is not implementing MSFD.
Geographic Coverage		OSPAR-area covered?	OSPAR II (Greater North Sea)
		Specify	The North Sea and the Skagerrak
Market Sector		Sector(s)?	Section 3 - Shipping - Focuses on the environmental impacts (air and water) of shipping.
		Kind of data?	
		Multipliers used?	Economic impacts (turnover, employment) due to establishment of sea based wind power has not yet been assessed, but will be by May 2012. However, potential negative impacts on the fisheries sector are discussed, which are linked to i) the area used for sea based wind power, ii) uncertainty regarding whether or not it will be possible to fish in the area, and iii) the impact on the behaviour of fish (*e.g*. patterns of migration and reproduction). Economic impacts from the land-based and coastal activities have not been assessed yet.
		Main data source?	Management plans (2011) - Norway Government Report
Links to main questions for ESA Assessment		Links to GES?	NA
		How was use of marine waters described?	NA
		How was cost of degradation described?	NA
Ports	Ports and Terminals	ESA Description/Definition	The information on ports is based on data provided by Norway statistics (SSB) for 2009. In the data base are large ports more thoroughly covered than small ones. The dimensions used are: i) domestic or foreign traffic, ii) number of calls, iii) tonnes of loaded and unloaded goods. Local traffic and passenger traffic (*e.g*. cruise and route ship traffic) is not included. Environmental Pressures mentioned in a few words about hazardous substances in sediments, for example TBT that still exists in old sediments. Ports are also receivers of alien species.
	Ports and Terminals	Employment	The starting point of the Norwegian analysis is to study how shipping in the North Sea and Skagerrak affects economic activities in shipping-related industries. This means that the focus is on the core activities of shipping (foreign traffic, domestic traffic, services linked to shipping, fisheries and catch) in the area of investigation. The spin-off effects of activities related to shipping have also been assessed (for suppliers, consumers etc.). The analysis indicates that the direct and indirect employment generated by shipping in the investigation area was 48,400 people in 2009, and is expected to be 47,300 in 2030. This corresponds to 2.8 and 2.5 % respectively of the total employment in the investigation area 2009 and 2030. In 2009, 28,400 of these people were employed in the core activities linked to shipping while the remaining 20,000 were employed in other parts of the industrial life. As regards the 2030 scenario, the number of employed in core activities is expected to be around 31,300. 16,000 employed are expected due to spin-off effects. Domestic and foreign shipping employed most people in 2009 with a proportion of around 46 % of the shipping related employment in the investigation area. In 2030, domestic traffic is expected to account for around 57% of the shipping related employment in the investigation

			area. The value added linked to the core activities in the investigation area has been estimated to 57 billion NOK in 2009 and 86 billion NOK in 2030. This accounts for 4.7% of the total value added in the investigation area both in 2009 and 2030. In 2009 38.9 bn NOK or 69% of the value added was linked to core activities, whereas the remaining 31% constituted value added linked to spin-off effects in other parts of the industry. Foreign shipping is the most important core activity, with a total value added of 42 bn NOK including spin-off effects. In 2030, it is expected that 65.2 bn NOK or 76% of the total value added is linked to the core activities and the remaining 24% is value added linked to other parts of the industry. In 2030, foreign traffic is expected to still be the most important core activity with a total added value of 67 bn NOK including spin-off effects.
	Ports and Terminals	Emissions	Larger ships have larger emissions due to their larger fuel consumption. This is reflected by the difference between estimated emissions to air from vessels within the NEZ and for vessels outside of the NEZ. Of the total ship miles, vessels outside of the NEZ accounted for 73% in 2009, and are estimated to account for 75% by 2030. This corresponds to around 80% of the total emissions to air for estimated emission components. A reduction of CO_2, NOx, SO2, CO and PM emissions is expected from 2009 to 2030 for both areas due to technological improvements, regulations and an expected increase of use of bio fuel. Outside of the NEZ, CO_2 emissions are expected to decrease by 5%, NOx (44 %), SO2 (86%), CO (26%) and PM (53%) respectively. 2009 and 2030 estimates for potential discharges to sea have also been calculated. In contrast to emissions to air an increase of potential discharges is expected. By 2030 it is expected that the potential discharge for waste and black water will increase by 17% within the NEZ and 14 % outside of the NEZ. The Institute of Maritime Research in Norway (IMR) and the Norwegian Institute for Nature Research (NINA) consider that the impacts of shipping-related emissions on environmental resources are minimal or that the knowledge base is too weak to make categorical conclusions. Air emissions however contribute to environmental climate changes that indirectly can have consequences for seabirds, fish and sea mammals. The largest potential environmental impact due to shipping within the management plan area stems from incidents such as ship collisions and groundings where accidental discharge of petroleum products constitutes the greatest hazard. It is important to recognize that acute incidents may have very different consequences depending on the area and time they occur. Minor incidents close to particularly vulnerable nesting and spawning grounds can have a dramatic impact whereas significantly larger discharges can have less serious consequences if they occur at a less vulnerable time and location. An upcoming environmental impact analysis from the Norwegian Coastal Administration (NCA) indicates a reduction in environmental risk within the management plan area towards 2025 in spite of increased traffic. This is primarily due to the introduction of new traffic separation systems in 2011 from Stad to the fjord of Oslo.
	Movements of goods and passengers on and off vessels	Throughput of goods and passengers	Foreign goods constitute around 65% of all goods transported to and from the largest Norwegian ports. Domestic goods constitute around 35%. The importance of foreign trade is explained by the fact that ships used for foreign traffic are larger than those used for domestic traffic, and that domestic traffic to a larger extent is characterized by ships not involved in goods transports. Statistics from Statistics Norway show that the traffic picture in Norwegian ports is dominated by domestic traffic. Of nearly 67,000 calls at North Sea ports around 70% were domestic calls. The corresponding figure for "Norskehavet" (north of the North Sea and south of Barents sea) is nearly 90%.
	Maintenance Dredge / Disposal	Dredge material volumes and disposal site(s)	Ship anchorages qualitative reference to severe impacts on cultural heritage (ship wrecks).

Shipping	Shipping volume/Number	Transport of goods and passengers	Extensive information available - AIS plots, pressures, emissions, supported by Figures images. The analysis of shipping in the area is divided into in total 13 ship types and 7 size categories, for which ship miles are presented. 27% of North Sea traffic takes place in the Norwegian Economic Zone (NEZ) and 73% outside of the NEZ. By 2030 these values are expected to decrease to around 25% (inside the NEZ) and increase to around 75% (outside the NEZ). For ship miles outside of the NEZ an increase of 18% from 2009 to 2030 is expected. For ship miles within the NEZ an increase of 11% is expected. Whilst gas tankers account for the relative largest increase for ship miles within the NEZ, bulk shipping will account for the relative largest increase outside of the NEZ. Within the NEZ, general cargo and passenger ships account for the largest amount of ship miles for both 2009 and 2030. Outside of the NEZ general cargo, chemical and product tankers account for the largest amount of ship miles for both 2009 and 2030. It is important to add that ships within the NEZ are generally smaller than ships outside of NEZ. Passenger and fishing vessels were the only ship type categories in 2009 with longer ship miles distance within the NEZ than outside of the NEZ. The same is expected for 2030. Graph image shows vessel counts by tonnage (y-axis = “ship miles”, x-axis = “gross tonnes”) shows that ships below 5000 gross tonnes are dominating inside the NEZ (NØS) and stands for nearly 70% of total ship miles. As regards the area outside the NEZ, ships below 5000 gross tonnes represents a little more than 40% of total ship miles. Outside the NEZ, larger ships are dominating.
	Anchoring	Location of anchorages (formal, informal, mooring buoys)	No information

Portugal	ESA Report Version	PT “Marine Strategy for Continental Subdivision” (2012)
Geographic Coverage	OSPAR-area covered?	OSPAR IV (Bay of Biscay and Iberian Coast)
	Specify	The Atlantic Sea
Market Sector	Sector(s)?	Commercial sea fisheries, tourism and leisure, ports and shipping, aquaculture, oil and gas, renewable energy, aggregate extraction, submarine cable & pipeline operations, defense operations, fish processing industry, storage of gases, municipal wastewater discharge, dredging, shipbuilding, water abstraction, desalination, marine research, survey & educational activities, seaweed and other sea-based harvesting, bioprospecting, extraction of genetic resources, extraction of salt and coastal defense.
	Kind of data?	GVA(commercial sea fisheries, fish processing industry, aquaculture, shipbuilding, ports operations, shipping, tourism and leisure and coastal defense) Production (commercial sea fisheries, fish processing industry, aquaculture, seaweed and other sea-based harvesting, shipbuilding, ports operations, shipping, tourism and leisure, water abstraction, desalination-water abstraction and dredging) Employment (fish processing industry, aquaculture and shipbuilding) Other specific indicators – some examples: Frozen and fresh fish marketed at first sale market at Continent; Production of fish processing industry; Ports activity at the Continent’s commercial fish.
	Multipliers used?	No information on multipliers to determine indirect effects in economics.
	Main data source?	INE - National Statistics Institute, Directorate General for Natural Resources, Safety and Maritime Services (DGRN) , Ports Administration Reports, Shipping and Ports Administration (IPTM).
Links to main questions for ESA Assessment	Links to GES?	No links with GES in the part of ESA related to use of marine waters. In the second part of ESA, degradation cost is implicitly understood referring to GES. Additionally, in the chapter on pressures and impacts is also made a link with marine waters uses.
	How was use of marine waters described?	Quantitative and qualitative description of use, which is divided between socioeconomic description and tendencies (qualitative).
	How was cost of degradation described?	Cost-based Approach was applied with quantitative data outcome in the following sectors: commercial sea fishing, aquaculture, shipping, ports operations, pollution control on land based activities and pollution prevention and control on the sea.

Ports	Ports and Terminals	ESA Description/Definition	The geographic distribution of ships traffic in commercial ports (number of ships, volume of goods in tons and oceanic passenger traffic in number of passengers) was presented, as well as the number of moorings (number along the coast). The geographic distribution and abundance of cargo from each port is given by the volume of fish marketed, reported in Kton, in euros and in average price per tonne. It is also presented the load capacity of fishing vessels, as well as information on the number of fishermen operating them. The historical evolution of capture volumes is given in graphical format (this information is given in the specific chapter for Commercial Fishing). Economic value (€) of investment in port management is included, turnover (€)GVA (€) and number of workers are presented. Data is provided by National Statistics Institute (INE) reports, Shipping and Ports Administration (IPTM) and Ports Administrations Reports
	Ports and Terminals	Employment	The number of workers operating in Ports is presented within the ESA.
	Ports and Terminals	Emissions	Qualitative information is provided, which describes Portugal's situation in accordance with the international context for reducing polluting atmospheric emissions, under the Convention MARPOL 73/78, from 1997, (resolution 8). Additionally, there is a brief mention of the international convention on management of ballasts and sediment from ships, the ban on organic composts in ships, dismantling and recycling of ships.
	Movements of goods and passengers on and off vessels	Throughput of goods and passengers	The geographic distribution of ships traffic in commercial ports (number of ships, volume of goods in tonnes, oceanic passenger traffic in number of passengers) was presented.
	Maintenance Dredge / Disposal	Dredge material volumes and disposal site(s)	Information is presented on dredge material volumes and disposal sites, as well as the percentage of contaminated sediments and the costs of dredging (€).
Shipping	Shipping volume/Number	Transport of goods and passengers	Information on shipping is presented (operational fleet with state flag control in number and TDW). Shipping safety information is also included.
	Anchoring	Location of anchorages (formal, informal, mooring buoys)	The number of moorings (number along the coast) was presented.

