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Study on the Economic Impact of Maritime Spatial Planning

Final Report

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List of acronyms

Name	Company/Organisation
ADP	Areas Designated for Preservation (Rhode Island)
AIS	Automatic Identification System
APC	Areas of Particular Concern (Rhode Island)
AVR	Annual Variation Rate
BBN	Bayesian Belief Network
BG	Blue Growth
BPA	Biodiversity Planning Assessment
BPNS	Belgian Part of the North Sea
CBA	Cost-Benefit Analysis
CCMP	Clyde to the Clyde Marine Planning Partnership
CCS	Carbon Capture and Storage
CEA	Cost-effective Analysis
CFRF	Commercial Fisheries Research Foundation (Rhode Island)
CI	Cumulative Impact
CRMC	Coastal Resources Management Centre (Rhode Island)
CZMA	Coastal Zone Management Act (US)
DCF	Data Collection Framework
DG	Directorate General
DST	Decision Support Tool
EBM	Ecosystem-Based Management
EC	European Commission
EEZ	Exclusive Economic Zone
ENOW	Economics National Ocean Watch (US)
EIO	Environmental Input-Output
EU	European Union
FCA	Fishery Cooperative Association
FDEE	Final Direct Economic Effects
FTE	Full-Time Equivalent
GBRMPA	Great Barrier Reef Marine Park Authority
GBSP	German Baltic Sea Plan
GDP	Gross Domestic Product
GES	Good Environmental Status
GIS	Geographic Information System
GVA	Gross Value Added
HAB	Habitat Advisory Board (Rhode Island)
HELCOM	Helsinki Commission
IA	Impact Assessment
ICZM	Integrated Coastal Zone Management
IDEE	Initial Direct Economic Effects
IMO	International Maritime Organisation
I-O	Input-Output
IOC	Intergovernmental Oceanographic Commission
JRC	Joint Research Centre
LME	Large Marine Ecosystem
MARKET	Modelling Approach to Resource economics decision-maKing in EcoaquaculTure
MEPA	Marine Environmental Protection Act (Belgium)
MoD	Ministry of Defence (Scotland)
MPA	Marine Protected Area
MPCI	Marine Potential Conflict Index
MSP	Maritime Spatial Planning
NACE	Nomenclature statistique des activités

Name	Company/Organisation
	économiques dans la Communauté européenne
NGO	Non-Governmental Organisation
nm	Nautical Miles
NMP	National Marine Plan (Scotland)
NOAA	National Oceanographic and Atmospheric Administration (US)
NOP	National Ocean Policy
NSI	National Statistical Institute
OECD	Organisation for Economic Co-operation and Development
OSPAR	Oslo Paris Commission/Convention
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PRODCOM	PRODuction COMmunity
RDBM	Relational Data Base Management System
RDMW	Regional District of Mount Waddington
REZ	Renewable Energy Zone (Rhode Island)
SAMP	Special Area Management Plan (Rhode Island)
SIMSP	Shetland Islands’ Marine Spatial Plan
SIOT	Symmetric Input-Output Table
SSCF	Small Scale Coastal Fisheries
SSMO	Shetland Shellfish Management Organisation
TFEU	Treaty on the Functioning of the European Union
UEPG	Union Européenne des Producteurs de Granulats
UNESCO	United Nations Educational, Scientific and Cultural Organisation
US	United States
VMS	Vessel Monitoring System
WTP	Willingness to Pay

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Glossary

Cost-Benefit analysis: cost-benefit analysis is a framework used to determine the desirability of an investment or a policy. It is an analysis of all costs and benefits generated by an investment or a policy.

Hedonic prices: hedonic prices are used to reveal individuals' and businesses' willingness to pay for ecosystem or environmental services, for which there is no market, by looking at variations in the price of a surrogate good for which there is a market. The handbook example is the housing market: some individuals are willing to pay a premium for a house that has a nice view of the ocean. To quantify the economic value of "ocean view", one may use regression analysis and determine how much on average individuals are willing to pay for a house with a view of the ocean, compared with a house without it, all other things being equal.

Input-Output analysis: developed by the late economist Wassily Leontief, input-output analysis is a technique used to measure the interdependencies between different sectors of an economy. In the context of this study it is used to measure the indirect and induced effects of MSP on the 'non-blue economy', by describing the flows between the activities directly affected by a plan with the rest of the economy.

Market and non-market goods and services: some goods and services (and resources) can be traded in markets. For instance, a house or a haircut are a good and a service normally traded in markets. At the same time, there are goods and services that cannot possibly be traded in markets. Many natural resources – albeit not all of them – are not traded in markets either. In the context of this study, non-market goods and services are of special relevance when it comes to ecosystem services. Not all the benefits that individuals obtain from ecosystems can be traded. There is no market for cleaner air or healthier oceans, for instance. However, that does not imply that such goods and services have no value. On the contrary, economists have devised several methods to quantify their value in monetary terms, the most common of which is 'willingness to pay' (see below).

Monetary value: monetary value is the value that an individual or a business attach to a good, service or resource, expressed in units of currency. The monetary value of goods, services, and resources for which there is a market is normally revealed by prices; that is, for any quantity of goods, services or resources on the market, there will be a price that "clears" the market. However, it is not as equally straightforward to determine the monetary value of goods, services and resources for which there is no market and, consequently, no price. What is the monetary value of clean(er) air? For more details on how to determine the monetary value of non-market goods, services and resources, please see "Market and non-market goods and services" above.

Opportunity costs: opportunity costs are the benefits missed upon choosing an alternative over the other. For instance, in the context of MSP, assigning an area of the ocean to, say, wind farms precludes fishers from fishing in the same area. The revenue forgone by fishers is (one of) the opportunity cost(s) of siting wind farms in that precise area.

Social discount rate: it is the discount rate used in computing the value of funds spent on social projects. The discount rate is considered as a critical element in cost-benefit analysis when the costs and the benefits differ in their distribution over time. The proper discount rate should represent the *opportunity cost* of what else the investor could accomplish with the same funds.

Scenario (low, medium, high): in economics, scenarios are built to forecast or foresee several possible outcomes for the economy (e.g. economic growth, employment trend, financial consequences) as a consequence of e.g. a policy change. They are also aimed to assess implications to operators and society as a whole. In this study, scenarios are built to estimate the economic impact of MSP at two levels; in business operations (affecting the value of production of the industries managed under the MSP) and in the wider economy (directly related to the influence on the stakeholders). For each case study, three scenarios are built: 'low', 'medium' and 'high', each assuming a different impact of MSP on the blue economy of the country analysed. The medium scenario is what comes out after adjusting statistical data for stakeholder perception.

Transaction costs: Transaction costs can be defined as the costs incurred when exchanging goods and services (hence, a transaction) in a market. In the context of this study, they often indicate search, legal and administrative costs incurred by businesses engaged in blue economy activities.

Willingness to pay: willingness to pay is the maximum price that an individual or a business is willing to pay to acquire one unit of 'something'. The concept is of special relevance in the context of natural resources and ecosystem services for which there is no market. To quantify their value, one may measure an individual's willingness to pay. How much would someone be willing to pay to have litter-free oceans? In the context of natural resources and ecosystem services, it is important to stress that the aim is not to quantify the economic value of a resource, but rather the economic value attached to a change in its stock.

Abstract

With maritime space in increasingly high demand, due to competition between different sectors, Maritime Spatial Planning (MSP) can be a determining factor for the development of the blue economy. This study aims to explore evidence of effects stemming from the current state of implementation of MSP, with a particular focus on economic effects, so to provide EU Member States with additional information on how to maximise its benefits. The first part of the study consists of a review and an analysis of existing economic literature on the costs and benefits of MSP. In the second part, the authors develop five case studies to estimate the economic impact of MSP in countries where, albeit at different levels, this has been implemented: Belgium, Germany (Baltic Sea), Scotland, Norway (North Sea and Skagerrak), Rhode Island. The preliminary results of the study were discussed with economists and stakeholders at a workshop that took place in Brussels in October 2019. The comments received during the workshop were taken into account for the preparation of the Final report.

Introduction

The blue economy can be a driver for Europe's welfare and prosperity. The Commission has undertaken a series of steps[1] to translate it into actions. Among others, it has launched initiatives in many policy areas related to Europe's oceans, seas and coasts, facilitating the cooperation between maritime business and public authorities across borders and sectors, and stakeholders to ensure a sustainable development of the maritime economy.

One of the challenges is that maritime space is in high demand, and increasingly so. On the other hand, it is well accepted that many economic and business decisions are affected by geography and location. For example, spatial factors like the sea depth or distance to the electrical land grid or between nodes can affect the viability of offshore energy projects. In this regard, Maritime Spatial Planning can be a determining factor for the development of maritime sectors. Conversely, decisions in Maritime Spatial Planning have to take into account the spatial analysis of economic operators in maritime sector and the blue economy in general.

The competing needs of renewable energy installations, oil and gas, maritime shipping and fishing, ecosystem and biodiversity conservation (Marine Protected Areas), extraction of raw materials, tourism, aquaculture installations and underwater cultural heritage, as well as the multiple pressures on coastal resources by an increasing population, call for an integrated planning and management approach.

From the very outset, the Commission has initiated a number of successful facilitating and 'enabling' actions such as Maritime Spatial Planning (MSP). Successful implementation of MSP can lead to more efficient administrative procedures, reduce the bureaucratic barriers for investment, cut 'red-tape’, and manage potential conflicts between different maritime activities.

The MSP Directive adopted in 2014[2], accompanied by the EU-funding of cross-border cooperation projects, has made cross-border maritime spatial planning and the streamlining of permitting procedures for large projects a realistic prospect for the first time.

The Directive requires Member States to develop maritime spatial plans but leaves it to their discretion how they should do so. It also requires them to cooperate across borders. Member States had to transpose the Directive into their national legislation and nominate a competent authority by September 2016 and need to establish plans by March 2021.

It is expected that towards 2021, Member States will be gradually advancing in their implementation of the MSP Directive on Maritime Spatial Planning - 2014/89/EU. Some Member States have already established national maritime spatial plans with many making quick progress, while others need more guidance and information. All could benefit from additional information on how MSP can help them deliver sustainable growth for their maritime economies.

The background of the study is to expand the limited information on economic benefits and impacts of maritime spatial planning which was produced by the Impact

[1] Report on the Blue Growth Strategy Towards more sustainable growth and jobs in the blue economy - SWD(2017) 128 final

[2] Directive 2014/89/EU of the European Parliament and the Council of 23 July 2014 establishing a framework for maritime spatial planning: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0089

Assessment study[3] commissioned in 2010 when the Directive was proposed. More recently, a study on MSP and Blue Growth was concluded in 2017[4].

As a follow-up to the 2010 prospective study, the European Commission's Directorate for Maritime Affairs and Fisheries (DG MARE) wished to conduct this study on the actual economic impacts of maritime spatial planning in order to assess its role in the blue economy. As indicated in the Tender Specifications[5], the general objective of this study is to evaluate how MSP benefits specific blue economy sectors, with the aim to feed the results into relevant EU policies and Competent Authorities in charge of implementing MSP.

The specific aim of this study is twofold:

1. to explore evidence of effects stemming from the current state of implementation of MSP, with a particular focus on economic effects.

2. to provide Member States with additional information on how to maximise benefits from Maritime Spatial Planning.

Under the term 'benefits', the focus is on economic benefits (increased turnover, revenue, profit, security of supply, reduced cost and time required to start new projects, reduced red tape, reduced potential conflicts for competing uses of the maritime space, reduced costs of production, reduced time of licensing permits, provided long-term stability, predictability and transparency, etc.) and on related social benefits (jobs, impact of the economic benefits on local communities).

It should be noted that a separate study will address issues related to the environmental dimension in Maritime Spatial Planning. This study has as main objectives to look at how the "Ecosystem Based Approach" (EBA) has been incorporated in MSP processes in the EU, and to explore links between such processes and the implementation of the Marine Strategy Framework Directive (MSFD). Ecosystems services in the context of MSP are also an area to be covered by the mentioned the study. **Consequently, economic valuation and economic benefits provided by the MSP contribution to the preservation of marine ecosystems services are not under the scope of the present study**.