Spain		
ESA Report Version		Estrategia Marina - Demarcación Marina Noratlántica. Evaluación Inicial, Parte III: Análisis Económico y Social Estrategia Marina - Demarcación Marina Sudatlántica. Evaluación Inicial, Parte III: Análisis Económico y Social
Geographic Coverage	OSPAR-area covered?	OSPAR IV (Bay of Biscay and Iberian Coast)
	Specify	The North Atlantic marine demarcation extends from the limit of territorial waters between Spain and France in the Bay of Biscay to the northern limit of territorial waters between Spain and Portugal. The South Atlantic marine demarcation extends from the limit of territorial waters between Spain and Portugal in the Gulf of Cadiz to the meridian passing through Cape Spartel.
Market Sector	Sector(s)?	Fisheries (marine fisheries, aquaculture, processing Industry), port infrastructure, marine recreation, shipping, tourism, ship building, oil and gas, water treatment (sewage disposal, bathing waters, desalination), defence, renewable energy (information provided only at national level)
	Kind of data?	GVA and employment figures of the different sectors; fishing fleet and landings data; production levels of aquaculture (metric Tonnes); net revenue of the fish processing industry; number of ports; port traffic (tonnes), number of ships entered and number of passengers; number of licenses granted for nautical sports and recreation; number of international tourists per autonomous community; shipyard workload (new contracts and pending orders); volume of treated wastewater and reused water (m^3/day) No or limited data available for the following sectors: oil and gas, bathing waters, desalination, defence, renewable energies
	Main data source?	Government reports, national statistics, tourism studies, sectorial associations. • Reports and statistics from the INE (Instituto Nacional de Estadistica), MAGRAMA (Ministerio de Agricultura, Medio Ambiente y Alimentacion), Ministerio de Fomento, Ministerio de Defensa, Minsiterio de Industria, Turismo y Comercio, ANEN (Asociación Nacional de Empresas Náuticas), Instituto de Estudios Turísticos, • 2011 bulletin of the CORES (Corporación de Reservas Estratégicas de Productos Petrolíferos) • Port yearbooks
Links to main questions for ESA Assessment	Links to GES?	Apart from the objectives of the programmes analysed in the assessment of the cost of degradation, there was no direct connection to GES found.
	How was use of marine waters described?	Quantitatively based on the economic analysis of the different sectors related to marine water use. (Marine waters accounts approach)
	How was cost of degradation described?	The description is quantitative and based on the analysis of the budgets allocated to government programmes that involve measures related to the protection of the marine ecosystem. This analysis considers programmes by the national administration as well as those by the regional governments (autonomous communities). The analysis includes programmes between years 2009 and 2011. (Cost based approach)

Ports	Ports and Terminals	ESA Description/Definition	In accordance with Law 27/1992 of 24 November, modified by Law 62/1997 of 26 December, a distinction is made between ports of regional ownership (autonomous community level) and those which are state-owned. The former are identified in the ESA as being mainly fishing, sports and shelter ports while the latter are referred to as those where international commercial maritime activities take place; where the yearly volume and characteristics of their commercial marine activities is sufficiently relevant for the national economy; which technical or geographical conditions are essential for the security of marine traffic; which serve industries of strategic importance for the national economy. Spain has a total of 46 state-owned ports which are managed by 28 Port Authorities. At the regional level, there are 320 fishing ports, 355 marinas and 126,963 moorings under autonomous administration. The North Atlantic Marine Demarcation hosts 12 state-owned ports and 10 Port Authorities. The autonomous communities making up the demarcation host 136 fishing ports, 96 marinas and more than 23,000 moorings under autonomous administration. The South Atlantic Marine Demarcation hosts 10 state-owned ports and 4 Port Authorities. The demarcation hosts 22 fishing ports, 21 marinas and more than 7,600 moorings of autonomous administration (figures according to the Fleet Census of 2006).
	Ports and Terminals	Employment	35,000 job positions at the national level of which: - 3,659 job positions in the North Atlantic Marine Demarcation - 6,728 job positions in the South Atlantic Marine Demarcation (Figures for year 2009) (Employment figures are expressed as 'job positions' in the Spanish report).
	Ports and Terminals	Emissions	No Information
	Movements of goods and passengers on and off vessels	Throughput of goods and passengers	At the national level, port throughput is roughly 60% of the country's exports and 85% of its imports. This represents 53% of external commerce with the EU and 96% with countries outside the EU. (See shipping data below for more information.)
	Maintenance Dredge / Disposal	Dredge material volumes and disposal site(s)	No data Note: Spain has divided the studies of the marine strategy for each demarcation into 5 documents: - General framework (Part I) - Pressures and impacts analysis (Part II) - Economic and social analysis (Part III) - GES descriptors (Part IV) - Environmental objectives (Part V) This task focuses on the ESA document (Part III). Some information on dredge material is found on the Pressures and Impacts Analysis (Part II).

Shipping	Shipping volume/Number	Transport of goods and passengers	North Atlantic Marine Demarcation (2009 data for the State-Owned Port System) Transported goods: 104.9 m tonnes. Number of ships entering the ports: 14,900 Number of passengers: 1.68 m. South Atlantic Marine Demarcation (2009 data for the State-Owned Port System) Transported goods: 99.6 m tonnes. Number of ships entering the ports: 29,368 Number of passengers: 5.3 m. According to the 2009 Annual Services Survey of the National Statistics Institute (INE), the Spanish shipping sector registered a turnover (gross product) of 1,850 m Euro, with a GVA of 496.134 m Euro. The reported mean annual employment figure for the sector was 7,810. The extrapolated figures based on the traffic registered in the autonomous communities which are part of the North Atlantic Marine Demarcation and the South Atlantic Marine Demarcation are as follows: GVA (North Atlantic): 51.867 m Euro Mean annual employment (North Atlantic): 816 GVA (South Atlantic): 97.028 m Euro Mean annual employment (South Atlantic): 1,527
	Anchoring	Location of anchorages (formal, informal, mooring buoys)	No Information

Sweden			
ESA Report Version			Analysis of the maritime sector- from drivers to impact on ecosystem services (2011) [draft - project A maritime sector]
Geographic Coverage		OSPAR-area covered?	OSPAR II (Greater North Sea)
		Specify	The Baltic Sea, which refers to the Swedish marine waters of the Bothnian Bay, the Bothnian sea and Baltic Sea Proper and the North Sea, which refers to the Swedish marine waters of the Skagerrak, the Kattegat and the Sound (Öresund). The Sound is interpreted as having its southern border at the Drogden threshold, *i.e*. at the Öresund Bridge. Parts of these waters belong to OSPAR II.
Market Sector		Sector(s)?	Trend and status of final ecosystem services; trend and status of intermediate ecosystem services; trend and status of indicators. Screening of GES descriptors and associated indicators.
		Kind of data?	Tourism, separated into sectors: cruise ship traffic in marine waters, international passenger ferry traffic in marine waters, national passenger ferry traffic in marine waters other commercial passenger transportation in marine waters, leisure boating in marine waters, holiday housing associated with marine recreation, commercial accommodation (*e.g*. hotels, camping sites, etc.) associated with marine recreation, same-day visits associated with marine recreation
		Multipliers used?	total economic value (TEV), turnover, employment, gross value added, percent of GNP, sector information (number of calls, number of passengers, number of boats, number of overnight stays, etc.)
		Main data source?	Resurs AB (Swedish Travel and Tourist Data Base), SEPA, scientific reports
Links to main questions for ESA Assessment		Links to GES?	Through ecosystem services (*e.g*. section 4.3.1. 'Linking selected intermediate ecosystem services to GES descriptors and indicators)
		How was use of marine waters described?	Both quantitative and qualitative descriptions of use (market and non-market data)
		How was cost of degradation described?	Partly quantitative description by referring to estimates of TEV, which can give indications of what may be lost if GES is not achieved. Also indicates in degrees of likelihood which activities will bear the cost of degradation
Ports	Ports and Terminals	ESA Description/Definition	The five largest ports by goods volume (Gothenburg, Brofjorden, Trelleborg, Malmö and Luleå) together handle approximately half of all goods transported by sea. Graphs present 2010 tonnages by cargo type. Information presented on National policies and legalisations governing environmental performance of port activities.
	Ports and Terminals	Employment	Employment from 2009 presented for the Water Transport and Water Transport sectors, with Value Added information.
	Ports and Terminals	Emissions	Information on possible impacts from restrictions on emissions - and subsequent effects to the Maritime Sector - Summary of information on modal transport shift from sea to land transport evaluation resulting from policy changes.

	Movements of goods and passengers on and off vessels	Throughput of goods and passengers	No information
	Maintenance Dredge / Disposal	Dredge material volumes and disposal site(s)	Mass of dredged material disposed of in North East Atlantic region presented as a table for 2005 each year to 2009.
Shipping	Shipping volume/Number	Transport of goods and passengers	AIS data used with baseline transects to records shipping passing different points - data for 2010 presented with values for ships passing baseline transect points. Employment from shipping presented for 2009, and Added Value. There is no direct data that allows the determination of what part of these economic indicators that should be allocated to the Swedish economic zone. One approximation can be done by use of fuel sale statistics. This is divided on fuel sold for domestic use and bunker fuel (for international traffic) but not divided into Swedish and non-Swedish ships, data for 2010 fuel sales presented.
	Anchoring	Location of anchorages (formal, informal, mooring buoys)	No information

United Kingdom		
ESA Report Version		Charting Progress 2. Feeder Report: Productive Seas (UKMMAS, 2010)
Geographic Coverage	OSPAR-area covered?	OSPAR III (Celtic Seas), OSPAR II (Greater North Sea)
	Specify	Seas and water surrounding the UK divided into eight regions, the charting progress covers the different regional seas: Northern North Sea, Southern North Sea, Eastern Channel, Western Channel and Celtic Sea, Irish Sea, Minches and Western Scotland, Scottish Continental Shelf, and Atlantic North-West Approaches (additional geographic regions are also used in regard to specific marine activities).
Market Sector	Sector(s)?	Ecosystem services; themes. Per driving force (*e.g*. aquaculture, Leisure and recreation, fisheries, etc.) pressures, impact, and description of change (intensity, spatial extent, frequency, duration) induced is presented, as well as existing management measures. Also the ecosystem services that these pressures impact and the relative significance of these impacts are identified per driving force.
	Kind of data?	Aquaculture, coastal defence, defence - military, education, fisheries, leisure and recreation, maritime transport, mineral extraction, oil and gas, pipelines, power transmission, renewable energy, research and development, storage (of gases), telecommunications, waste disposal, water abstraction.
	Multipliers used?	Turnover, investment, expenditure, gross value added, employment, and industry/activity specific data (*i.e*. thousands tonnes landings) data is also included for ancillary and secondary activities
	Main data source?	Department for Environment, Food and Rural Affairs (Defra), the Centre for Environment, Fisheries and Aquaculture Science (Cefas), Marine Scotland, environment agencies, (Environment Agency, Scottish Environment Protection Agency, Northern Ireland Environment Agency), The Crown Estate (TCE), the Department of Energy and Climate Change (DECC), the Office for National Statistics (ONS) and spatial datasets (*e.g*. Seazone), industry reports and scientific articles.
Links to main questions for ESA Assessment	Links to GES?	Through qualitative descriptions on pressures and impacts on the environment and ecosystem services.
	How was use of marine waters described?	Mostly quantitative *i.e*. monetary values with additional quantitative/qualitative descriptions of activities and their trends/state. But also in terms of relevant ecosystem services which support an activity.
	How was cost of degradation described?	Not conducted in the 'feeder report', but it is expected to be described in quantitative (monetary) values.