This report is divided into six chapters. The first chapter deals with a review of existing literature on the economic impact on MSP, based on "critical systematic review", a method widely used in academia. The exercise consisted of identifying and categorising as many papers as possible on the economic impact of MSP, without any particular restriction as to geographic scale or method used. Both peer-reviewed and grey literature were looked at.

The papers identified were analysed, and the results of this analysis are reported in the second chapter of the report, while the third chapter lists the main methodological gaps found in the existing literature that prevent researchers from quantifying the economic benefits and costs generated by MSP fully.

These first three chapters represent the first part of the study. Its completion marked the transition to the second phase of the study. While the first phase focused on reviewing and analysing the work on estimating the economic impact of MSP carried out by other authors, the second phase saw the development of original research,

[3] Economic effects of maritime spatial planning', a study published on 1 April 2010: https://ec.europa.eu/maritimeaffairs/documentation/studies/study_msp_en

[4] European Commission, Maritime Spatial Planning (MSP) for blue growth, 2018: https://op.europa.eu/en/publication-detail/-/publication/0223d4a6-41ec-11e8-b5fe-01aa75ed71a1

[5] https://etendering.ted.europa.eu/cft/cft-display.html?cftId=3426

through five case studies: Belgium, Germany (Baltic Sea), Scotland, Norway and Rhode Island.

The two phases of the study are strictly connected to each other. The review and analysis of literature aimed to take stock of the methods used by other researchers to quantify the economic impact of MSP, so as to verify whether the method proposed for the development of the case study is credible and sound.

Nevertheless, an important limitation needs to be mentioned. Despite the rich body of literature reviewed, very few papers could be considered fully relevant to this study. Generally speaking, the literature on MSP has so far focused on qualitative aspects, mostly related to processes, with scant attention paid to an economic quantification of the effects of the practice. A number of papers and reports have attempted to capture the economic costs and benefits of a plan, but often without establishing a cause-effect relationship between MSP and the performance of the blue economy. Therefore, it should be kept in mind that the figures and the conclusions reported in this report are based on a limited subset of the reviewed literature.

At the same time, one should also note that, despite the known limitation, the poor availability of economic literature on MSP did not jeopardise the development of the case studies. The gap analysis confirmed that there remain several grey areas which hinder the quantification of costs and benefits of MSP, but the methods proposed were enough robust to carry out the case studies.

The fourth chapter includes the "core" of the study, i.e. the 5 case studies. The case studies are structured based on a template that was included in the Inception Report. The main sections of the template are consistent across all the five case studies, and the method used is the same. However, the type of information reported might vary, and each case study might have specific sub-sections. This was necessary because each case study is unique and inherently different from the others; they might vary considerably in terms of data availability, time period, number of stakeholders interviewed, and, naturally, results. The rationale for presenting information is to give as much information as possible. For instance, in some countries stakeholders were more cooperative than in others, and this reflects in more information available for those case studies. More specifically, it should be noted that a considerable degree of information was made available in Belgium and Germany; in Norway statistical information was widely available, but an extremely low reply rate from stakeholder suggests taking the results with a pinch of salt; in Scotland and Rhode Island, the effects of MSP have not yet shown up fully in statistical data. Therefore, these two case studies focus more on qualitative information and are inherently different from the others, despite using the same template.

The first four chapters of the study were submitted to a group of economists, MSP experts and other stakeholders, who acted as (peer) reviewers. The process culminated in a workshop which took place in Brussels on 29 October 2019. The workshop will be an occasion to review and further improve the method used for the case studies and to brainstorm about what should be done to maximise the economic impact of MSP. The results of the peer-review process are reported in chapter five of this report.

The sixth chapter of the report draws some conclusions and suggests avenues for future research.

The study team acknowledges with grateful thanks the input, feedback and expertise provided by the wide range of representatives from the maritime sector who kindly cooperated in the compilation of this study. A special mention goes to the members of the peer-review group, who, even though not paid for it, did not hesitate to read a lengthy report and to provide their feedback on how to improve it. This amazing group of people – whose names are not reported here for the sake of brevity – were chaired by Prof Karyn Morrissey (University of Exeter), who meticulously coordinated the different phases of the peer-review process, and superbly chaired the Brussels workshop. Without them, our work would have been overwhelmingly more difficult and most certainly less accurate.

1 Review of existing literature

The first task of the study consisted of a review of the literature on the economic effects of MSP, so as to understand whether other researchers carried out exercises that are similar in scope to the present study. The rationale behind this task was to take stock of the methods used by economists to quantify the impact of MSP on an economy, in order to benchmark the method to conduct the case studies to be carried out in Task 4 against the most reliable state-of-the-art approaches used in literature.

To ensure full coverage, we reviewed both scientific papers from peer-reviewed literature, as well as reports from grey literature related to MSP.

The methodology applied to carry out the task is known as critical systematic review, which is made up of 4 phases: Identification, Screening, Eligibility and Inclusion. The goal was to identify the widest possible number of papers and publications dealing with the quantification of the economic effects of MSP. Economic effects may include direct and indirect costs and benefits to the maritime sectors considered in a plan, as well as costs and benefits associated to other phenomena such as reduction of administrative burden, simplification of permitting/licencing procedures, etc.

1.1 Identification

The first phase of the literature review aimed to identify the largest possible number of papers and publications dealing with the quantification of the economic effects of MSP. Economic effects include direct and indirect costs and benefits to the maritime sectors considered in a plan, as well as other costs and benefits such as reduction of administrative burden, simplification of permitting/licencing procedures, etc. To avoid methodological biases, multiple sources were used, both academic (SCOPUS and Web of Science) and non-academic, such as grey literature or literature indexed in other databases (reports, technical studies, working papers by e.g. the United Nations or DG MARE, etc.). In terms of geographical scope, no limitation was applied. Special emphasis was placed on papers and reports from the case-study countries, but literature from any other region of the world was taken into consideration, as long as it was in one of the languages spoken by the research team. While in principle it is possible that some publication in a language not spoken by the research team escaped the review, this circumstance is highly unlikely, at least as far as scientific papers are concerned, because usually peer-reviewed journals require that at least an abstract be submitted in English.

In order to identify the available literature, search equations were used in referenced search engines[6] to query the different databases selected. The search equations varied depending on the database consulted and depending on the search criteria (e.g. title of the document, keywords, summary, a combination of these three, etc.). The exact keywords used in the search equations play a pivotal role. They need to be sufficiently "broad", so as not to overlook any relevant publication; at the same time, they need to be precise enough to obtain only results (i.e. publications) that are germane to the topic at hand. The keywords selected were:

[6] An example of a search equation is:
((TITLE-ABS-KEY (maritime AND spatial AND planning) OR TITLE-ABS-KEY (maritime AND spatial AND regulation) OR TITLE-ABS-KEY (marine AND spatial AND design) OR TITLE-ABS-KEY (ocean AND spatial AND planning) OR TITLE-ABS-KEY (ocean AND spatial AND regulations) OR TITLE-ABS-KEY (ocean AND spatial AND design) OR TITLE-ABS-KEY (coastal AND spatial AND planning) OR TITLE-ABS-KEY (coastal AND spatial AND regulations) OR TITLE-ABS-KEY (coastal AND spatial AND design) OR TITLE-ABS-KEY (integrated AND coastal AND management) OR TITLE-ABS-KEY (integrated AND zone AND coastal AND management) OR TITLE-ABS-KEY (marine AND spatial AND planning) OR TITLE-ABS-KEY (marine AND spatial AND regulations) OR TITLE-ABS-KEY (marine AND spatial AND design)) AND PUBYEAR > 1999) AND (msp) AND (LIMIT-TO (SUBJAREA , "ENVI") OR LIMIT-TO (SUBJAREA , "SOCI") OR LIMIT-TO (SUBJAREA , "AGRI") OR LIMIT-TO (SUBJAREA , "ECON") OR LIMIT-TO (SUBJAREA , "BUSI") OR LIMIT-TO (SUBJAREA , "DECI") OR LIMIT-TO (SUBJAREA , "MULT"))

- maritime
- marine
- spatial
- planning
- ocean
- regulations
- design
- integrated
- coastal
- zone
- economic
- data
- licensing
- red tape

After selecting the keywords, these were combined to build the necessary search equations. The publications returned from the query to meet three criteria. They had to:

1. deal with the maritime dimension;
2. be related to spatial planning;
3. analyse economic effects or impacts.

For each of the three requirements, it was necessary to choose the right keywords (including synonyms and linguistic variations) that could be used to build one or more search equations to query the databases.

The number of documents obtained applying the first two criteria was 10,222, which became 7,737 with the third criteria. After repeating the same process with other databases, a first set of documents (N1) were identified:

N1 = documents in Scopus and Web of Science = 7,703

1.2 Screening

This phase consisted of a review of author, document title, year of publication, type of publication (article, working paper, conference proceedings, report, etc.), as well as the publication itself (name of the journal, title of the book, publisher, etc.). The screening aimed to eliminate duplicate entries (e.g. a document that was included in two or more databases), documents which contained obvious errors in their classification, and/or documents that were not relevant to the study. Furthermore, some documents appeared in the results twice: first in a given format (e.g. working paper) and later published as a scientific article. In this case the earlier version was excluded. After the screening, there remained 775 documents.

N2 = N1 – excluded results = 775

1.3 Eligibility

In this phase, in addition to the above-mentioned data, the abstracts/summaries of each publication included in N2 were assessed for eligibility. To carry out this assessment, it was necessary to clarify the criteria for inclusion and exclusion of a document in the subsequent steps of analysis. We distinguished between pragmatic and quality criteria:

Table 1 - Criteria for inclusion/exclusion of publication for further analysis

	Inclusion criteria	Exclusion criteria
Pragmatic	– Documents in English, French, German, Spanish, Italian, Dutch, Norwegian, Polish, Portuguese (i.e. the languages spoken by the study team). – Recent documents (from 2000 onwards) – Documents in which MSP and its economic effects are a relevant part of the study – Economic relevance (e.g. economic benefits, economic impact, economic and econometric methods)	– Documents in languages not spoken by Project team (very few occurrences). – Documents published before the year 2000 – Documents in which MSP and its effects are mentioned but are marginal or not relevant to the study.
Quality	– For indexed articles on the Web of Science and Scopus we assumed that they had already gone through a rigorous quality filter (peer review). – For the rest of the documents, we verified that the objectives of the investigation were well defined, the methodology well specified, the conclusions/findings reached were presented and the author or the source that published it was reliable.	– Anonymous documents, published by unknown sources or with scant reliability. – Documents that lack an adequate structure (with introduction, data and methods, results and conclusions). – Unrelated topics to the Economic Impact of MSP

After step 3, there was a new set of documents that, in principle, met the inclusion criteria:

N3 = N2-excluded documents = 393

1.4 Inclusion

In this phase, the entire set of documents in N3 was fully examined. However, N3 also included some false positives, i.e. documents that fulfilled all the requirements for inclusion, but whose content did not correspond to the object of our analysis. Furthermore, through the bibliographic references of the revised documents other studies were detected that had not been captured in the search. The result of this step was again a new set of documents that constituted our "bank of documents" for further qualitative and quantitative analysis:

N4 = N3-non-relevant documents + grey literature from bibliographic references= 91

Each document in N4 was assigned an identification code and was accompanied by a form that reports:

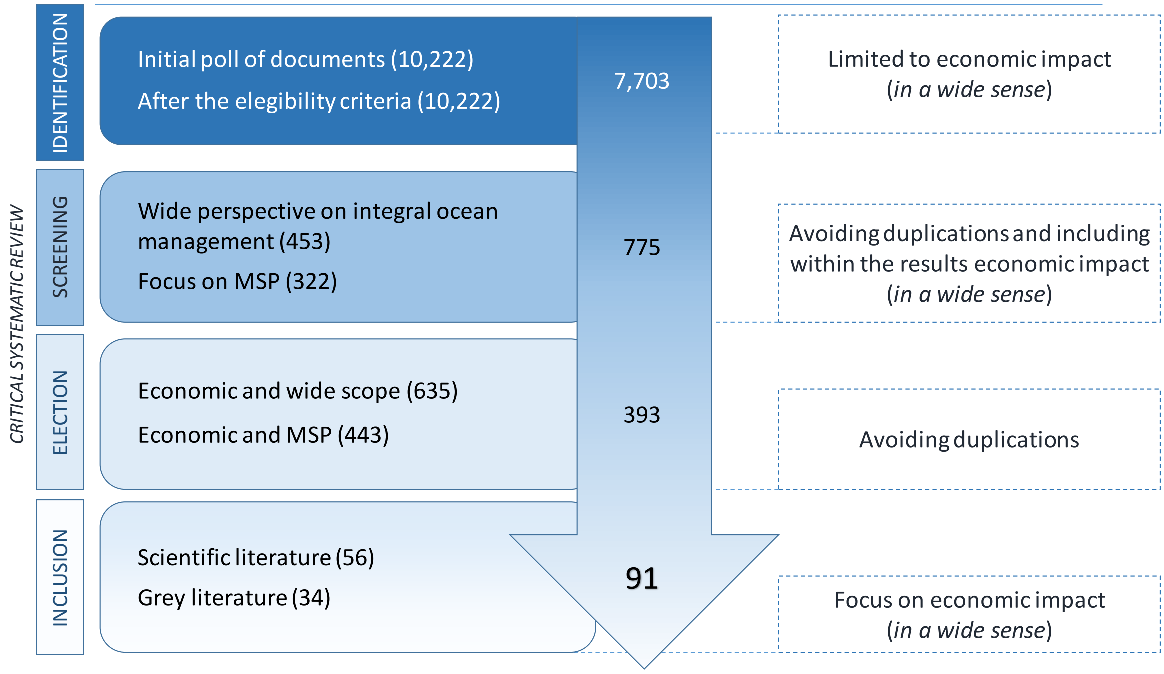
- A full bibliographic reference of the document (author, title, source, year, etc.).
- Quality indicators: for peer-reviewed papers, the indicators used were impact factor[7] (Q1, Q2, Q3 or Q4 for magazines), reputation of the publisher according to its academic category or reliability of the publishing institution (E1, E2, E3 and E4)[8].
- Type of work: descriptive (D), theoretical (T) or methodological (M) research, applied research or case study (A). When a publication met more than one criterion, this was clearly indicated.
- Central object of the study: information on thematic scope (keywords that helped categorise of the work) and, if it was an empirical study, also an indication of its temporal and geographic scope.
- Informative summary: this is different from the abstract of the publication, as it looked at the publication from the perspective of our study. It reported the objectives of the work (which question(s) it seeks to answer), the methodology used, as well as the main conclusions.
- Main aspects and contributions: to highlight the main contributions of the study (models, procedures, concepts, experimental analysis, numerical estimates, etc.) and the aspects that we considered most relevant (originality of the approach, type of graphics or presentations used, accessibility to the original data, amplitude and rigorousness of the analysis, etc.).
- Additional comments: any other comment or critical assessment deemed appropriate.

These reports can be found in Annex I. It should be noted that 'non-relevant documents' were not discarded altogether; a record has been kept as they might become useful at a later stage during the study.

The 4 phases and the achieved results are summarised in the figure below.

[7] The impact factor of a journal is a measure reflecting the yearly average number of citations to recent articles published in that journal. The higher the impact factor, the higher the reputation of the journal.
[8] Contrary to what stated in the Inception Report, it was not possible to retrieve the H-Index of each author, therefore this indicator was excluded.

Figure 1 - Review of literature, summary of results



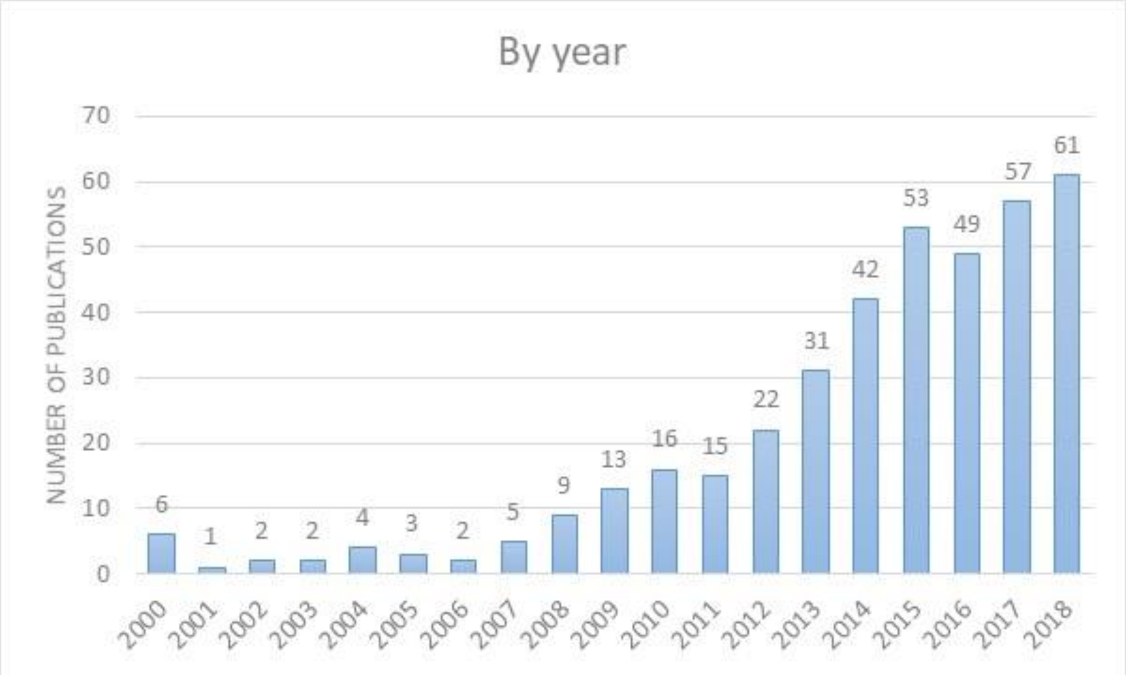
1.5 Analysis of results

The number of publications on MSP since 2000 has been increasing steadily, with 2009 marking a change of pace (Figure 2). In particular, during the first decade of the century, the number of publications on this topic did not reach ten per year, the only exception being the year 2009 with 13 publications. After 2009, there was a steady increase which culminated in 61 publications in 2018. The trend reported in the graph below should not come as a surprise. Apart from few notable exceptions, MSP tends to be a relatively recent practice; the upward trend in the number of publications in recent years simply reflects increased awareness and interest towards the practice.

In addition, two more factors are to be considered: the number of official plans that are in force and the adoption in 2014 of Directive 2014/89/EU establishing a framework for Maritime Spatial Planning. The number of "legal plans" in place clearly influences the number of papers and reports that deal with the economic aspects of MSP. One should consider that measuring the impact of MSP on the economy is an exercise which can be carried out only if a plan has entered into force for quite some time. With more and more spatial plans being adopted, it is reasonable to expect a higher number of papers trying to quantify the economic impact of the policy.

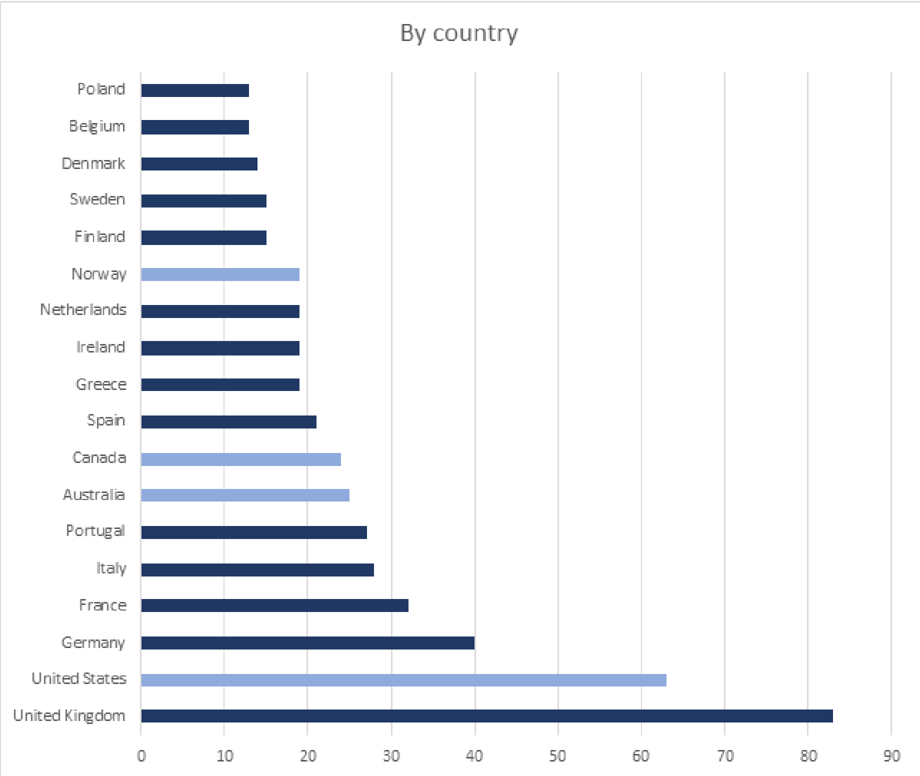
Directive 2014/89/EU may also have been one of the factors behind the increasing number of publications. Because, amongst other things, it establishes an obligation for EU Member States to implement Maritime Spatial Planning by 2021, the Directive might have influenced researchers to look into the potential effects of the practice on the blue economy.

Figure 2 - Number of scientific publications on MSP by year of publication



The number of scientific publications by country of publisher is also relevant, especially when it comes to EU Member States (Figure 3). With more than 80 papers, the UK – still a Member State of the European Union at the time of writing[9] – ranks first, followed by Germany with 60, and Italy, Australia and Spain, which range from 20 to 30 publications.

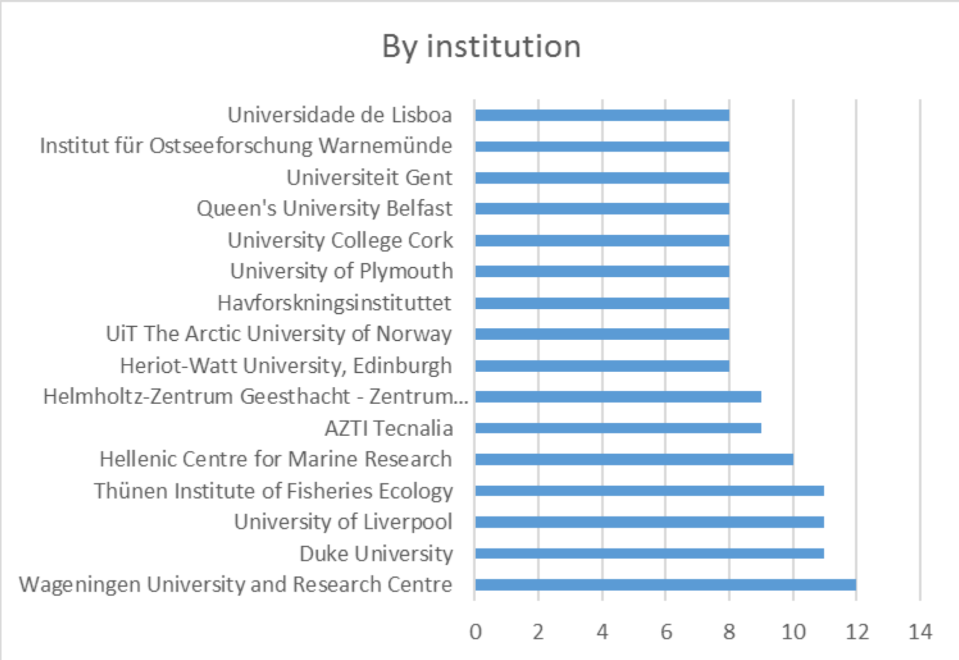
Figure 3 - Number of publications by country of publisher (EU MSs in dark blue)



[9] The study was carried out from October 2018 to December 2019, when the UK was still a Member State of the European Union.

As one may expect, the EU also leads the way when it comes to the most active university and research centres in the topic of MSP (Figure 4).