Ports	Ports and Terminals	ESA Description/Definition	Ports categorised by their size (large/small) with a division at 1 million tonnes of cargo handled per year. Information presented spatially. Commentary about port split (regional). Ports identified geographically on figures, classified as small ports and large ports. Split regionally. In total there are more than 650 ports in the UK for which statutory harbour authorities have been established; of these 120 are commercially active. Values to the economy were assigned to reporting regions based on the proportion of freight tonnage handled by major coastal ports in each region. The majority of value to the economy (> £1 bn each) is located in Region 2 (Southern North Sea; which includes major ports in the Thames connecting with London), Region 1 (Northern North Sea; linking with the northern European mainland), Region 5 (Irish Sea; linking Scotland, the Republic of Ireland, Northern Ireland, England and Wales), and Region 3 (Eastern Channel; with key routes to Europe and North Africa). Information used as a proxy to reflection distribution of pressures from shipping among the regions.
	Ports and Terminals	Employment	Information form 2007 on the number of jobs in the Ports and Maritime Sector, provided from SIC code information and summarised within the chapter. In total during 2007, the ports industry directly employed 132,000 workers.
	Ports and Terminals	Emissions	Qualitative information on shipping contribution to overall global emissions which currently account for around 3.3% of global CO2 emissions. Emissions from UK shipping have been estimated using refuelling figures from UK fuel bunkers (whether the ships are from the UK or not) this suggests that fuel emissions have remained around the same since 1990 at about 6 to 7 million tonnes of CO2 per year.
	Movements of goods and passengers on and off vessels	Throughput of goods and passengers	Regional distribution of ports, mostly for 2007 and/or 2006 data expressed as tonnages and GVA.
	Maintenance Dredge / Disposal	Dredge material volumes and disposal site(s)	Dredging dealt with under Waste Disposal, geographic location of disposal grounds shown on supporting Figure, revenue generation calculated from Licences issued, information presented for England/Wales, Scotland and Northern Ireland as separate values, GVA calculated for each. 2001 to 2007 licences issued and tonnages dispose graphed. Pressures-impacts-description of environmental change-existing management measures listed. For marine aggregate extraction, value of industry in 2008 with GVA shown, size of industry quantified, number of wharfs, regional distribution of activity, supporting geographic figures, 1998 to 2008 tonnages shown.
Shipping	Shipping volume/Number	Transport of goods and passengers	1997 to 2007 - throughput of tonnage graphed - 2007 shipping calls documented, not other data about shipping number. Information from 2007 providing quantification of UK turnover from shipping (freight, passenger and charter services) was £9.5 billion with a direct contribution to GDP of £4.7 billion GVA. In 2007, there were 24.8 million passengers making international sea journeys and 424.42 million domestic sea passengers. UK ports handled 582 million tonnes of freight traffic, although the number of freight passages is unknown due to the commercial sensitivity of shipping data. Information of ships flagged to the UK - In 2007, the UK registered trading fleet consisted of 646 ships, including 134 tankers, 133 Ro-Ro vessels, 165 container vessels and 38 passenger vessels (DfT, 2008a). These all provide employment for associated ancillary industries such as ship repair and shipbuilding. According to Government statistics the UK shipbuilding industry employed 25,000 people in 2004
	Anchoring	Location of anchorages (formal, informal, mooring buoys)	Anchorage areas identified on supporting figures

Annex 4: OSPAR ESA Country Data

Commercial Sea Fisheries

Country	MSFD sea-region	Data (Euros in 2012 prices)	Year of data	Notes on Data
Belgium	OSPAR II	Number of vessels: 89	2009	
		Gross tonnes per vessel (ave): 180	2009	
		KW per vessel (ave): 580	2009	
		Turnover: €59 million	2009	
		GVA: €26 million	2008	
		Direct employment: 2,500		
		Indirect employment: 5,000		
Denmark	OSPAR II	Turnover €403 million	2010	
		Employment 3,681		
France	OSPAR II OSPAR III OSPAR IV	Total Number of vessels: 3,277	2009	A breakdown of the data for the different OSPAR regions is provided.
		Total turnover: €797 million		
		Total GVA: €403 million		
		Total Employment: 8,286 (crew onboard)		
Germany	OSPAR II	Landings 70,300 tonnes		
		Employment (fishing and processing) 3,666	2010	
		GVA €66 million	2007	
Ireland	OSPAR III	Direct GVA €100 million	2003, 2007	Various temporal scales used
		Turnover €251 million		
		Employment 2,200		
		Industry data: Exports €200 million Irish Fleet 1,935 Total capacity of 81,600 tonnes		
Netherlands	OSPAR II	Netherlands: Production Value €524 million Value added €207 million Full-time Employment 1,000	2007	Several time scales: 1995, 2000 and 2007 data Costs of the activities on land not taken into account
		Dutch Continental shelf: Production €113 million Value Added €45 million		

		Full-time Employment 200		
Norway	OSPAR II	GDP €256 million	2009	
		Export value €3 million	2010	
		Value of catch €337 million	2009	
		Number of fishermen 2,340		
Portugal	OSPAR IV	Employment 13,600	2007	Cost-based Approach was applied with quantitative data outcome
		Turnover €221 million	2010	
		GVA: €373 million	2009	
Spain	OSPAR IV	Number of vessels 6,722	2009	
		Gross tonnage 315,305 tonnes		
		Power 719,036 HP		
		Length 14.75m		
		Total catch 210,692 tonnes		
		Value €454 million		
		Contribution to GDP €550 million		
Sweden	OSPAR II	Employment: Occupation abroad 1,133		Some data available for 2010, majority of the data is pre-2008. Data refers to Swedish OSPAR waters, not Baltic waters.
		Production €18 million	2008	
		Added value €33 million	2008	
		Value of landings €69 million		
		Fishing Vessels 1,358	2010	
		Licensed Fishers 1,459	2010	
UK	OSPAR II OSPAR III	Employment 31,633	2007	Data for employment, GVA, production are only provided on a country basis. They cannot be accurately broken down into OSPAR regions, but could be crudely estimated in proportion to turnover.
		Catches of fish: Turnover €628 million GVA €251 million		
		Fishing fleet Turnover €795 million GVA €297 million		
		UK commercial fisheries Production 611,000 tonnes Turnover €801 million, broken down by UK country as: Scotland: €448 million England: €248 million Northern Ireland: €48 million Wales: €16 million		
Summary				

MSFD sea-region	Country	Data (Euros in 2012 prices)	Year of data	Notes on Data
OSPAR II	Belgium	Number of vessels: 89	2009	
		Gross tonnes per vessel (ave): 180	2009	
		KW per vessel (ave): 580	2009	
		Turnover: €59 million	2009	
		GVA: €26 million	2008	
		Direct employment: 2500		
		Indirect employment: 5000		
	Denmark	Turnover €402 million	2010	
		Employment 3681		
	France	Number of vessels: 1,444	2009	A breakdown of the data for the different OSPAR regions is provided.
		Turnover: €369 million		
		GVA: €181 million		
		Employment: 3,974 (crew onboard)		
	Germany	Landings 70,300 tonnes		
		Employment (fishing and processing) 3,666	2010	
		GVA €66 million	2007	
	Netherlands	Netherlands: Production Value €524 million Value added €207 million Full-time Employment 1,000	2007	
		Dutch Continental shelf: Production €113 million Value Added €45 million Full-time Employment 200		
	Norway	GDP €256 million	2009	
		Export value €3 million	2010	
		Value of catch €337 million	2009	
		Number of fishermen 2,340		
	Sweden	Employment: Occupation abroad 1,133		Some data available for 2010, majority of the data is pre-2008. Data refers to Swedish OSPAR waters, not Baltic waters.
		Production €18 million	2008	
		Added value €33 million	2008	
		Value of landings €69 million		
		Fishing Vessels 1,358	2010	
		Licensed Fishers 1,459	2010	

	UK	Turnover: Fish Landings €394 million	2007	
Summary				
OSPAR III	France	Unknown		
	Ireland	Direct GVA €100 million	2003, 2007	
		Turnover €251 million		
		Employment 2,200		
		Industry data: Exports €200 million Irish Fleet 1,935 Total capacity of 81,600 tonnes		
	UK	Turnover fish landings €221 million	2007	
Summary				
OSPAR IV	France	Number of vessels: 1833	2009	
		Turnover: €428 million		
		GVA: €222 million		
		Employment: 4492 (crew onboard)		
	Portugal	Employment 13,600	2007	
		Turnover €221 million	2010	
		GVA: €373 million	2009	
	Spain	Number of vessels 6,722	2009	
		Gross tonnage 315,305 tonnes		
		Power 719,036 HP		
		Length 14.75m		
		Total catch 210,692 tonnes		
		Value €454 million		
		Contribution to GDP €550 million		
Summary				

Tourism and Recreation

Country	MSFD sea-region	Data (Euros in 2012 prices)	Year of data	Notes on Data
Belgium	OSPAR II	Turnover €3 million		Different time-scales used on different data sets. No data for GVA or employment
		Tourist beds 580,000		
		One-day tourism turnover €630 million	2009	
Denmark	OSPAR II	Turnover €2 billion	2007	Data used comes from a number of different sources and years. Data for employment is a rough estimation.
		Full-time employment 14,488		
France	OSPAR II OSPAR III OSPAR IV	Volume (nights) 84 million	2008	No data for Turnover, GVA or number of companies. No information on recreational fishing
		Employment 202,000		No information on full/part time employment or FTE
Germany	OSPAR II	Number of nights 41.2 million	2009	
		Number of day guests 52 million	2011	
		Employment 60,683	2010	
		Turnover (overnight and day-guests) €4 billion	2011	
Ireland	OSPAR III	GVA -€453 million	2003 and 2007	Data from 2003 and 2007 used for Irish maritime economy; various temporal scales used for different sectors. There is no specific scale used for the geographical coverage.
		% GDP Accounts for 7% of Irish economy = €453 million		
		Turnover - €944 million		
		Full time employment 5,836		
		Average expenditure per person: €444		
		Number of vessels:130		
		Number of passengers 102,000		
Netherlands	OSPAR II	Direct Employment 80,000	Long time frame (1995–2007)	
		Indirect employment 30,000		
		8.3 million day trips and 4 million over night visitors annually (14 million nights total)		
		650, 000 recreational anglers: Value €165 million	2007	

Norway	OSPAR II	GDP €3 billion	2007	
		Expenditure from leisure home owners €242 -363 million		
		Expenditure of recreational fishermen €175 million	2011	
		Employment 29,400	2007	
Portugal	OSPAR IV	Employment 438,500	2008	
		GVA €6 billion	2010	
		Number of visitors 174,156	2008	
		Employment 20,200	2006	
Spain	OSPAR IV	Number of tourists 5.3 million	2010	
		Employment (sector) 477,531	2009	
		Active employment 395,909	2009	
		Contribution to GDP €20 billion		
Sweden	OSPAR II	Turnover €7 – €9 billion		
		Employment 38,878 – 53,466 Employment onshore: 370		
		Number of calls: 379		
		Passengers: 471,182		
		Turnover on shore €60 million		
		Leisure boats 414,000		
		Overnight stays: 1.164 million		
UK	OSPAR II OSPAR III	Regional turnover €4 billion	2007	
		Employment: 59,000		
		GVA €2 billion		
		Recreational fishing €837 million		
		Market value Turnover €3 billion		
Summary				