Figure 4 - Number of publications by university/research centre

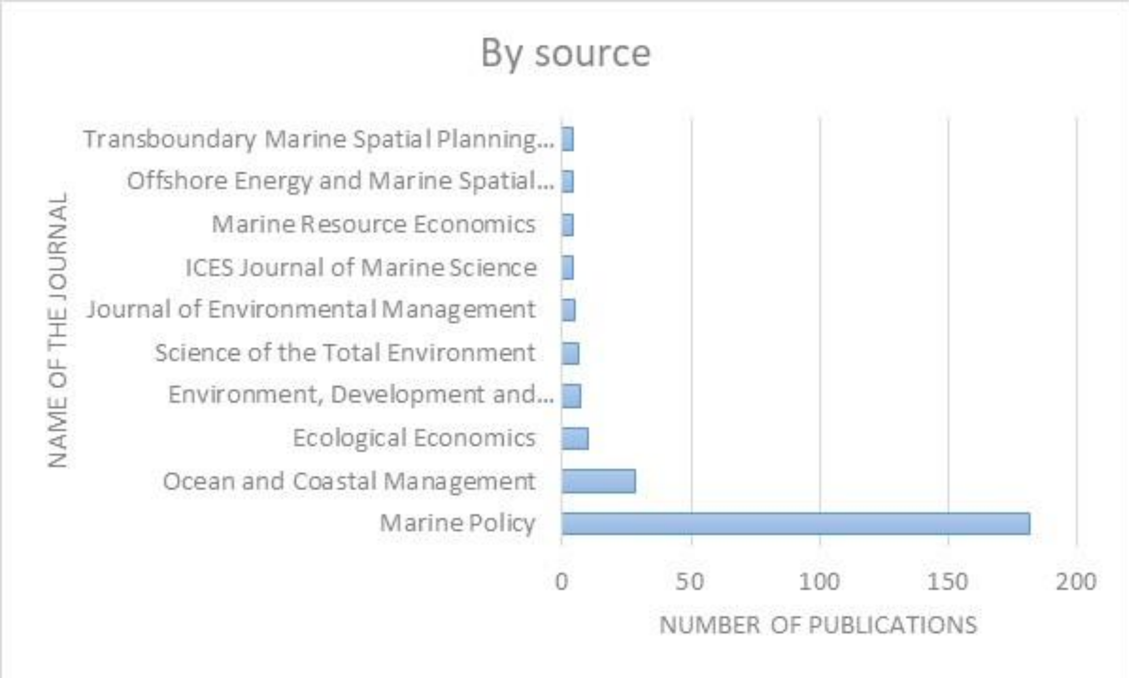


Likewise, the most recurring authors who have analysed economic aspects of MSP are from European Countries (Figure 5).

Figure 5 - Number of publications by author

In terms of sources, Marine Policy is the journal with most publications on the topic, then some way behind is Ocean Coastal Management and third is Ecological Economics (Figure 6). This indicates two things: the publications on MSP are largely addressing Policy and Management issues, and the economics or ecological journals lag behind on MSP.

Figure 6 - Number of publications by source



Summary fiches of the 91 papers in aggregate N4 are available in Annex I

2 Analysis of the outcomes of the literature review

2.1 Introduction

The objective of this task was to analyse the literature reviewed under Task 1 and to draw conclusions that inform the methods to be used for the case studies.

The approach adopted was to categorise the papers and reports reviewed during Task 1 according to a functional (i.e. the type of benefits identified) and sequential (i.e. what stage of the planning process was analysed) classification.

An important limitation was identified. Despite the rich body of literature reviewed, very few papers could be considered fully relevant to this study. Therefore, it should be kept in mind that the figures and the conclusions reported in this report are based on a limited subset of the reviewed literature.

Nevertheless, some basic statistical information is provided on the themes, sectors, methods, stakeholders, geographical and temporal scopes of the reviewed papers and reports. The most recurring quantitative and qualitative benefits are also reported.

More importantly, the analysis draws conclusions that seek to answer a number of questions on the economic costs and benefits of MSP. One of the main conclusions that can be drawn from this exercise is that this study will be one of the first attempts at quantifying all the costs and benefits of MSP.

2.2 Methodology

Maritime Spatial Planning (MSP) can be defined as a public process for analysing and assigning the spatial and temporal distribution of human activities in marine areas in order to achieve ecological, economic and social objectives that are normally specified through a political process (Ehler and Douvere, 2009).

The EU Commission similarly describes it as "a process by which the relevant Member State's authorities analyse and organise human activities in marine areas to achieve ecological, economic and social objectives" (Directive 2014/89/EU).

Both definitions, share some elements:

- The aim is to achieve a more rational use of space and of marine resources, streamlining the interaction between different potential uses of the ocean.

- The main focus is on planning and managing human activities in the marine environment, striking a balance between the protection of marine ecosystems and the development of economic activity.

- It requires concerted public intervention through bespoke policy instruments and stakeholder participation.

- It is a dynamic and forward-looking process, which calls for setting priorities for a marine area in a given time horizon.

MSP aims to pre-empt conflicts in marine areas, or at least minimise their negative effects. Conflicts may arise between users competing for the same resources or for the same space (incompatible human activities); they may also arise between users and the marine environment itself (human uses with negative effects on the marine environment). Moreover, MSP may yield obvious benefits on the ecological and environmental (e.g. preservation of biodiversity, protection of areas of biological and ecological interest, reduction of the anthropogenic cumulative effects on ecosystems, etc.), economic (development of income-generating activities, reduction of conflicts between competing uses, facilitate and transparency for the incorporation of new agents and uses, etc.) and social dimension (development opportunities for coastal communities, improved protection of cultural heritage related to the sea, etc.).

The economic literature on MSP can be classified into three categories: effects, impacts and economic benefits[10]. The functional classification distinguishes 4 main groups: Public Action, Transaction Costs, Economy-Environment and Related Topics. This classification responds to the requirements laid out in the *Tender specifications* (see section 1.6.2, pp. 8-9) and aims to generate further information to improve the methodology and assumptions to be used in the case studies (Task 4).

Because MSP is a process, its implementation calls for a sequence of phases to be completed. These phases incorporate the necessary elements for the elaboration and development of a plan, as well as for its subsequent implementation and review. However, as of today, European experiences are still scarce and relatively recent and so further information on the phase, stage and/or level of development of the plan is

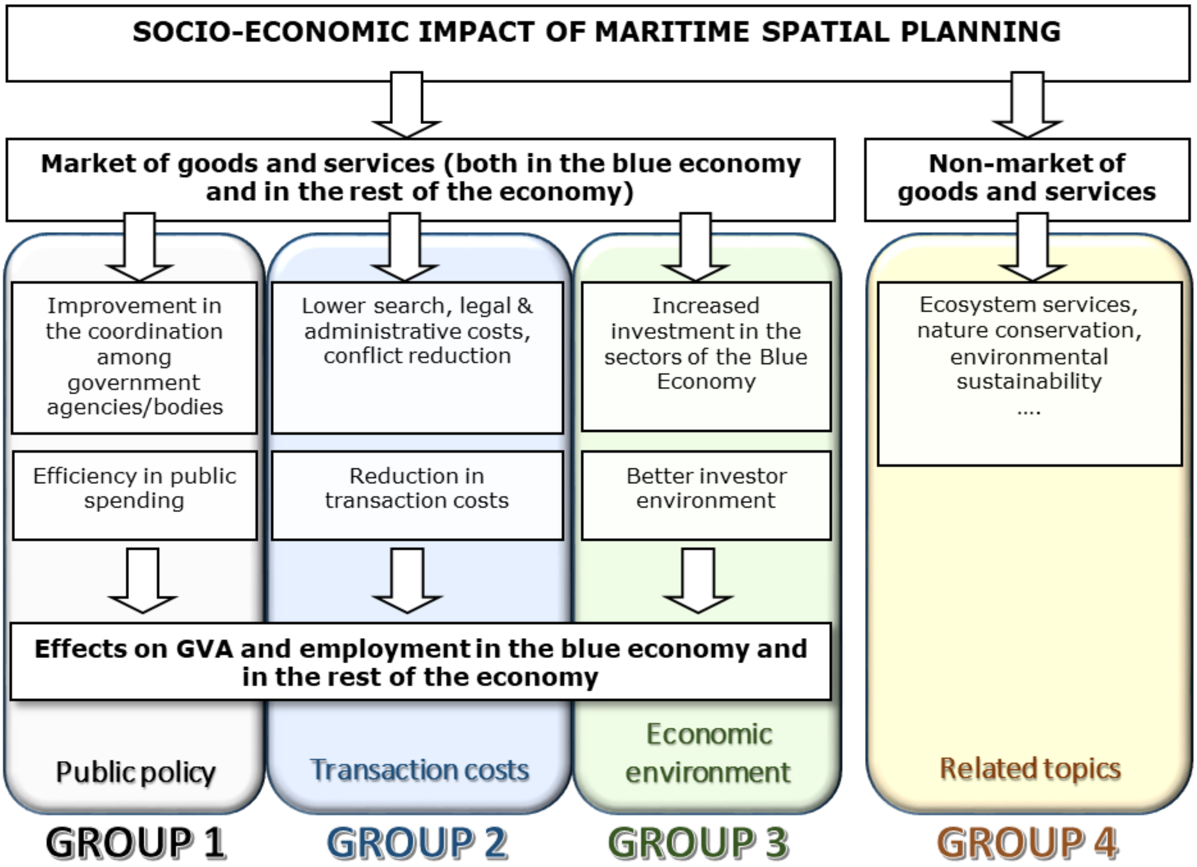
[10] Effects, impacts and economic benefits are often interchangeable in common language. In this report they are defined as:
Effect: a change or result that is caused by direct, indirect effects on the main economic variables (e.g. sales, value of production, income, or employment) including households' behaviour and international trade.
Impact: quantification of the effects that a project or policy has on the economy of a designated project area.
Benefit: includes direct use benefits, indirect use benefits, option benefits, bequest benefits and existence benefits.

needed. Therefore, the literature surveyed was also be categorised according to the stage of development of the plan analysed (sequential analysis), thus complementing the above-mentioned functional classification.

2.2.1 Functional classification

The economic literature on the impact, benefits and/or effects of MSP has mostly focused on two main areas, which can be defined according to the type of goods and services analysed: market and non-market (see Figure 7).

Figure 7 - Scope and groups of the socio-economic impact studies analysed



Source: own elaboration

The studies focusing on non-market goods and services mainly seek to evaluate the set of ecosystem services[11] offered by the oceans, and quantify the value of biodiversity conservation and environmental sustainability. By definition, these are goods and services for which there is no market and, consequently, there is no equilibrium price either. Nevertheless, usually most of these studies still assign a monetary value to ecosystem services, thus contributing to quantifying the economic benefits associated with marine resources and environmental management.

Despite the relevance of non-market goods and services, the impact studies in this area are beyond the scope of our study. Therefore, our research will rather focus on the economic literature related to the effects, benefits or impacts of MSP in the area of market goods and services.

[11] Ecosystem services are out of the scope of this study, as a new study is being launched by EASME specifically on this topic. However, they are often mentioned throughout this report, because several papers and reports analysing the economic impact of MSP focus on ecosystem services. While they remain out of scope, it is believed that a thorough literature review should mention them as a recurring topic of research.

As mentioned above, according to a functional criterion, the literature surveyed can be classified into 4 groups:

1. **Public policy**: documents focusing on the actions and procedures carried out by the different public administrations for the preparation, implementation, monitoring and review of maritime spatial plans.

2. **Transaction costs**: documents focusing on the analysis of the different uses of maritime space or on the analysis of other transaction costs linked to the blue economy sectors.

3. **Economy-environment**: documents analysing the interactions between environmental and socio-economic objectives of the blue economy industries, or studies that link MSP with the improvement of the investment climate and the promotion of synergies within the blue economy sectors.

4. **Related Topics**: documents that do not fall under any of the previous groups but that deal with topics linked or directly related to some relevant aspect of MSP.

Each of these groups is further broken down into more specific sub-groups:

Group 1 - **Public Policy** (Table 2):

Table 2 - Sub-groups of Group 1, Public Policy

Sub-group	Content
1.1. MSP Processes	Studies whose main objective is the review of the procedures followed for the elaboration of MSP (compilation of information, relationship and consultation with stakeholders, zoning of uses, development of management plans, etc.), studies which qualitatively evaluate the implementation and the results achieved by MSP, and studies which review and revise the procedures followed by the administrations to improve a spatial plan.
1.2. Public efficiency and MSPs	Studies focusing on costs and benefits of MSP for the public sector. Generally speaking, these studies seek to assess the costs and benefits associated with the training of human resources, the implementation and monitoring of MSP. These analyses tend to include a monetary quantification.
1.3 Combination of 1.1 and 1.2	Studies combining qualitative and quantitative analysis of the processes followed by public authorities.

Group 2 - Transaction Costs. As reported in Table 3, within this group we also distinguish 3 subcategories:

Table 3 - Sub-groups of documents of Group 2 of Transaction Costs

Sub-group	Content
2.1. Use of marine space	Studies that link MSP to the resolution of conflicts between different uses of maritime space or between different types of agents within the same maritime sector. The studies analyse alternative uses of maritime space, implications for maritime industries and their economic contribution. Due to their characteristics, these analyses contain a quantification of impacts and effects of MSP on blue-economy sectors.
2.2 Other transaction costs	Studies that analyse MSP and its implications for the blue economy in terms of transaction costs linked, for example, to administrative procedures (e.g. elimination or simplification of administrative burden), to search or information costs (e.g. capacities and qualities of the marine space) or to establishment costs (e.g. public licences or concessions).
2.3 Combination of 2.1 and 2.2	Studies that combine the analysis of transaction costs from a broad perspective and incorporate qualitative and quantitative aspects.

Group 3 - Economic Environment. As shown in Table 4, here we also distinguish 3 sub-groups:

Table 4 - Sub-groups of documents of Group 3 of Economic Environment

Sub-group	Content
3.1. Economy-environment interaction	This sub-group includes documents that attempt to analyse the different interactions between blue-economy sectors and the objectives of environmental preservation and sustainability. These documents mainly focus on Marine Protected Areas and their effects and consequences on the economic activities of the different marine sectors. These studies tend to have a high quantitative component (valuation of ecosystem services, impacts on income and employment, etc.).
3.2. Economic activity	This sub-group includes studies that analyse the linkages and effects that MSP may have on the impulse (or lack of) on a blue economy sector. Examples are impact analysis documents (in terms of added value or employment) on one or more maritime industries; on the emergence and promotion of new marine sectors (biotechnology, energy generation, etc.); on synergies between different sectors (including traditionally terrestrial sectors), etc. Due to their characteristics, these analyses usually have a high quantitative component.
3.3 Combination of 3.1 and 3.2	Studies that combine the analysis of the interactions between the blue economy sectors and the different objectives pursued by MSP, both those related to environmental preservation and sustainability, as well as to economic and social improvement.

Group 4 includes documents on topics which – albeit closely related to MSP – do not fit any of the above-mentioned categories. The sub-groups are:

Table 5 - Sub-groups of documents from Group 4 of Related Topics

Sub-group	Content
4.1. Ecosystem services	It includes studies that focus on marine ecosystem services, but that may have implications or consequences for MSP and the blue economy.
4.2. Distributive effects	Studies focusing on the consequences of MSP on the spatial distribution of income (between coastal municipalities or regions affected by a plan), or on the cross-border dimension of MSP.
4.3. Other	Documents dealing with various topics such as, for example, studies focusing on technical or legal elements of MSP, studies focusing on the relationship and coherence between marine and terrestrial planning, etc.

2.2.2 Sequential classification

MSP is a fairly complex process, which requires a series of sequential phases for effective implementation. Ehler and Douvere (2009) describe a step-by-step approach to set up and apply MSP sequentially through the following steps:

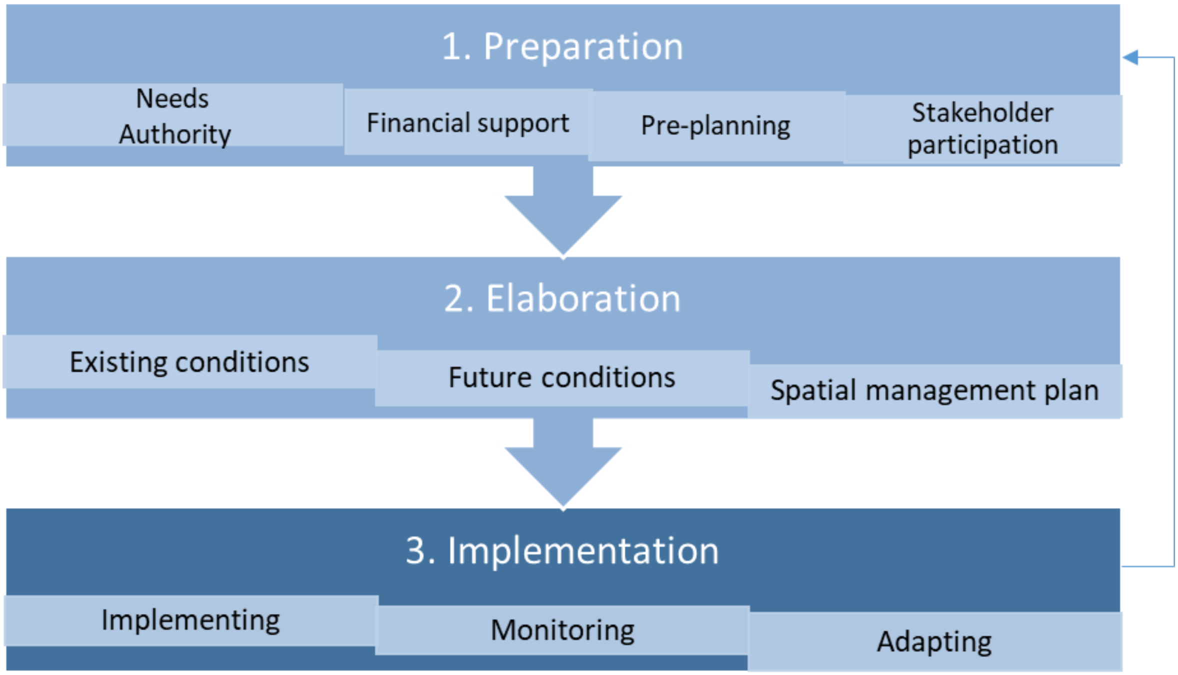
1. Identifying need and establishing authority;
2. Obtaining financial support;
3. Organising the process through pre-planning;
4. Organising stakeholder participation;
5. Defining and analysing existing conditions;
6. Defining and analysing future conditions;

7. Preparing and approving the spatial management plan;
8. Implementing and enforcing the spatial management plan;
9. Monitoring and evaluating performance;
10. Adapting the maritime spatial management process.

Throughout all of these steps there are elements related or linked to socio-economic evaluation and to economic impact assessment, the main topics of this study. The steps outlined above are grouped into 3 major stages or sequences, depending on the stage of implementation of a plan (see Figure 8), in order to facilitate the classification of the literature collected:

1. Preparation (including the 4 first steps);
2. Elaboration (including steps 5, 6 and 7);
3. Implementation (including steps 8, 9 and 10).

Figure 8 - Sequences in the Marine Spatial Planning Process



Source: own elaboration

Below a detailed description of the sequences and of the specific elements related to the economic effects or impacts that were considered for the analysis of the literature collected:

Phase 1: preparation

The reasons for undertaking the MSP process, and whether there is an organisation or institution capable of implementing it, must be clear in advance (step 1). As mentioned above, the beginning of the MSP process may be motivated by the existence of previous or foreseeable conflicts in the use of the marine environment and its resources. Consequently, existing studies describing, analysing and assessing the economic consequences of these conflicts should be taken into account in the preparation phase of the plan.

The most relevant papers to our study are those focusing on conflicts between competing uses in the marine environment; in particular, conflicts between different economic activities in the marine environment (e.g. commercial vs. artisanal fishing, aquaculture vs. recreational uses of coastal areas, shipping vs. offshore wind farms, etc.), or conflicts between an economic activity and the marine environment (e.g. studies of the effects of marine protected areas on fishing or tourism activities, economic evaluation of the impact of human activities on ecosystem services provided by the marine environment, etc.). In addition, studies with relation to the quantification of the costs and benefits linked to setting up or empowering public bodies capable of elaborating and/or implementing the MSP process.

Availability of financial resources is a necessary requirement to develop a spatial plan (step 2). Public authorities should identify both the existing sources of funding for the development of MSP as a whole, as well as the possible alternative funding mechanisms that would become available. Therefore, in this group, we include studies that report on the different options mechanisms for obtaining income to finance the set of activities associated with MSP (public budget allocations, income associated with nautical and coastal tourism, rights and royalties for mining and energy exploitations at sea, income from fishing licenses and quotas, etc.), as well as studies focusing on the economic-financial viability of MSP given the income alternatives.

MSP requires organising the planning process, hiring or selecting qualified professionals to develop it, scheduling their work, defining the scope and deadline for planning, setting its basic principles, selecting the set of general goals and specific quantifiable objectives and, finally, evaluating the risks and possible incidents that may impinge on the process throughout its duration (step 3). Special emphasis should be placed on establishing the socio-economic objectives of a plan, which need to be specific, measurable, achievable, relevant and time-bound (e.g. that within 10 years from implementation, offshore renewable sources meet consumption needs by a certain percentage). Therefore, the studies that focus on the desirable objectives for the different marine activities are listed here according to the foreseeable economic effects associated with their achievement, considering the different options for ocean use and the different scenarios for the evolution of economic activity.

As a public process involving political decisions, MSP needs stakeholder participation to increase its legitimacy and effectiveness (step 4). It is thus necessary to identify the actors who should be involved in the process (not all agents have the same relevance), at what stage of the planning process they should be involved, and how they can be involved (through communication and information channels, consultation processes, establishing dialogue and consultation mechanisms, or establishing negotiations between stakeholders and public authorities). The role of impact or economic studies in these tasks is limited to the selection of representative economic agents with interests in activities linked to or dependent on the ocean.

A summary of the type of studies included under Phase S.1. Preparation by sub-phases is reported in Table 6.

Table 6 - Type of studies of economic effects in phase 1 - Preparation

	1. PREPARATION			
Steps	Needs / Authority	Financial Support	Pre-planning	Stakeholder participation
Socio-economic topic	Conflicts of use of the marine environment and institutions with authority for the MSP	Financing of the MSP	Establishment of socio-economic objectives of the MSP	Identification of relevant economic agents
Relevance to our study	• Economic valuation of use conflicts between different marine activities • Economic valuation of use conflicts between human activity and the marine environment • Economic valuation of the costs and benefits of the activity carried out by the authorities in charge of the MSP	• Analysis of sources of income to finance the activities of the MSP	• Choice of objectives based on assessments of the socio-economic effects of the different alternatives for the use of the marine environment.	• Studies assessing the economic contribution of the various sectors of activity linked to the sea

Phase 2. Elaboration

When engaging in MSP, one should carefully consider the state of the marine environment and the activities to be regulated (step 5). It is necessary to elaborate inventories and maps with information on the current state of the marine and coastal environment (relevant biological and ecological areas, and human activities). It is also desirable to assess existing and possible conflicts and synergies (both between different human uses and between human uses and the environment). In this sense, the role of economic impact studies within this step can be to determine the biological value of the area under planning, based on a socio-economic valuation of the ecosystem services provided by the marine environment. Also of interest are studies which use socio-economic information to give an idea of the distribution and spatial and temporal density of human activities in the marine area, as well as their implications on and connections with coastal communities. At the same time, economic impact studies may also make use of spatial analysis to help identify marine areas where there are conflicts and synergies between different human uses.