MSFD sea-region	Country	Data (Euros in 2012 prices)	Year of data	Notes on Data
OSPAR II	Belgium	Turnover €3 million		
		Tourist beds 580,000		
		One-day tourism turnover €630 million	2009	
	Denmark	Turnover €2 billion	2007	
		Full-time employment 14,488		
	France	Volume (nights) 28 million people	2008	
		Employment 99,000		
	Germany	Number of nights 41.2 million	2009	
		Number of day guests 52 million	2011	
		Employment 60,683	2010	
		Turnover (overnight and day-guests) €4 billion	2011	
	Netherlands	Direct Employment 80,000	Large time frame (1995 – 2007)	
		Indirect employment 30,000		
		8.3 million day trips and 4 million over night visitors annually (14 million nights total)		
		650, 000 recreational anglers: Value €165 million	2007	
	Norway	GDP €3 billion	2007	
		Expenditure from leisure home owners €242 -363 million		
		Expenditure of recreational fishermen €175 million	2011	
		Employment 29,400	2007	
	Sweden	Turnover €7 – €9 billion		
		Employment 38,878 – 53,466 Employment onshore: 370		
		Number of calls: 379		
		Passengers: 471,182		
		Turnover on shore €60 million		
		Leisure boats 414,000		
		Overnight stays: 1.164 million		
	UK	Proportion of GVA for leisure and recreation activities: €823 million	2007	
Summary				

OSPAR III	France	1: Unknown; Nothing reported for this region		
	Ireland	GVA -€453 million		
		% GDP Accounts for 7% of Irish economy = €453 million	2003, 2007	
		Turnover - €944 million		
		Full-time Employment 5,836		
		Average expenditure per person: €444		
		Number of vessels:130		
		Number of passengers 102,000		
	UK	Proportion of GVA for leisure and recreation activities: €732 million		
Summary			2007	
OSPAR IV	France	Volume (nights) 56 million people		
		Employment 103,000		
	Portugal	Employment 438,500	2008	
		GVA €6 billion		
		Number of visitors 174,156	2008	
		Employment 20,200	2010	
	Spain	Number of tourists 5.3 million	2008	
		Employment (sector) 477,531	2006	
		Active employment 395,909	2010	
		Contribution to GDP €20 billion	2009	
Summary			2009	

Ports and Shipping

Country	MSFD sea-region	Data (Euros in 2012 prices)	Year of data	Notes on Data
Belgium	OSPAR II	Maritime traffic (tonnes) 266.9 million	2008	
		Gross tonnage 4 million tonnes	2010	
		DWT 6.5 million tonnes	2010	
		Port GVA: Direct: €15 billion Indirect: €13 billion		
		Employment Direct: 107,940 Indirect: 137,225		
Denmark	OSPAR II	Turnover €22 billion	2007	
		Employment 10,000	2010	
France	OSPAR II OSPAR III OSPAR IV	Goods transported: 239.2 million tonnes		
		Passengers: 16.8 million		
		Employment (marina only) 2,500		
Germany	OSPAR II	Goods handled 219.1 million tonnes	2010	
		Companies 360		
		Employment 18,000		
Ireland	OSPAR III	GVA €329 million	2003, 2007	
		Turnover €889 million		
		FTE employment 2194		
		Exports €294 million		
Netherlands	OSPAR II	Sea ports: Production Value €80 billion Value Added €18 billion Employment (FTE) 121,000	2007	Aggregated for Dutch continental shelf. Detailed data in annex
		Shipping: Production €5 billion GVA €1 billion Employment 7,637 Throughput: 513 million tonnes	2007 2009	
Norway	OSPAR II	GDP of shipping €5 billion	2009	Aggregated data
		Employment 23,960		
Portugal	OSPAR IV	Number of trips 70,300 (cargo and passenger ships)	2010	Data for specific years

		Passengers 537,303		Marginal data Cost-based Approach was applied with quantitative data outcome
		Moorings 8,649		
Spain	OSPAR IV	Number of ships 44,275	2009	Distribution factors applied to some national data to obtain figures at the demarcation level (*e.g*. Based on regional GDP levels, production value, traffic levels, number of licenses granted, employment etc.)
		Gross tonnage 488.4 million tonnes		
		Passengers 7 million		
		Tonnes loaded and unloaded 171.5 million tonnes		
		Number of companies 100		
		GVA €149 million		
		Employment 2,343		
Sweden	OSPAR II	Full time employment 12,945	2009	Shipping: Some information on shipping reported under oil spills (shipping tankers and non-tankers explicitly mentioned) Limited quantitative descriptions
		Production Turnover €4 billion		
		GVA €358 million		
		Amount of Oil transported (Domestic and international) 2.426 million (m^3)		
		Full time employment 1,838	2009	
		Production Turnover €386 million		
		GVA €27 million		
UK	OSPAR II OSPAR III	Turnover €16 billion	2007: Ports	Employment figures are for both shipping and ports
		GVA €8 billion		
		Production 6 million tonnes		
		Number of ports 650		
		Turnover €2 billion	2007: Ship building	
		GVA €1 billion		
		Ancillary Turnover €414 million GVA €147 million		
		Employment 394,446		
		Turnover €12 billion	2007: Shipping	
		GVA €6 billion		
		Fleet capacity 213,000 tonnes		
		Number of vessels 6,763		
Summary				

Sea-Region	Country	Data (Euros in 2012 prices)	Year of data	Notes on Data
OSPAR II	Belgium	Maritime traffic (tonnes) 266.9 million	2008	
		Gross tonnage 4 million tonnes	2010	
		DWT 6.5 million tonnes	2010	
		Port GVA Direct: €15 billion Indirect: €13 billion		
		Employment Direct: 107,940 Indirect: 137,225		
	Denmark	Turnover €22 billion	2007	Data from a variety of sources and state that it is not possible to calculate across sectors
		Employment 10,000	2010	
	France	Goods transported 191 million tonnes	2010	
		Passengers 16.8 million		
		Employment (marina only) 2,500		
	Germany	Goods handled 219.1 million tonnes	2010	Lack of other socio-economic data
		Companies 360		
		Employment 18,000		
	Netherlands	Production Value €80 billion	2007	Sea port data, aggregated for Dutch continental shelf. Data not actually used, but is mentioned in some detail in annex
		Value Added €18 billion		
		Employment (FTE) 121,000		
		Production €5 billion	2007	
		GVA €1 billion		
		Employment 7,637		
		Throughput: 513 million tonnes	2009	
	Norway	GDP of shipping €5 billion	2009	Aggregated data
		Employment 23,960		
	Sweden	Full time employment 12,945	2009	Limited quantitative descriptions
		Production Turnover €4 billion		
		GVA -€358		
		Amount of Oil transported (Domestic and international) 2.426 million (m^3)		
		Full-time employment 1,838	2009	
		Production Turnover €386 million		
		GVA €27 million		

	UK	Amount of freight 392.4 million tonnes	2007	Data is only provided in CP2 regions for freight and value of freight. None of the other data provided can be broken down into OSPAR regions.
		Value €4 billion		
Summary				
OSPAR III	France	1: Unknown; No data recorded for this region		
	Ireland	GVA €329 million		
		Turnover €889 million	2003, 2007	
		FTE employment 2194		
		Exports €294 million		
	UK	Amount of freight: 173.2 million tonnes		Data is only provided in CP2 regions for freight and value of freight. None of the other data provided can be broken down into OSPAR regions
		Value €2 billion	2007	
Summary				
OSPAR IV	France	Goods transported 48.2 million tonnes		
		Passengers: low activity		
	Portugal	Number of trips 70,300 (cargo and passenger ships)	2010	Data for specific years Marginal data Cost-based Approach was applied with quantitative data outcome
		Passengers 537,303		
		Moorings 8,649	2010	
	Spain	Number of ships 44,275		Distribution factors applied to some national data to obtain figures at the demarcation level (*e.g*. Based on regional GDP levels, production value, traffic levels, number of licenses granted, employment etc.)
		Gross tonnage 488.4 million tonnes		
		Passengers 7 million	2009	
		Tonnes loaded and unloaded 171.5 million tonnes		
		Number of companies 100		
		GVA €149 million		
		Employment 2,343		
Summary				

Aquaculture

Country	MSFD sea-region	Data (Euros in 2012 prices)	Year of data	Notes on Data
Belgium	OSPAR II	1: Unknown; Nothing reported		
Denmark	OSPAR II	Turnover €47 million	2009	Emphasised that the data used come from a number of different sources and years.
		Employment 152		
		Exports €42 million		
France	OSPAR II OSPAR III OSPAR IV	Turnover €668 million	2009	Temporal scale of data varies as well as spatial scale
		GVA €354 million		
		Employment 8,695		
Germany	OSPAR II	3.Activity level is unknown as it is considered in aggregation with fishery		Employment and gross value added are given for the entirety of the fishing sector.
Ireland	OSPAR III	Turnover €106 million	2007	
		GVA €42million		
		Exports €23 million		
		Production 48,350 tonnes		
		Licenses 573		
		Employment 1,981 (686 full time; 478 part time; 817 seasonal)		
Netherlands	OSPAR II	2: Aquaculture does not occur on the DCS		
Norway	OSPAR II	GDP €269 million	2009	
Portugal	OSPAR IV	Production 7,893 tonnes	2006	Marginal data
		Employment 2,300	2010	
		Turnover €925 million	2009	
		GVA €3 million	2010	
Spain	OSPAR IV	Production 215.6 million kg	2009	Distribution factors applied to some national data to obtain figures at the demarcation level
		Value (Turnover) €209 million		
		GVA €70		
		Employment 22,869	2008	
Sweden	OSPAR II	Production 7,851 tonnes	2010	3: Mainly covered under commercial fishing
		Producing businesses 200 (stocking and consumption)		
		Net turnover €38 million		
		Number of enterprises 125		

		Full-time employment 223		
UK	OSPAR II OSPAR III	Regional production of shellfish Total: 27,410 tonnes	2007	Scotland: 5,053 tonnes England: 3,905 tonnes Wales: 10,027 tonnes Northern Ireland: 8,425 tonnes
		Regional Value: Total: €28 million	2007	Scotland: €6 million England: €6 million Wales: €9 million Northern Ireland: €7 million
		Employment UK full time 1812 UK part time 686 FTE 2163 (England 713, Scotland 605)	2007	Limited employment data even by country
Summary				

MSFD sea-region	Country	Data (Euros in 2012 prices)	Year of data	Notes on Data
OSPAR II	Belgium	1: No data reported for Belgium		
	Denmark	Turnover €47 million	2009	Emphasised that the data used come from a number of different sources and years.
		Employment 152		
		Exports €42 million		
	France	Turnover €230 million	2009	
		GVA € 112 million		
		Employment 2693		
	Germany	3. Activity level is unknown as it is considered in aggregation with fishery.		Employment and gross value added are given for the entirety of the sector
	Netherlands	2: Aquaculture does not occur on the DCS		
	Norway	GDP €269 million	2009	
	Sweden	Production 7,851 tonnes (2010)	2010	3. Mainly covered under commercial fishing
		Producing businesses 200 (stocking and consumption)		
		Net turnover €38 million		
		Number of enterprises 125		
		Full-time employment 223		
	UK	Total aquaculture value €201 million	2007	No other socio-economic data available in OSPAR regions
		Total GVA €110 million		
Summary				