In the next step of the MSP process, the focus is placed on developing a clear vision for the plan. This implies forecasting and orienting possible future uses of the marine space. The forecasting scenarios are often based on the establishment of goals, objectives and assumptions in a specific time horizon (step 6). In this case, some economic impact studies are related to the analysis and projection of trends observed in the main economic sectors of the blue economy in the area involved. These are studies that concoct possible growth scenarios for the activities of the blue economy (evolution of production, added value, employment, etc.) in order to project their future needs for the use (both spatial and temporal) of marine space. Depending on the goals and objectives set in the plan (objectives that may incorporate ecological, social or cultural elements, in addition to strictly economic ones), some studies also deal with alternative uses of marine space and help determine the preferred spatial use scenarios for the future and analyse their economic implications (sectoral distribution of the possible costs and benefits derived from each chosen scenario).

The development stage should conclude with the drafting and approval of a spatial management plan (step 7). The plan is a comprehensive and strategic document, which reflects the political declaration of the competent authorities, establishes a general guiding framework for decision-making in the management of a given marine area, and identifies when, where and how to achieve the goals and objectives agreed throughout the process. A plan should include: a physical description and limits of the maritime area under planning, a schedule of the planning activities to be developed, the goals and objectives pursued, a description of the desired future scenario, the definition of the necessary measures to achieve it, the establishment of the necessary actions and the determination of the financing needs to carry it out and its sources. Within this step, some MSP economic impact studies are related to specific spatial management measures (those that may induce the production of desired goods and services in the planning marine area: who, how, when and where human activities should take place in the managed marine environment). These economic studies can focus either on determining the specific spatial management measures (costs and benefits linked to the economic incentives implemented and to the institutional organisation chosen for the implementation of MSP), or on establishing criteria for the selection of the spatial management measures (for example, according to the economic effects of the specific measures and their distribution among the different agents involved).

Table 7 reports a summary of the type of studies that under Phase 2, 'Elaboration':

Table 7 - Type of studies of economic effects in phase 2 - Elaboration

	2. ELABORATION		
Steps	**Existing conditions**	**Future conditions**	**Spatial Management Plan**
Socio-economic topic	2.1 Socio-economic descriptions	2.2 Sectorial trends of blue sectors	2.3 Socio-economic preferences in management
Relevance to our study	• Biological value calculated through the socio-economic valuation of the goods and services provided by the marine ecosystem. • Studies on the distribution and spatial and temporal density of human off-shore activities and their connections with the coastal territory. • Preparation of maps to identify conflicts and compatibilities between the different human activities in the marine environment.	• Studies on current trends in the sectors of the blue economy in the area to be managed • Identification of potential alternative human uses of marine space and choice of preferred uses and scenarios.	• Analysis of incentives, institutional regimes and criteria for selecting spatial management measures.

Phase 3. Implementation

In this phase, the first step is to implement and enforce the approved plan (step 8). This step is not entirely germane to the scope of our study. However, some economic impact studies could venture into estimating government costs and benefits derived from the implementation of a plan (e.g. costs and benefits linked to the compliance services implemented, linked to mediation and negotiations with the agents involved, linked to the legal actions necessary to enforce compliance, etc.).

Once a plan has been implemented, a systematic collection of data on relevant indicators is an essential activity for assessing the results of the planning process, as well as of the plan itself. This monitoring system constitutes step 9. The periodic assessments provide the agents involved (decision-makers, policy-makers, industrial actors, etc.) in MSP with invaluable information. The most interesting studies here are those which aim to quantify relevant socio-economic indicators (e.g. by assessing whether the intended objectives have been reached; by establishing reference scenarios, and temporal comparisons; by defining intermediate milestones). Other useful studies are those focusing on plan evaluation (relevance, reliability and cost-effectiveness). They make it possible to evaluate whether the investment and effort carried out during the previous steps is adequate and also provide valuations for the process of adaptation and continuous improvement of management.

The final step in the MSP implementation process focuses on redefining and adapting the main elements of management for the next planning (step 10). According to the lessons learnt and the results obtained after the assessment, the selected goals, objectives, desired outputs and management strategies can be modified. The economic impact studies relevant for our research are necessarily linked to the previous ones; for example, performance evaluation studies (e.g. cost-benefit analyses, management effectiveness, unintended effects or undesired consequences) or information gaps.

Table 8 provides a summary of the type of studies that are included under Phase 3 'Implementation'.

Table 8 - Type of studies of economic effects in phase 3 - Implementation

	3. IMPLEMENTATION		
Steps	**Implementing**	**Monitoring**	**Adapting**
Socio-economic topic	3.1 Implementation of the MSP	3.2 Follow-up of results	3.3 Adaptation of the management process
Relevance to our study	• Valuation of the government costs and benefits linked to the implementation of the MSP	• Studies on the definition and identification of key socio-economic indicators for the monitoring of the MSP • Evaluations of the achievements of the implementation of the MSP in relation to the objectives set • Socio-economic impact assessments with the application of the MSP	• Adaptation of marine spatial management plan according to the assessments of the results.

2.3 Quantitative analysis

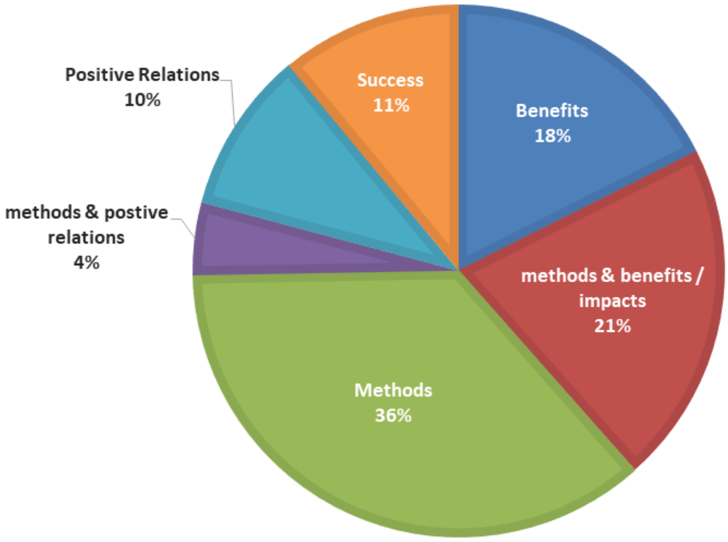
The study team reviewed the 91 papers selected in Task 1 and described these against a number of criteria and categories, which are described below.

2.3.1 Thematic

Methods dominate the main themes of the papers, with 61% described as being methods-focused and 21% describing methods as well as benefits/impacts. The methods described range from natural capital accounting and valuation of ecosystem services to methods of undertaking spatial analysis.

A minority of papers either identify the benefits of MSP (18%), key factors in success (11%) and approaches to ensuring positive relations (10%). The positive relations papers mainly address how to better maintain positive relations between users (most often fishermen) with the establishment of Marine Protected Areas (MPAs).

Figure 9 - Main themes of selected MSP papers



The papers focusing on the benefits of MSP (18%) are mainly based on case studies in Europe (at a relatively local scale such as the Lyme Bay MPA in England, or on a broader geographic scale such as Norwegian waters). Most papers exploring benefits consider marine reserves and the potential for wider benefits for some maritime sectors (fishing, recreation and tourism) in addition to conservation value and benefits from ecosystem services. The IMP reports from the Norwegian Ministry of the Environment are the few to provide a more holistic consideration of broader scale maritime regions including the Barents Sea and the Norwegian Sea. These report added value and employment for three key sectors in the regions: fishing, transport and oil & gas. The reports on the Scottish National Marine Plan (Marine Scotland, 2018) have a similar objective, seeking to identify the trends in maritime sectors since implementation of the plan.

2.3.2 Sectors

The titles and summary reviews of the papers were analysed for key words associated with maritime sectors. The most frequent sector referred to in the papers was the fishing sector with 'fish' mentioned in two thirds of the papers. 'All maritime sectors' is mentioned in 41% of papers, but the sectors included vary in number and categorisation. 22 sectors are referenced in Fernandes, M (2017) and 27 fishing and shipping segments in Freeman, M (2016), but most of the papers professing to cover the maritime economy refer to several (less than 10) sectors even if they are not consistently defined.

Tourism and recreation are each mentioned in a third of papers, most commonly where the research focuses on coastal (rather than maritime) economies. Tourism and recreation are the key sectors, along with commercial fishing, that are managed under the zoning plans of US States and the Great Barrier Reef Marine Park.

The 'energy' sector is also referenced in a third of papers, particularly in cases where the marine energy sector is significant, such as the petrochemical industry within the Norwegian IMPs and the growing marine renewable sector in the UK and Rhode Island, US.

Aquaculture and transport/shipping are referred to in 23% and 20% of papers respectively. The focus on the aquaculture sector is in case study countries where these sectors are significant, namely Scotland and Norway (aquaculture), but more widespread examples for transport and shipping, which is ubiquitous in maritime regions.

Generally speaking, plans have typically not brought major economic benefits to incumbent industries such as commercial and recreational fisheries, tourism and shipping. (Blau and Green, 2015).

Figure 10 - Sectors mentioned in selected MSP papers

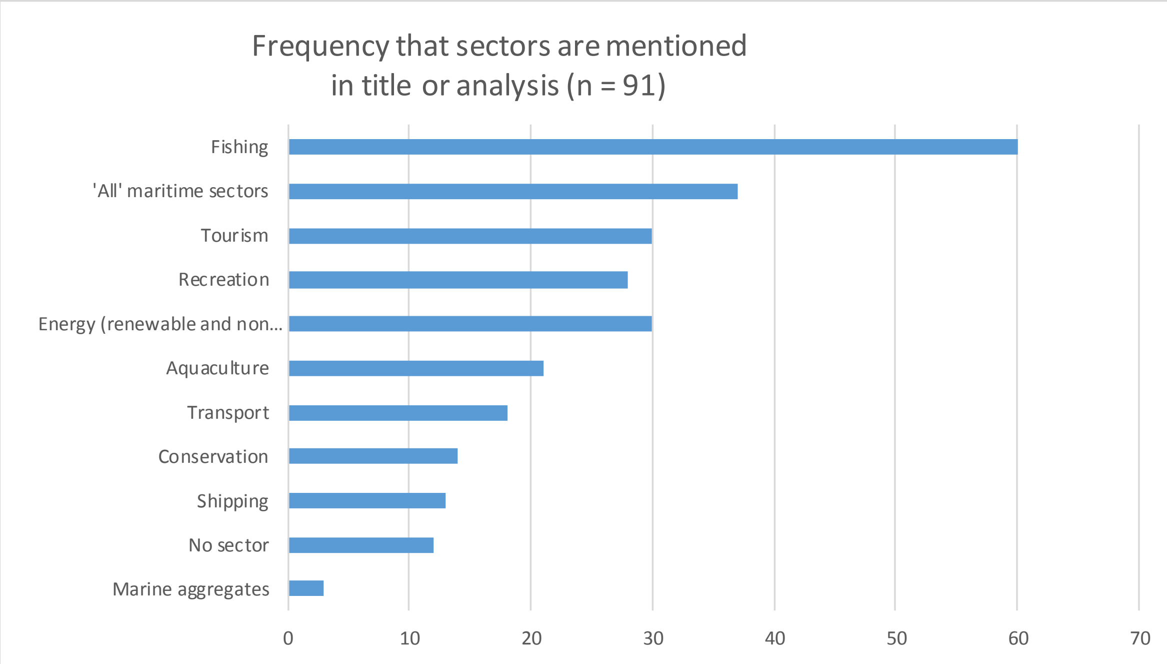


Table 9 - Sectors mentioned per geographic region for selected MSP papers

	Fish	Recreation	Tourism	Energy
Europe	26	10	13	13
North America	11	4	3	3
Asia	5	2	3	3
Australia	7	7	8	0
Caribbean	5	3	2	2
Africa	1	1	1	0
South America	1	0	0	0
Not applicable	4	0	0	0
Total	**60**	**27**	**30**	**21**

2.3.3 Stakeholders

The importance of the public sector in driving the MSP process is evident with 'public' and/or 'government' mentioned in 40% of papers.

The word 'private' is only mentioned in 14%, but specific stakeholders are mentioned more frequently, mainly 'fisher' which appears in 44% of paper titles or summaries. Scientists are mentioned in 18% of papers, mostly associated with environmental management, for example all references involving the Great Barrier Reef Marine Park, Australia.

Coastal communities are frequently mentioned among the main beneficiaries, due to increased living standards, environmental improvements, tourism development, etc. (PEMSEA, 2016).