OSPAR III	France	1: Unknown; No data reported for this region		
	Ireland	Turnover €106 million	2009	
		GVA €42 million	2007	
		Exports €23 million		
		Production 48,350 tonnes		
		Licenses 573		
		Employment 1,981 (686 full time; 478 part time; 817 seasonal)		
	UK	Total aquaculture value €231 million	2007	No other socio-economic data available in OSPAR regions
		Total GVA €127 million		
Summary				
OSPAR IV	France	Turnover €458 million		No numbers for volume, number of companies or sector specific information
		GVA €242 million		
		Employment 6,002	2009	
	Portugal	Production 7,893 tonnes		Data for specific years Marginal data
		Employment 2,300		
		Turnover € 925 million	2006	
		GVA €3 million	2010	
	Spain	Production 216 million kg	2009	Distribution factors applied to some national data to obtain figures at the demarcation level
		Value (Turnover) €209 million	2010	
		GVA €70	2009	
		Employment 22,869		
Summary				

Oil and Gas

Country	MSFD sea-region	Data (Euros in 2012 prices)	Year of data	Notes on Data
Belgium	OSPAR II	1: Unknown; Nothing reported		
Denmark	OSPAR II	State revenues €3 billion	2010	Data from a variety of sources and state that it is not possible to calculate across sectors. No primary WTP studies but mention of a German oil spill
		Employment 1,734		
France	OSPAR II OSPAR III OSPAR IV	1: Unknown; No data recorded		
Germany	OSPAR II	Oil extraction 2 million tonnes	2009	No data for investment or GVA
		Gas extraction 1.2 billion m^3	2008 - 2011	
		Employment 14,000		
		Turnover €8 billion		
		Number of companies 78		
Ireland	OSPAR III	GVA €137 million	2003, 2007	
		Turnover €197 million		
		Full time employment 790		
Netherlands	OSPAR II	Production €76 billion	2007	Aggregated for Dutch continental shelf.
		Value Added €6 billion		
		Employment 2,800 (offshore only)		
Norway	OSPAR II	GDP €42 billion	2009	Data for oil and gas production in and outside the Norwegian parts of the North Sea.
		Employment 120,000	2010	
Portugal	OSPAR IV	Investment €165 million	2007-2012	Data for specific years Marginal data
Spain	OSPAR IV	1: Unknowns; No or limited data available for the oil and gas sector		
Sweden	OSPAR II	2: At present there are no commercial or pilot scale extractions for energy purposes. Oil transported: 1,245,200 t/yr	2009	Do not expect offshore oil or gas extraction to become a commercial activity in Sweden during the period up to 2050.
UK	OSPAR II OSPAR III	Production GVA €46 million	2008	No other data and no regional data available
		Employment 578,000		
Summary				

MSFD sea-region	Country	Data (Euros in 2012 prices)	Year of data	Notes on Data
OSPAR II	Belgium	1: Unknown; Nothing reported for Belgium		
	Denmark	State revenues €3 billion	2010	Data from a variety of sources and state that it is not possible to calculate across sectors. No primary WTP studies but mention of a German oil spill
		Employment 1,734		
	France	1: Unknown; Nothing reported for this region		
	Germany	Oil extraction 2 million tonnes	2009	No data for investment or GVA
		Gas extraction 1.2 billion m^3	2008 - 2011	
		Employment 14,000		
		Turnover €8 billion		
		Number of companies 78		
	Netherlands	Production €76 billion		Aggregated for Dutch continental shelf.
		Value Added €6 billion		
		Employment 2,800 (offshore only)		
	Norway	GDP €42 billion	2009	Data for oil and gas production in and outside the Norwegian parts of the North Sea.
		Employment 120,000	2010	
	Sweden	2: At present there are no commercial or pilot scale extractions for energy purposes. Oil transported: 1,245,200 t/yr	2009	Do not expect offshore oil or gas extraction to become a commercial activity in Sweden during the period up to 2050.
	UK	Value of the sector €44 billion	2008	No other regional data provided
		Oil 2744 km2 Gas 2744 km2	2008	
Summary				
OSPAR III	France	1: Nothing reported for this region		
	Ireland	GVA €137 million		
		Turnover €197 million	2003, 2007	
		Full time employment 790		
	UK	Value of the sector €1 billion		No other regional data provided
		Oil 4 km2 Gas 214 km2	2008	
Summary				

OSPAR IV	France	1: Unknown; Nothing reported for this region		
	Portugal	Investment €165 million		Data for specific years Marginal data
	Spain	1: Unknown; No or limited data available for the oil and gas sector		
Summary			2007-2012	

Renewable Energy

Country	MSFD sea-region	Data (Euros in 2012 prices)	Year of data	Notes on Data
Belgium	OSPAR II	1: Unknown		
Denmark	OSPAR II	Turnover €174 million	2010	Data from a variety of sources and state that it is not possible to calculate across sectors.
		Employment 5,000		
France	OSPAR II OSPAR III OSPAR IV	1: Unknown; Nothing reported		Qualitative description and non-monetary data, related to different themes
Germany	OSPAR II	Number of turbines 30		Various timescales are used Starting in 1989, and reported in time periods and sometimes by year. Appears dependent upon data availability as different datasets used
		Employment 7,400	2011	
		Turnover €75 billion	2010	
		Number of companies 131	2011	
Ireland	OSPAR III	GVA €4 million	2003, 2007	Benefit study
		Turnover €6 million		
		Full time employment 101		
		Invested €1 billion		
Netherlands	OSPAR II	Production €241 million	2007	Aggregated for Dutch continental shelf. The costs of the measures taken on land are not taken into account for this study.
		GVA €129 million		
Norway	OSPAR II	2: Zero Activity; Currently no commercial wind farms in Norway.		All assessments of possible impacts in this report are mainly based on existing knowledge from projects outside Norway.

Portugal	OSPAR IV	1: Unknown; No or limited data available for renewable energies		
Spain	OSPAR IV	3: Data is covered in other national reports		
Sweden	OSPAR II	Turnover €1 billion	2009	Limited quantitative descriptions
		Employment 1,700		
UK	OSPAR II OSPAR III	Capacity (operational) 674 MW	2007	No other data available for renewable energy. No employment figures.
		Number of turbines (operational) 228		
		Area (operational) 80km2		
		Investment €1 billion		
		Turnover €204 million		Includes wind farm, wave, tidal resource
		GVA €61 million		Includes wind farm, wave, tidal resource
Summary				
MSFD sea-region	**Country**	**Data (Euros in 2012 prices)**	**Year of data**	**Notes on Data**
OSPAR II	Belgium	1: Unknown; No data available for Belgium		
	Denmark	Turnover €174 million	2010	Data from a variety of sources and state that it is not possible to calculate across sectors.
		Employment 5,000		
	France	1: Unknown; No data available for this region		
	Germany	Number of turbines 30		Various timescales are used Starting in 1989, and reported in time periods and sometimes by year. Appears dependent upon data availability as different datasets used.
		Employment 7,400	2011	
		Turnover €75 billion	2010	
		Number of companies 131	2011	
	Netherlands	Production €241 million	2007	The costs of the measures taken on land are not taken into account for this study. Aggregated for Dutch continental shelf.
		Value Added €129 million		
	Norway	2: Zero Activity; Currently no commercial wind farms in Norway.		All assessments of possible impacts in this report are mainly based on existing knowledge from projects outside Norway.
	Sweden	Turnover €1 billion	2009	
		Employment 1,700		
	UK	Turnover €104 million	2007	The only data that is available is from the areas where the wind farms are set up. These were then put into CP2 region and then separated into OSPAR regions
		GVA €31 million		
		Investment in wind farms €638 million		

Summary				
OSPAR III	France	1: Unknown; No data available for this region		
	Ireland	GVA €4 million		Benefit study
		Turnover €6 million	2003, 2007	
		Full time employment 101		
		Invested €1 billion		
	UK	Turnover €100 million		The only data that is available is from the areas where the wind farms are set up. These were then put into CP2 region and then separated into OSPAR regions.
		GVA €30 million	2007	
		Investment in wind farms €567 million		
Summary				
OSPAR IV	France	1: Unknown; No data available for this region		
	Portugal	1: Unknown; No data available or recorded for Portugal		
	Spain	3: Data is covered in other national reports		
Summary				

Aggregate Extraction

Country	MSFD sea-region	Data (Euros in 2012 prices)	Year of data	Notes on Data
Belgium	OSPAR II	Turnover €265 million	2009	Different timescales from one data set to another
		GVA €31 million		
		Employment 295		
Denmark	OSPAR II	State Revenue €3 million	2010	Data from a variety of sources and state that it is not possible to calculate across sectors
		Employment 340		
France	OSPAR II OSPAR III OSPAR IV	Production 6496 kt	2009	Data is provided for the 3 OSPAR regions that cover France.
		Turnover €73 million	2009	
		GVA €28 million	2008	
		Employment 665	2009	
		Firms 24	2009	
Germany	OSPAR II	1: Unknown; Nothing reported		
Ireland	OSPAR III	1: Unknown; Nothing reported		
Netherlands	OSPAR II	Production €627 million	2007	Aggregated for Dutch continental shelf.
		GVA €186 million		
		Full-time Employment 3,000		
		Production Value of sand extraction: €69 million		
		GVA sand extraction €17 million		
Norway	OSPAR II	1: Unknown; Nothing reported for Norway		
Portugal	OSPAR IV	1: Unknown; No data recorded or available		
Spain	OSPAR IV	1: Unknown		
Sweden	OSPAR II	Marine aggregates not sustainable	2009	Limited quantitative descriptions
UK	OSPAR II OSPAR III	Annual production UK total: 21 million tonnes	2007	Although regional data is provided, it cannot be broken down into CP2 regions or into OSPAR regions: Humber: 5.04 East Coast 7.72 Thames: 2.57 South Coast 5.21 English Channel 3.19 South West 1.92 North West 0.53
		Value landed (UK) €96 million (13.2 million tonnes)		
		Value exported €32 million (6.22 tonnes)		

		Total Value €143 million (21.54 tonnes)		Data is available in CP2 regions which are then separated into OSPAR regions No breakdown of employment figures by region, only by activities within the sector. Employment data does not specify whether it is full/pert time or FTE.
		GVA €67 million		
		Employment 1,745		
Summary				
MSFD sea-region	**Country**	**Data (Euros in 2012 prices)**	**Year of data**	**Notes on Data**
OSPAR II	Belgium	Turnover €265 million	2009	Different timescales from one data set to another
		GVA €31 million		
		Employment 295		
	Denmark	State Revenue €3 million	2010	Data from a variety of sources and state that it is not possible to calculate across sectors.
		Employment 340		
	France	Production 1651 kt	2009	
		Turnover €24 million	2009	
		GVA €8 million	2008	
		Employment : 465	2009	
		Firms : 12	2009	
	Germany	1: Unknown; Nothing reported		
	Netherlands	Production €627 million	2007	Aggregated data for the Dutch Continental Shelf (DCS) Hydraulic engineering figures
		GVA €186 million		
		Full-time Employment 3,000		
		Production Value of sand extraction: €69 million		
		GVA sand extraction €17 million		
	Norway	1: Unknown; Nothing reported for Norway		
	Sweden	1: Unknown; No data reported for Sweden		
	UK	Value landed €82 million	2007	No other data available in regions
		Value Exported €32 million		
		Total value €129 million		
		GVA €61 million		
Summary				
OSPAR III	France	1: Unknown; No data available for this region		

	Ireland	1: Unknown; No data available for Ireland		
	UK	Value landed €14 million		No other data available in regions
		Value Exported €0 million	2007	
		Total value €14 million		
		GVA €1 million		
Summary				
OSPAR IV	France	Production 4845 kt		
		Turnover : €49 million		
		GVA €20 million	2009	
		Employment : 190	2009	
		Firms : 12	2009	
	Portugal	1: Unknown; No data available or recorded for Portugal	2008	
	Spain	1: Unknown; Nothing reported for Spain	2009	
Summary				