'Organisations' are not mentioned explicitly, but some organisations / planning authorities in charge of the MSP process are mentioned, such as the Great Barrier Reef Marine Park Authority and the Rhode Island Coastal Resources Management

Council. There are also specific sector groups occasionally mentioned, mainly fisher groups such as Japanese Fishery Cooperative Associations.

Increased stakeholder involvement is consistently reported as one of the benefits from MSP. A number of papers and studies do link better interactions between stakeholders with an improvement of the economic environment, due to increased certainty, stability and reduction of conflicts. What remains to be addressed is how to quantify this effect, or, in other words, how to tease out the impact of increased stakeholder involvement on the performance of the blue economy as a whole. In the literature surveyed, increased stakeholder involvement is often measured through semi-structured interviews. Therefore, it may be relatively easy to establish whether in a country MSP contributed to better interactions between stakeholders and whether these better interactions had a positive effect on the blue economy. However, a precise quantification of the "better interaction effect" might be an extremely difficult exercise.

2.3.4 Geographic scope

45% of the selected papers relate to Europe or countries within Europe of which most relate to methods, but nearly half discuss the benefits of MSP.

By contrast, the 20% of papers associated with North America are primarily methods-focused. Similarly, the Caribbean (featuring in 6% of papers) are mostly on methods. The 18% of Asia-related papers are more evenly spread across the themes of benefits, methods and keys for successful MSP. This is also true of the Australia-focused papers (9%).

Figure 11 - Geographic scope of selected MSP papers

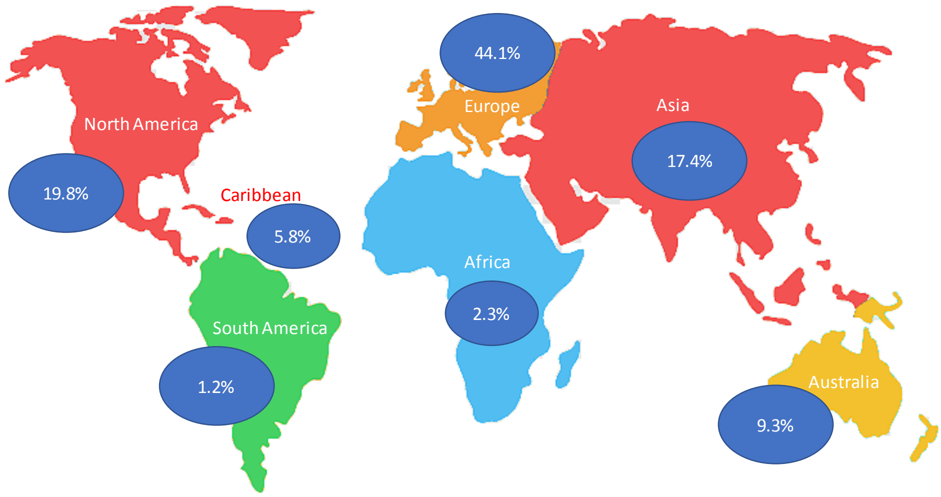


Table 10 - Main theme per geographic region of selected MSP papers

	Benefits	Methods	Success	Total
Europe	15	22	1	38
North America	1	14	2	17
Asia	5	6	4	15
Australia	2	3	3	8
Caribbean	0	4	1	5
Africa	0	2	0	2
South America	0	1	0	1
Not applicable	0	5	0	5
Total	**23**	**57**	**11**	**91**

2.3.5 Functional classification

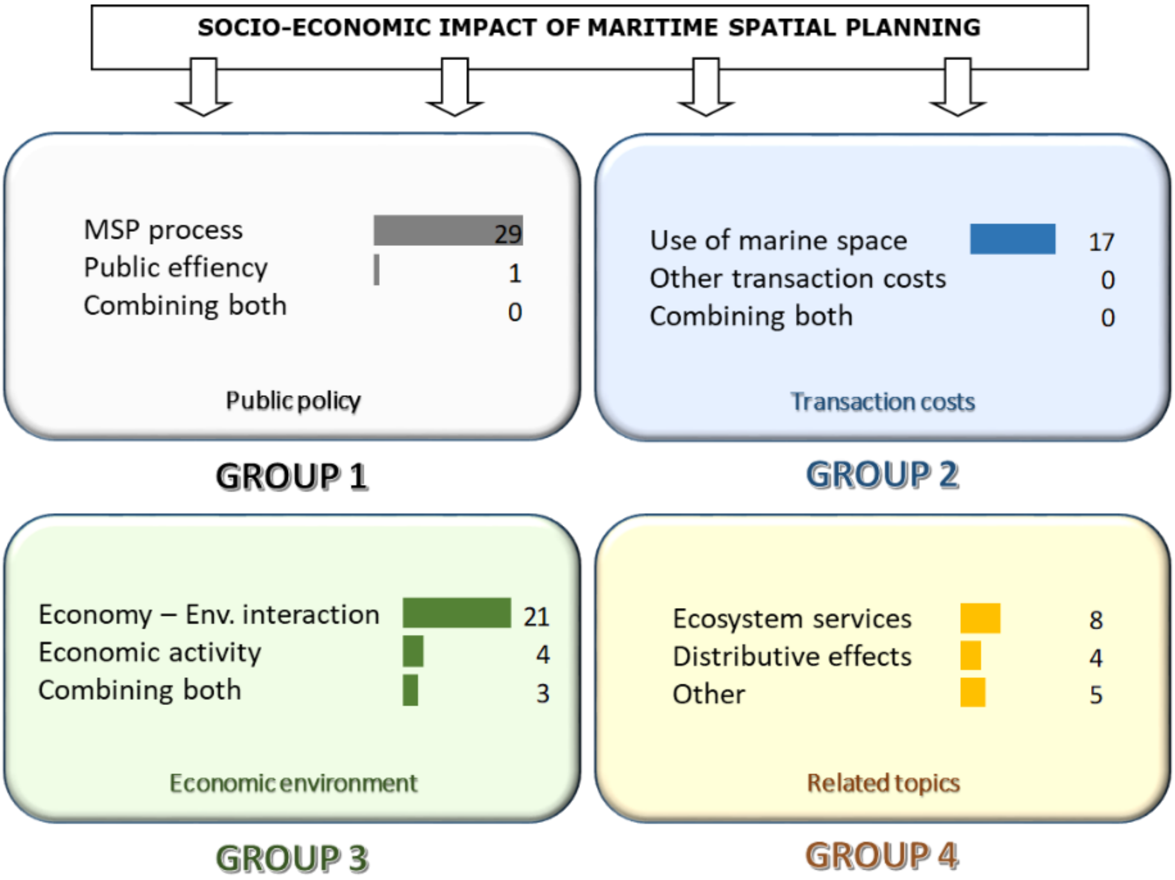
In relative terms, most papers fall under Group 1 'Public policy', although 70% of them are descriptive and only 30% adopt an analytical approach. The literature on 'Transaction costs' (Group 2) focuses on the use of marine space, but none of the reviewed papers is centred on the analysis of the reduction of administrative burden or other administrative costs (although they are both mentioned as a consequence). Fisheries are by far the most analysed sector, included in 100% of the reviewed papers. While a few studies deal with all the economic activities affected by a given spatial plan, other frequently analysed sectors are aquaculture, renewable energy and shipping.

Group 3 'Economic environment' is the most populated in terms of papers. Remarkably, 100% of the papers under it deal with applied methods, most of which tested on-going and/or fully implemented cases. The interactions between the economy and the environment are the most analysed topic. The quantification of economic benefits mainly concerns specific sectors (e.g. fisheries, renewable energy, aquaculture) or non-market goods (e.g. ecosystem services).

Finally Group 4 includes literature on other topics of marginal interest to the study.

Figure 12 reports the main sub-topics addressed in the literature for each type of function[12]

Figure 12 - Functional classification of the literature reviewed (n=92)



[12] The list of selected references includes a total of 91 papers/reports (see Annex I). However, Figure 12 reports 92 references, due to the fact that a document is classified under two different categories (Stakeholders participation and existing conditions).

2.3.6 Sequential classification

The papers analysed are distributed evenly across the three phases of the MSP process: 34% under Preparation, 34% under Elaboration and 32% under Implementation.

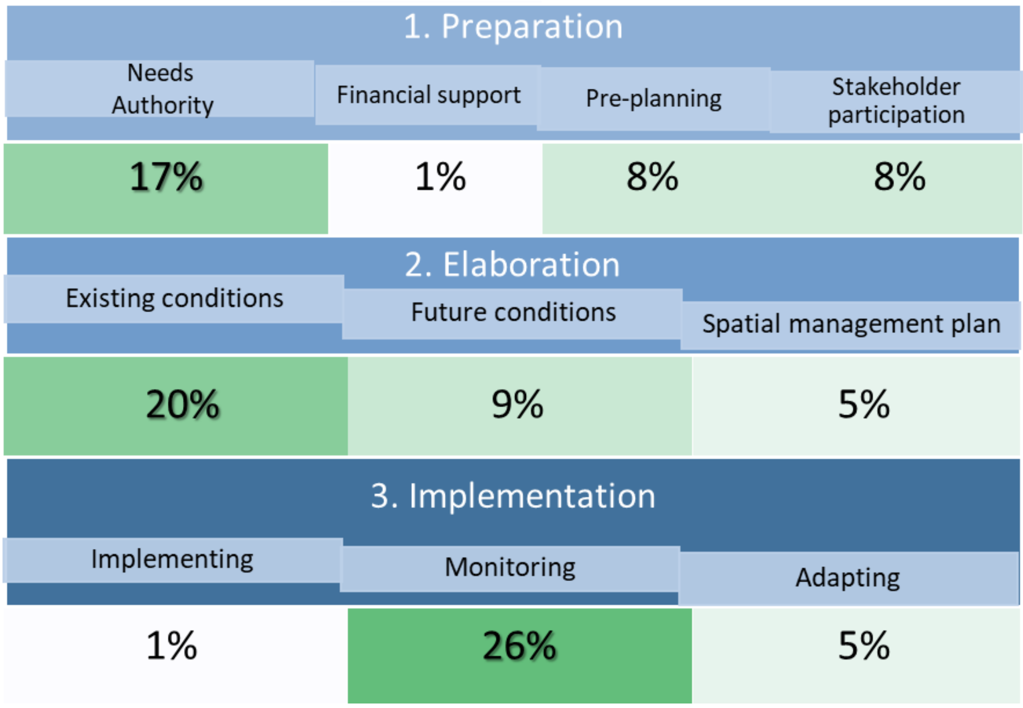
The literature on plans under preparation mainly focuses on the existing conditions and on the institutional framework, including the participation of stakeholders in the elaboration of the plan. Generally speaking, these papers describe the scope of implementation and the characteristics of the marine area. Therefore, it is mostly applied literature (66%) describing practical and real conditions of an ongoing or fully implemented plan. These contributions facilitate the understanding of the situation but are irrelevant to our study because do not include socio-economic valuations.

The same can be said for the Elaboration phase, where most studies do not venture into estimating the economic impact of a plan. Minor contributions can be extracted in terms of methodological approaches (e.g. willingness to pay) but their scope is different from this study's.

In the last phase, Implementation, the vast majority of literature focuses on the monitoring activities (through indicators and indexes). As observed with the other phases, the literature is merely descriptive of the effects of existing plans. No quantitative evidence has been found on clear positive effects of MSP, with few exceptions (forecasts and projections of current status of a plan).

Figure 13 reports the reviewed papers according to the 10 steps proposed by Ehler and Douvere (2009).

Figure 13 - The distribution of the reviewed literature along the three phases for implementing MSP



2.4 Benefits and impacts of MSP

By considering Maritime Spatial Planning (MSP) as an increasingly common approach to manage the use and protection of the resources, the ecosystems and the space of seas (Douvere 2008; Jay et al. 2013), the direct benefits and positive impacts are mostly related to management aspects. Indirectly, the implementation of this approach has an impact on the sectors that are affected by a plan. This fact is reflected in the often-cited definition that states that 'Marine Spatial Planning is a public process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that usually have been specified through a political process' (UNESCO-IOC 2010).