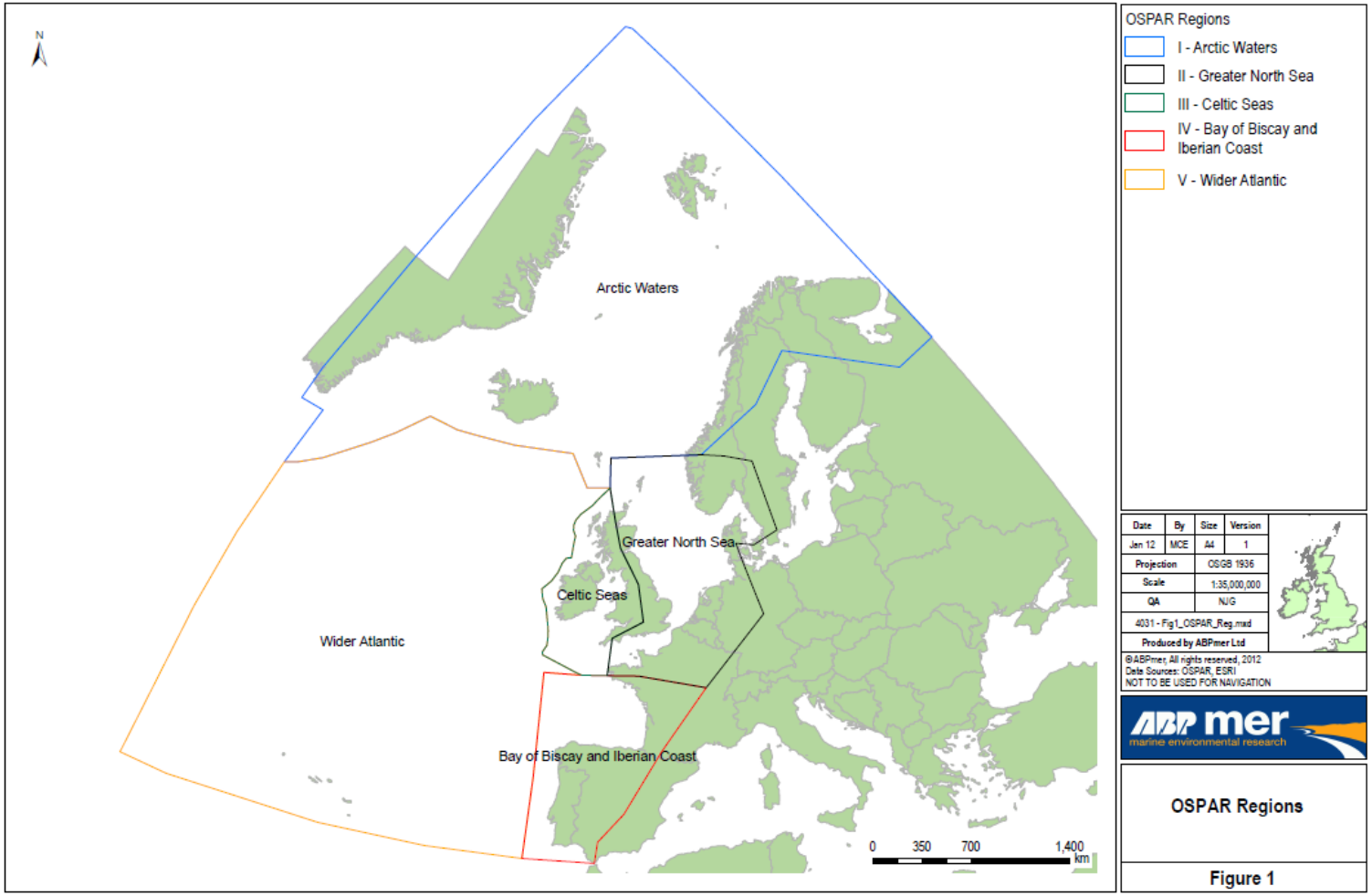
Submarine cable setting and maintenance

Country	MSFD sea-region	Data (Euros in 2012 prices)	Year of data	Notes on Data
Belgium	OSPAR II	1: Unknown; Nothing reported		
Denmark	OSPAR II	1: Unknown; Nothing reported		Mentioned very briefly and in general terms, no figures are presented.
France	OSPAR II OSPAR III OSPAR IV	Length of cables 9413km	2009	No other socio-economic data has been recorded for the OSPAR regions covering France
Germany	OSPAR II	Companies 15	2011	Mentions modelled data
		Employment 1,600		
Ireland	OSPAR III	1: Unknown; Nothing reported		
Netherlands	OSPAR II	Cost of these two cables: €600 million	2007	3: Economic value of piping and cables for wind turbines is reported under the oil and gas sector and wind energy sector
		4,000k cables in North Sea (2007)		
		Turnover: NorNed connection in 2015 will generate €51 million		
Norway	OSPAR II	1: Unknown; Nothing reported		
Portugal	OSPAR IV	Length of cables and pipelines 3,390km2 Telecommunications 6,830 km2	2010	Data for specific years Marginal data
Spain	OSPAR IV	1: Unknown; Nothing reported for Spain		
Sweden	OSPAR II	6 Cables in operation: Total Power 2810MW Total Length 1165km	2009	Limited quantitative descriptions
UK	OSPAR II OSPAR III	3: The economic value of pipelines and cables is reported within the 'Oil and Gas Sector'. Kilometres of pipelines: Gas: 9977, Oil: 3942, Other: 7386	2007	Data is broken down into CP2 regions and can be separated into OSPAR regions
Summary				

MSFD sea-region	Country	Data (Euros in 2012 prices)	Year of data	Notes on Data
OSPAR II	Belgium	1: Unknown; No data available for recorded for Belgium		
	Denmark	1: Unknown; No data available for recorded for Denmark		
	France	Length of cables 2344km	Report 2012	No other data has been recorded for this region

	Germany	Companies 15	2011	Mentions modelled data
		Employment 1,600		
	Netherlands	Cost of these two cables: €600 million	2007	3: Economic value of piping and cables for wind turbines reported under the oil and gas sector and wind energy sector
		4,000k cables in North Sea (2007)		
		Turnover: NorNed connection in 2015 will generate €51million		
	Norway	1: Unknown; No data available for recorded for Norway		
	Sweden	6 Cables in operation: Total Power 2810MW Total Length 1165km	2009	Limited quantitative descriptions
	UK	1: Unknown; No data available or reported for this sector	2007	
Summary				
OSPAR III	France	Length of cables 1,460km	2009	No other data recorded for this region
	Ireland	1: Unknown; No data available or reported for Ireland		
	UK	1: Unknown; No data available or reported for this region	2007	No other data available as the economic value of pipelines and cables is reported in the 'Oil and Gas Sector'.
Summary				
OSPAR IV	France	Length of cables 5,609km	Report 2012	No other data has been recorded for this sector.
	Portugal	Length of cables and pipelines 3,390km2 Telecommunications 6,830 km2	2010	Data for specific years Marginal data
	Spain	1: Unknown; Nothing reported		
Summary				

Annex 5: Maps


N
Arctic Waters
Greater North Sea
Celtic Seas
Wider Atlantic
Bay of Biscay and Iberian Coast
0 350 700 1,400
km
OSPAR Regions
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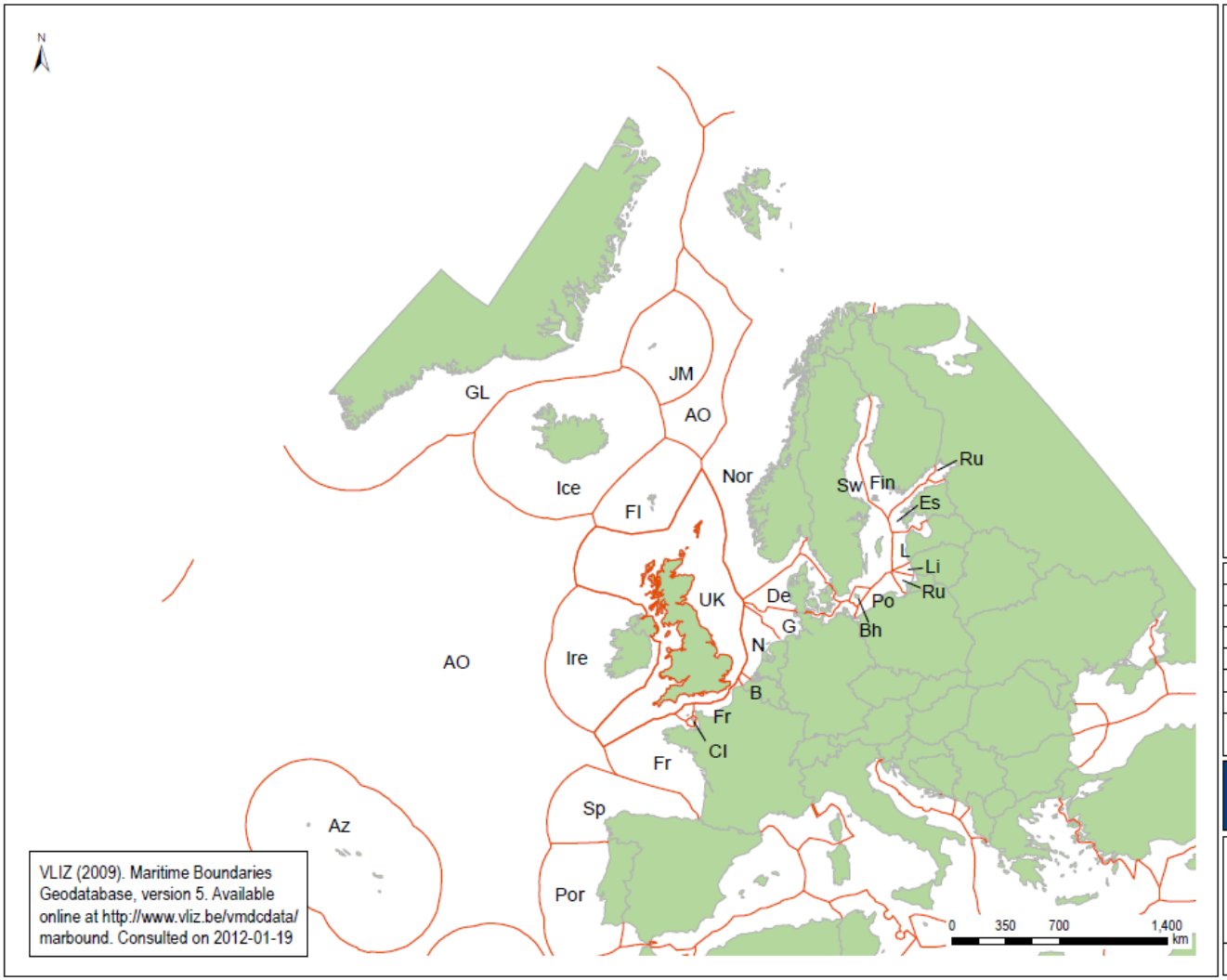
II - Greater North Sea
III - Celtic Seas
IV - Bay of Biscay and Iberian Coast
V - Wider Atlantic
Date By Size Version
Jan 12 MCE A4 1
Projection OSGB 1936
Scale 1:35,000,000
QA NJG
4031 - Fig1_OSPAR_Reg.mxd
Produced by ABPmer Ltd
© ABPmer, All rights reserved, 2012
Data Sources: OSPAR, ESRI
NOT TO BE USED FOR NAVIGATION
ABP mer
marine environmental research
OSPAR Regions
Figure 1



European Territorial Waters
AO - Atlantic Ocea
Az - Azures
B - Belgium
Bh - Bonholm
Cl - Channel Islands
De - Denmark
Es - Estonia
Fl - Faeroe Islands
Fin - Finland
Fr - France
G - Germany
GL - Greenland
Ice - Iceland
Ire - Ireland
JM - Jan Mayen
L - Latvia
Li - Lithuania
N - Neatherlands
Nor - Norway
Po - Poland
Por - Portugal
Ru - Russia
Sp - Spain
Sw - Sweden
UK - United Kingdom

Date	By	Size	Version
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Scale		1:35,000,000	
QA		NJG	
4031 - Fig2_Territorial_Water.mxd			
Produced by ABPmer Ltd			

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Data Sources: OSPAR, VLIZ (2009).
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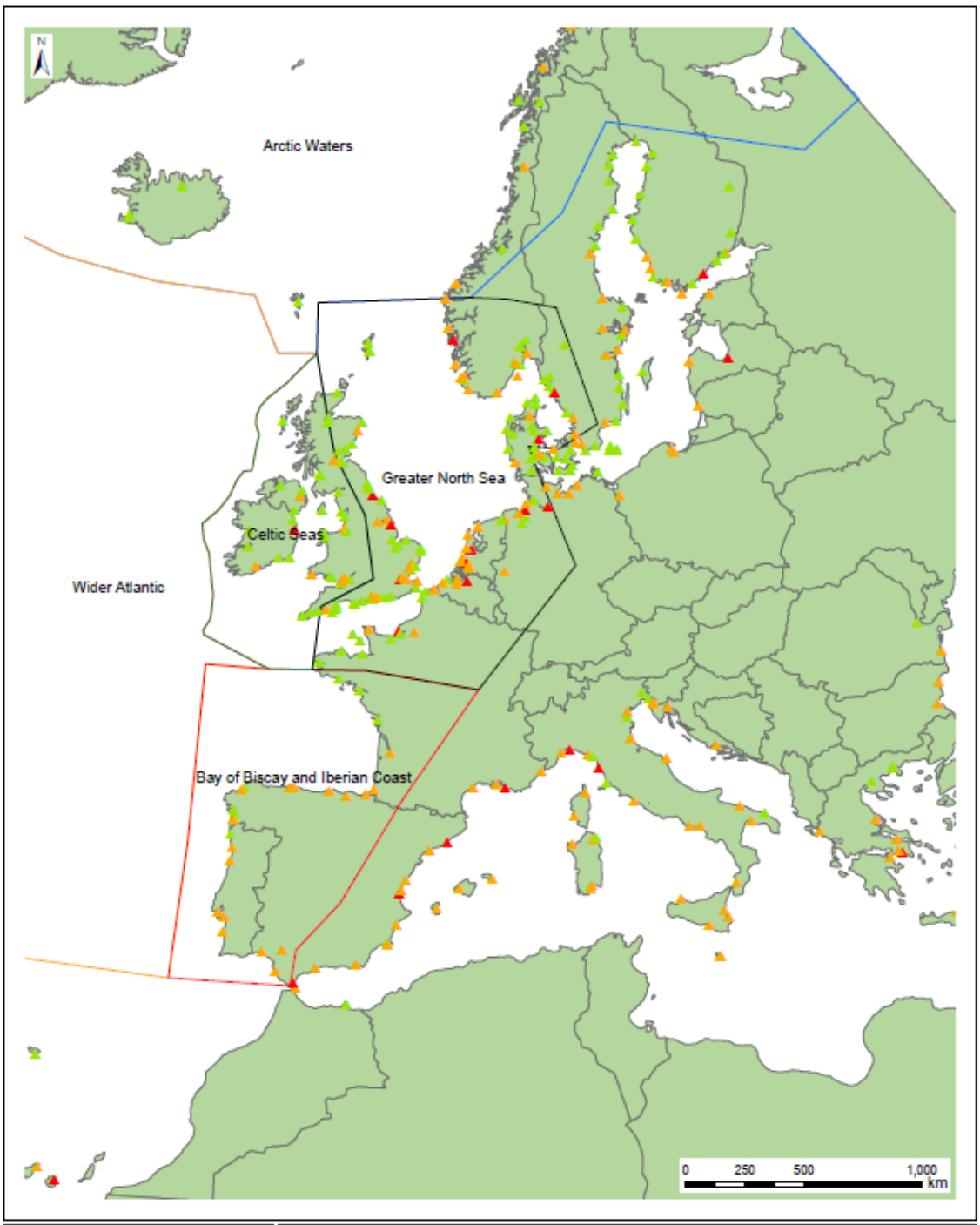
European Territorial Waters

Figure 2



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Scale		1:22,750,000	
QA		JDB	
4031 - Fig3_Ports.mxd			
Produced by ABPmer Ltd			

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Sources: ESRI
NOT TO BE USED FOR NAVIGATION

European Ports
- Large
- Medium
- Small

- I - Arctic Waters
- II - Greater North Sea
- III - Celtic Seas
- IV - Bay of Biscay and Iberian Coast
- V - Wider Atlantic

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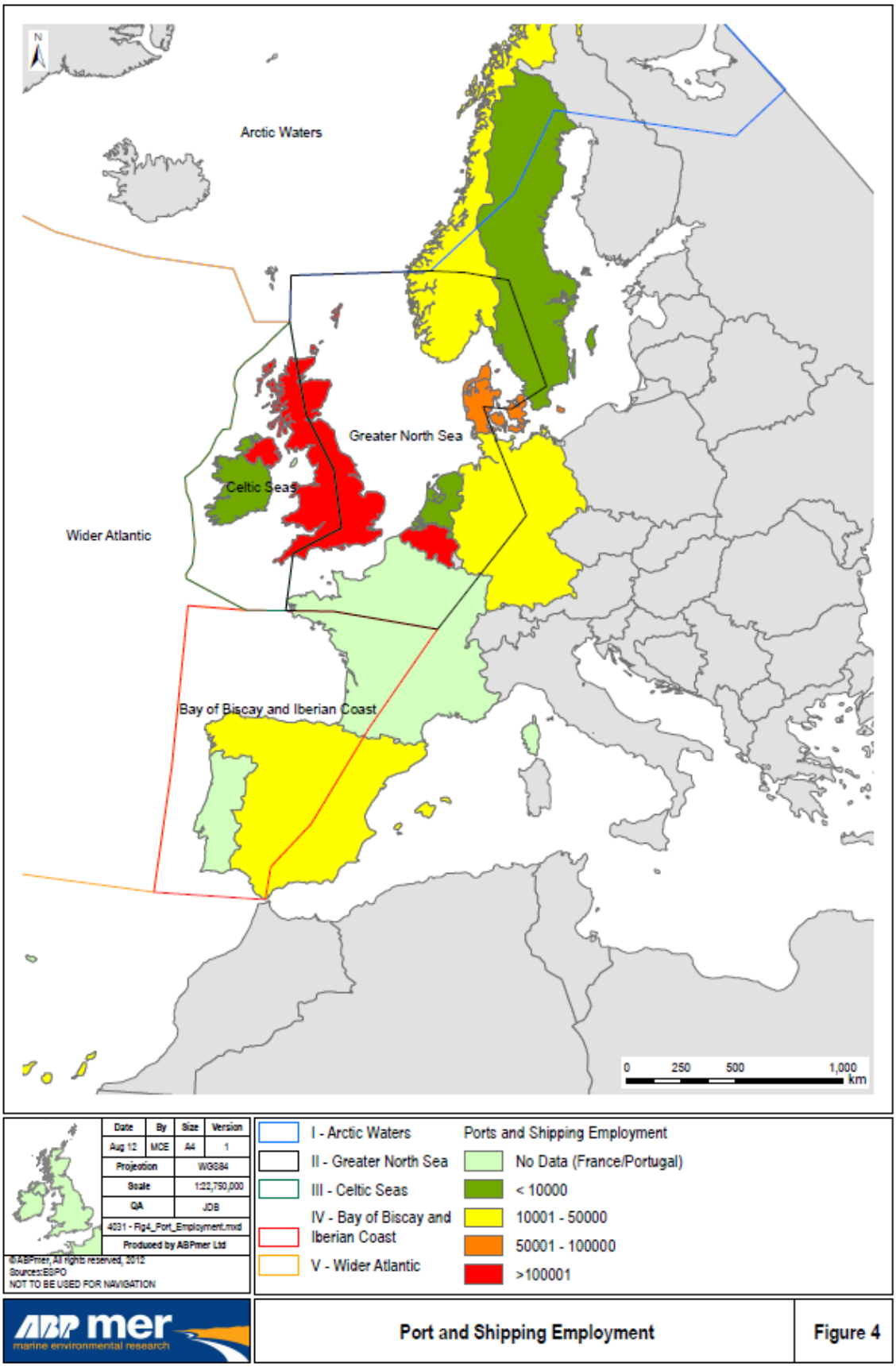
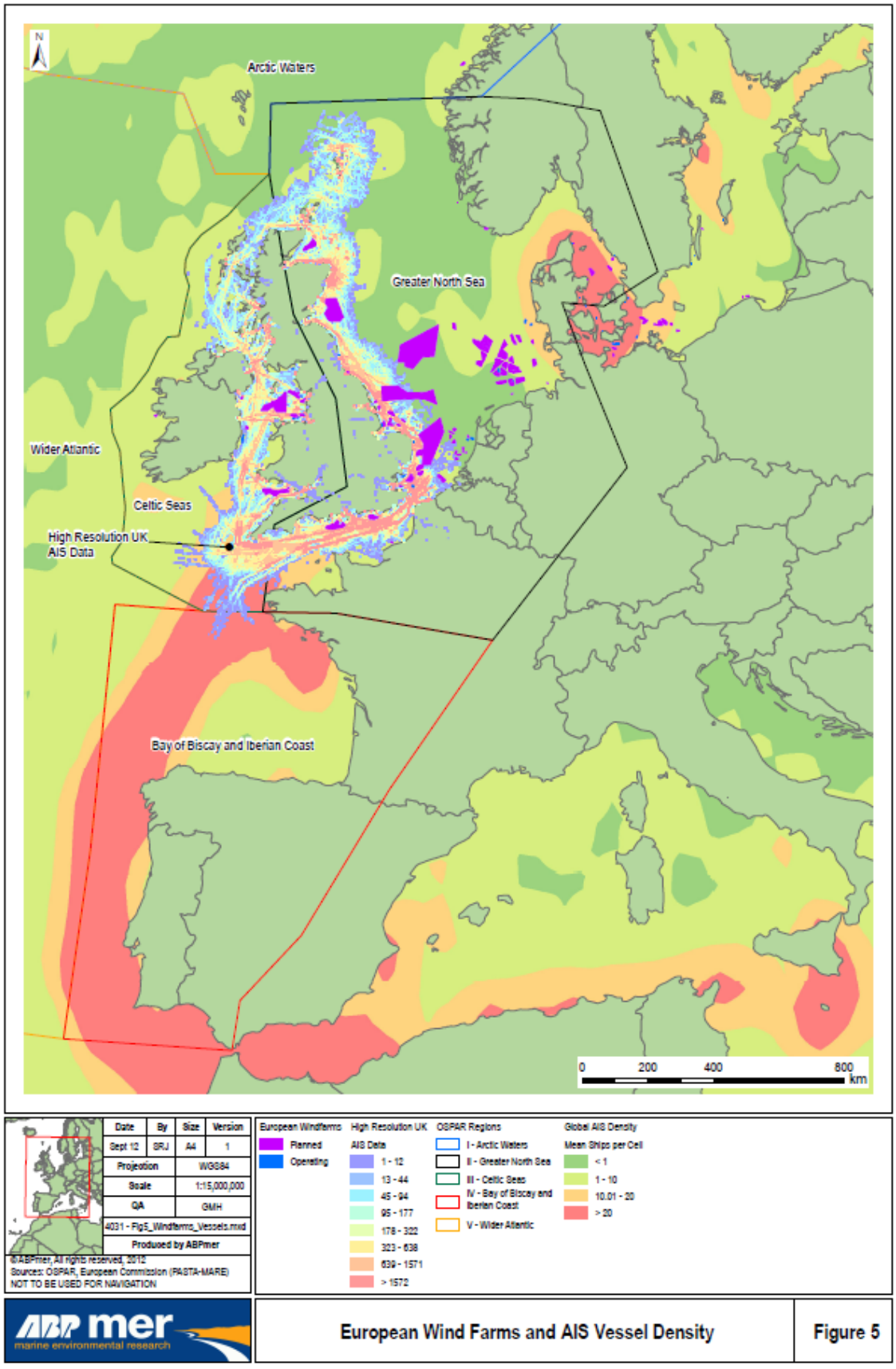
European Ports | **Figure 3**


N
Arctic Waters
Greater North Sea
Celtic Seas
Wider Atlantic
Bay of Biscay and Iberian Coast
0 250 500 1,000
km
Date By Size Version
Aug 12 MCE A4 1
Projection WGS84
Scale 1:22,750,000
QA JDB
4031 - Fig4_Port_Employment.mxd
Produced by ABPmer Ltd
©ABPmer, All rights reserved, 2012
Sources:ESPO
NOT TO BE USED FOR NAVIGATION
I - Arctic Waters
II - Greater North Sea
III - Celtic Seas
IV - Bay of Biscay and Iberian Coast
V - Wider Atlantic
Ports and Shipping Employment
No Data (France/Portugal)
< 10000
10001 - 50000
50001 - 100000
>100001
ABP mer
marine environmental research
Port and Shipping Employment
Figure 4



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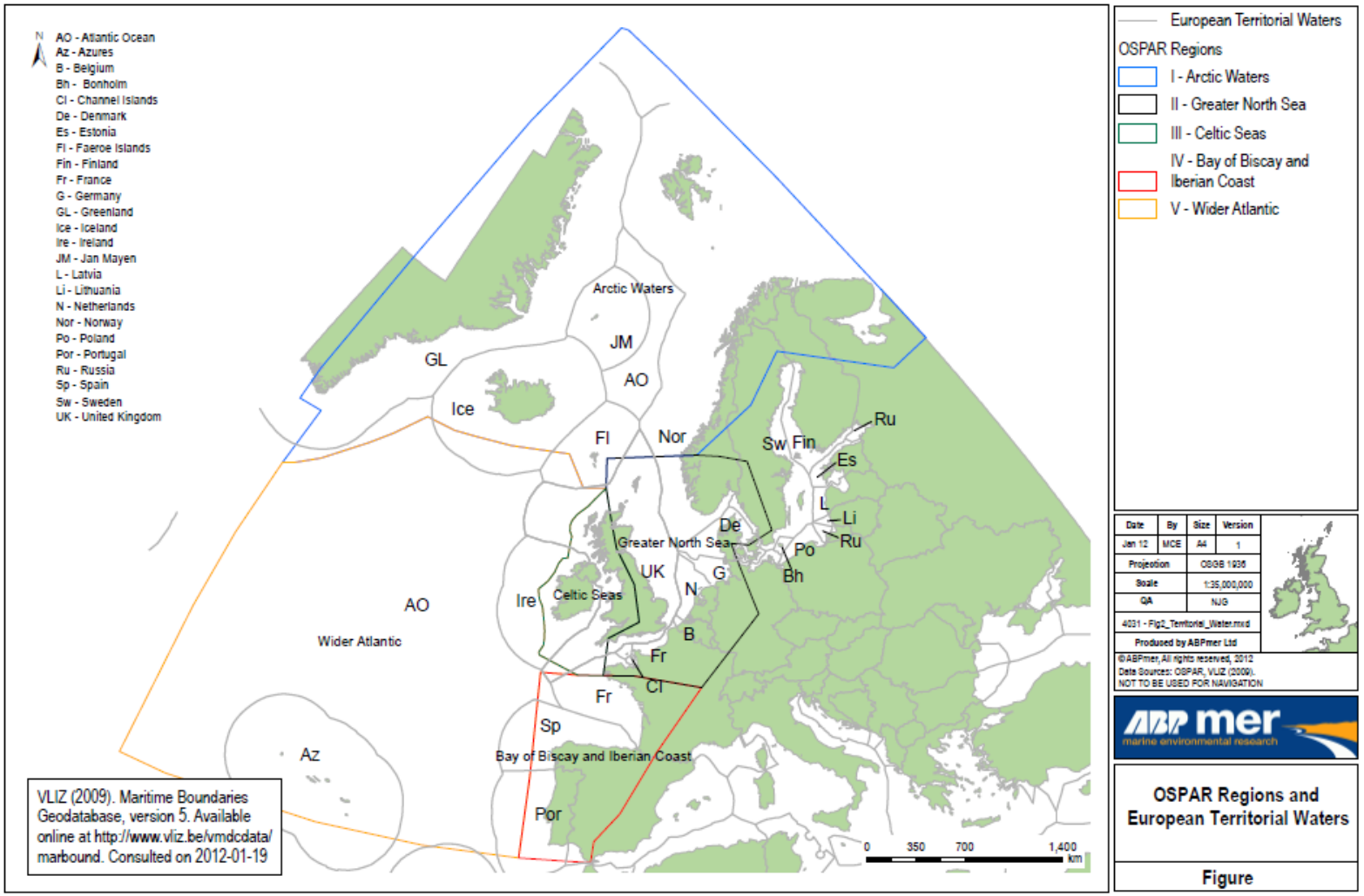
European Wind Farms and AIS Vessel Density | **Figure 5**


AO - Atlantic Ocean
Az - Azures
B - Belgium
Bh - Bonholm
CI - Channel Islands
De - Denmark
Es - Estonia
FI - Faeroe Islands
Fin - Finland
Fr - France
G - Germany
GL - Greenland
Ice - Iceland
Ire - Ireland
JM - Jan Mayen
L - Latvia
Li - Lithuania
N - Netherlands
Nor - Norway
Po - Poland
Por - Portugal
Ru - Russia
Sp - Spain
Sw - Sweden
UK - United Kingdom
Arctic Waters
JM
AO
GL
Ice
FI
Nor
Sw
Fin
Ru
Es
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Li
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De
Greater North Sea
Po
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VLIZ (2009). Maritime Boundaries Geodatabase, version 5. Available online at http://www.vliz.be/vmdcdata/marbound. Consulted on 2012-01-19
European Territorial Waters
OSPAR Regions
I - Arctic Waters
II - Greater North Sea
III - Celtic Seas
IV - Bay of Biscay and Iberian Coast
V - Wider Atlantic
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Data Sources: OSPAR, VLIZ (2009).
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Figure

Figure 6

Annex 6: Criteria used to assess regional ESA data actions

The criteria in Table D1 were used in the OSPAR Regional Economic and Social Assessment for the Marine Strategy Framework Directive (eftec, 2010).

Table D1. Definition of feasibility criteria

Criteria	Definition	Preferred Characteristic	Weighting
Screening criteria			
Complies with the minimum legal requirements of MSFD	Assessed with reference to analysis of economic and social requirements of the MSFD (including with reference to ongoing COWI study for the EC)	Compliance	One failure means approach is rejected.
Ability to compare between Member States	Provides a common structure of method and reporting framework allowing delivery of reports for areas of sea across political boundaries	Comparability	
Approach is methodologically valid	In line with established practice and published methods	Validity	
Links to DPSIR & scenario analysis are applied	DPSIR & scenario analysis are applied for problem scoping and scenario formulation	Applied	
Not obviously inefficient	Approaches that duplicate large amounts of effort and ignore economies of scale and shared needs (*e.g*. isolated approaches) are invalid.	Efficiency	
Feasibility criteria – procedural			
Additional cost	Level of additional cost against current resources	Lower cost	High
Human resource availability	Delivery using current levels of human resources, (*e.g*. with skills in marine economics and social sciences incl. marine governance – this reflects the extent that methods understood by/acceptable to professional groups)	Within existing resources	Medium
Required coordination	Would unanimity of effort be essential, desirable, or is there flexibility to accommodate different national approaches?	Flexibility	Medium
Delivery within MSFD timelines	Ability to be completed within the deadlines required by the MSFD	Fits timelines	High

Table D1. Definition of feasibility criteria			
Criteria	**Definition**	**Preferred Characteristic**	**Weighting**
Avoids duplication of effort across different scales of analysis	Allows for data to be reorganised over different spatial- and temporal- scales to meet different needs of MSFD (*e.g*. analysis of different descriptors/ measures, different economic requirement of Directive)	Flexibility	High
Prospects for external funding	Eligibility and suitability for external funding	Stronger prospects	High
Feasibility criteria - technical			
Consistent with DPSIR framework	Consistent at least with PSI- process: information on state (baseline), pressures and impacts (marginal change), and can be adjusted to analyse recommended responses.	Consistency	High
Consistent with ecosystem approach	At least partly consistent with principles for ecosystem-based approach.	Consistency	High
Sufficient supporting data available	Utilises monitoring/ impact data from marine science and social science. Availability of economic data on: economic activity in various marine sectors; the benefits of environmental improvements (*i.e*. market and non-market goods and services); and costs of action, are assessed in Appendix II.	Supported by data	High
Deals with uncertainty and local/global irreversibility	Able to recognise non-linear trends/changes in impacts	Handles non-linearity	Medium
Replicability	Method can be applied consistently in different contexts, and repeated during peer review (for comparability purposes), facilitating coordination where required	Replicable	High
Has SMART indicators	Outputs that summarise the analysis should be specific, measurable, acceptable, replicable and include a time dimension	SMART	Medium
Flexibility in the 'resolution' of the method	Can handle analysis/ utilise data at both low resolution (on-off comparisons; *i.e*. large scale aggregate data) and high resolution (marginal changes; *i.e*. changes due to MSFD).	Flexibility	Medium

Table D1. Definition of feasibility criteria			
Criteria	**Definition**	**Preferred Characteristic**	**Weighting**
Degree to which method is flexible over time	Ability to update analysis with new data: Easy (*i.e*. inflation / other parameters can be adjusted for) or difficult (*i.e*. entire method has to be repeated).	Flexibility	Medium
Feasibility criteria – decision-support			
Flexible enough to reflect key priorities	Enables different levels of detail on different environmental pressures as relevant to different Member States/areas of sea	Flexibility	High
Fit with decision context	Local, national, regional scales for different issues. Supports CEA for agreed objectives Supports CBA in areas of conflict (*e.g*. consideration of disproportionate costs) Supports deliberative techniques and use of involvement strategies/ tools in areas of conflict	Fits	High
Provides good links to the wider economic requirements of the MSFD	Provides inputs to subsequent required analysis (*e.g*. assessments of disproportional costs) or is an integral part of this analysis	Links well	Medium
Capacity to undertake spatial analysis	Suitability to integration with spatial data (*i.e*. from GIS systems), *e.g*. for a pressure analysed across a regional sea drainage basin, including new information in future as it becomes available	Spatial capacity	Medium

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OSPAR's vision is of a clean, healthy and biologically diverse North-East Atlantic used sustainably

ISBN 978-1-909159-44-0
Publication Number: 611/2013

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