Many of the reviewed papers and reports find that: "most evidence of the economic benefits of MSP is qualitative rather than quantitative"[13].

Among the benefits that are consistently reported qualitatively are:

- Conflict resolution: by bringing different actors together, the MSP process tends to minimise or pre-empt conflicts between uses, between users, as well as between users and regulators.

- Trust building: a spill-over of participatory processes that, when effective, tend to build up trust and consolidate relationships between stakeholders[14].

- Stakeholder participation: participatory processes increase stakeholder participation in public decision-making. This point is strictly related to conflict resolution and trust building. MSP is no exception.

- Greater clarity of policy and decision-making: policy-making may often be obscure to citizens and stakeholders. There have been increasing concerns about the distance between policy-makers and the civil society, especially in the last few years with the upsurge of populist movements in western politics. In this sense, an inclusive decision-making process can only be beneficial to society.

- Improvement of information collection and retrieval: MSP is quite demanding in terms of data. Usually, the planning process has the unintended benefit of making available a wealth of data on the ocean and its uses, which would have been otherwise unavailable to non-government actors.

While these benefits are described qualitatively, they do generate quantitative benefits, e.g. by improving the investment and economic climate of a region or by reducing costs. How to tease out the impact that each of the above-mentioned benefits has on the blue economy and its sectors is a question that remains unanswered in the reviewed literature. However, their effects would still be captured in the economic performance of the activities affected by a plan.

In general, the benefits found during the review of literature can be grouped in the frame of a better management with the following sub-groups (EC, DG-Mare, 2011; Jay et al. 2017; PEMSEA, 2016):

- Contribution towards an evidence-based management:
    - Improving the data-gathering
    - Addressing key priorities
    - Giving greater consideration to costs and benefits of MSP
    - Increasing appreciation of the benefits of a clean environment
- Increases in management efficiency by, for instance:

[13] GHK Consulting, Potential benefits of marine spatial planning to economic activity in the UK, 2004, p. 68.
[14] Beierle and Konisky, Values, Conflict and Trust in Participatory Environmental Planning, Journal of Policy Analysis and Management, Vol. 19, No. 4, 2000, pp. 587-602.

- Reducing transaction costs
- Finding optimal locations for maritime activities
- Improving the coordination and integration with other planning frameworks and governmental organisations
- Providing flexibility and adaptiveness in MSP practice
- Lower dependence of communities on coastal and marine resources

- Sectorial acceleration, participation and well-being:
  - Committing to plan implementation
  - Improved investment climate
  - Gaining resources and political support
  - Gaining meaningful stakeholder participation
  - Improved standards of living among coastal communities

The table below offers an overview of the main benefits encountered in the literature analysed.

Table 11 - Benefits and impacts of MSP

Type	Benefit, impact or positive effect	Reference
Data-gathering	Non-market goods valuation.	Picone, 2017
	The baseline 2012 situation reveals that the planned offshore wind mill parks in the western Baltic Sea do not really interfere with important fishing grounds for the Danish fisheries. A notable exception is the large "Kriegers Flak" site where wind turbines are intended to be shared between Denmark, Germany, and ultimately Sweden.	Bastardie, 2018
Efficiency, coordination and integration	Coordination among governance layers (multiple spatial scales: national, regional, or state-level).	Bates, 2017
Finding optimal locations for maritime activities	Finding of the optimal location for offshore wind farms, by considering both economic and ecological aspects. The results show a revenue range (4,104 - 4,330 million €), forgone existence value for razorbills (0.64 - 3.24 million €) and gained existence value for plaice (0.12- 0.84 million €).	Punt, et al. 2009
Improved standard of living among coastal communities	The California Coastal Act raises the price and rental income of multifamily housing units located within the Coastal Zone. The total effect of regulation on prices, an increase of 13–21%, results from local benefits generated from restrictions on immediate neighbors and from amenities operating at a larger spatial scale.	Severen, 2018
Meaningful participation and commitment with the plan	Integrated view of marine space use and take into account all activities and agents involved.	Agostini, 2015
	In Rhode Island, proactive stakeholder engagement may have alleviated implementation delays due to opposition from key ocean users, and could also lead to jointly determined siting decisions for new technologies or mitigation measures that are effective, minimise costs, and are mutually agreeable.	Bates, 2017
	An approach that combines available (often few) data with engagement of people, community or stakeholders (through interviews).	Rassweiler, et al. 2014
	Establishment of a panel of various stakeholders and scientific experts, representing diverse interest groups, and evaluate their perspectives to draw distinctions and understand where attitude gaps and similarities lie.	Breen, 2014
Reduction of conflicts	Set the base for quantitative studies, e.g. studies can analyse the potential conflicts between current and future ocean uses, and optimise scenarios for development that maximises value.	Bates, 2017
Reduction of conflicts and sector acceleration	Scenario analysis for user-user conflict resolution where offshore aquaculture is being developed, displacing artisanal fishers.	Coccoli, 2018
	Considered interactions and trade-offs between sectors (aquaculture and others).	Gimpel, 2018

Type	Benefit, impact or positive effect	Reference
	Method for optimal siting of marine developments to minimise visual impact regarding the wind energy sector.	Griffin, 2015
	MSP that considers trade-offs among alternative scenarios by comparing key metrics for ecosystem services will resonate more deeply with local people, planners, government officials, and policy-makers.	Townend, 2002
	Forecasting building different scenarios linked to the management of marine space. The results highlight that the energy sector may remain the highest-value marine industry, a more balanced exploitation of multiple services should yield greatest value towards the end of this century. Additionally, a decline in oil and gas revenues, partially replaced by offshore renewables revenues.	Hull et al., 2017
Reduction of transaction costs	Thorough assessments of affected communities before energy developments are underway can increase economic efficiency and avoid lengthy and costly delays in project development.	Bates, 2017
	Money was saved thanks to the plan, by speeding up the permitting process.	Blau and Green, 2015
Wide considerations of Cost and Benefits - data gathering	Most of the investigated scenarios affect the trip planning decisions with adverse significant consequences on energy efficiency (so, a cost).	Bastardie, 2018
	Spatio-temporal mapping of users to determine Marine Potential Conflict index (MPCI) and seeking to identify and so reduce conflict/collision risk in multi-use areas Washington's MSP Data catalogue.	Freeman, 2016
	Examines the full costs related to coastal disasters including losses to natural, social, human and built capital. Main addition is factoring in natural capital. Informs better disaster preparedness with climate change increasing the likelihood of extreme weather events.	Gimpel, 2013
	Developed GIS tool to inform optimal siting of aquaculture (seabass and mussel examples used). Considered interactions and trade-offs between sectors.	Gimpel, 2018
	Information of the marine activities by valuations of several ecosystem services provided by marine sectors.	Guerry, 2012
	The plans studied likely created approximately $310 million, mainly through offshore wind developments in Rhode Island and Belgium. Government costs (estimated through interviews) seem to be negligible.	Blau and Green, 2015
	Some sectors were damaged by the plans, e.g. in Australia and Rhode Island the government decided to compensate fishermen for their expected losses. However, in the Netherlands and Germany, planners expect losses to be negligible, as fishing revenue is more constrained by overfishing than by lack of space. Some sectors may reap benefits from MSP while some other may bear additional costs. The net effect found is positive, but this essentially depends on the policy choices made.	Blau and Green, 2015
	They analyse the variables that can explain the current spatial distribution in Japan of the marine-protected areas (MPAs) and the Fishery Cooperative Associations (FCAs).	Keiko, 2017
	Lack of data jeopardises the evaluation of the socio-economic impacts linked to the spatial decisions adopted in MSP.	Pinarbasi, et al., 2017
	Method to follow-up and valuate the recreation and leisure activities.	Rees, et al., 2010 and 2015; Ruiz-Frau, et al., 2013
	Improvements in the conduction of risk assessments to evaluate the performance of a plan.	Stelzenmuller et al., 2015
	The study states future economic losses linked to MSP, due to access restrictions of fisheries on offshore windfarms areas; MSP needs comprehensive and spatial explicit socio-economic viability studies.	Stelzenmüller et al., 2016
	Elucidation of opportunity costs for different scenarios linked to the management of marine space.	Teixeira et al., 2018

Type	Benefit, impact or positive effect	Reference
	Integrated Coastal Zone Management in Xiamen (China) has led to a significant increase (over 40%) in annual socioeconomic benefits from its marine sectors.	Peng et al., 2006
	Highlights where plan has impacted: making policies statutory, cross-sector engagement, informed leasing, influenced business planning.	Marine Scotland Gov, 2018
	They analyse a wide marine space (a Large Marine Ecosystems (LME). The results highlight the importance of co-operation for LME governance as most areas stretch for more than 2 countries and prove that the economic valuations of marine ecosystems are critical in acquiring the attention of politicians towards transboundary agreements on the management of shared marine resources.	GEF, 2015
	Spatial identification and quantification of the relative monetary and non-monetary value of ecosystems and environmental threats. The results highlight that most of the high-valued places (both monetary and non-monetary) were close to coastal towns.	Klain et al., 2012
	Combined ecosystem vulnerability and anthropogenic drivers to produce a Cumulative Impact (CI) score and proposals of MSP.	Fernandes, 2017
Wide considerations of Cost and Benefits - data gathering and reduction of conflicts and sectorial acceleration	They analyse the opportunity costs of the displacement of pre-existing ocean uses by new uses on a regional scale. Particularly, the displacement of pre-existing ocean uses by new uses on a regional scale. The results highlight that a complete displacement of commercial fishing would result in estimated direct output impacts to the regional economy of $5 million, leading to $11 million in direct, indirect and induced impacts and a corresponding loss of about 150 jobs.	Hoagland P., et al., 2015
Wide considerations of Cost and Benefits - data gathering and improved standard of living among coastal communities	Zoning plan helped address governance issues and management concerns. It also promoted a participatory and multidisciplinary approach for strategies and plans. The main benefits identified were: improved standard of living among coastal communities; increased investments in tourism, increased revenue for the city, more job opportunities for the people; reduced dependence of communities on coastal and marine resources; increased appreciation of the benefits of a clean environment.	PEMSEA, 2016
	The report offers a method to calculate the impact of MPAs and (potentially) MSP on tourism. In Western Australia, the researchers successfully used tourism direct expenditure data when presenting a business case which is accepted to the Western Australian Treasury for increased management resources.	Department of Tourism of South Africa, 2017; Jones et al. 2011.
Wide considerations of Cost and Benefits - data gathering and reduction of transaction costs	The study aims at analysing the economic effects of MSP for the maritime economy and related stakeholders (employment and environmental effects are excluded). The analysis draws four scenarios and the values associated to each of them is measured in terms of MSP contribution to the various maritime economic activities (impact on transaction costs and level to which it accelerates the reference economic activity). The impact on transactions costs is assessed by a sensitivity analysis, while that on the acceleration of economic activities is analysed in terms of value added and government subsidies (to innovation). The results of the study are provided at EU level and presented according to data collection methods used (expert interviews, survey, validation by stakeholders) and maritime activities identified in the EU. In particular, once the value of each activity is known, the economic effects of MSP is estimated.	EC, DGMare, 2011

Type	Benefit, impact or positive effect	Reference
	The paper aims at assessing the socioeconomic benefits of MSP and identifying the key issues for improving its effectiveness by reviewing the literature. The study identifies the following as key issues for improving the effectiveness of MSP: gaining resources and political support, data-gathering, addressing key priorities, ensuring integration with other planning frameworks, gaining meaningful stakeholder participation, maintaining flexibility in MSP practice, committing to plan implementation, giving greater consideration to costs and benefits of MSP.	Jay, S., et al., 2017
	In the report, some benefits are suggested: facilitating sector growth; optimising use of sea; reducing costs.	RSPB, 2004

The literature shows that not all economic benefits have been shared equally. In general, scientific publications are more cautious when suggesting potential benefits, impacts and positive effects of MSP. A plausible explanation could be that the peer-review process induces researchers to be less assertive. In the case of grey literature, the process and the standards are different and the positive suggestions in favour of MSP may be related to a clearer advocacy approach.

Major capital-intensive projects such as wind farms have reaped the biggest economic benefits, mainly arising from greater certainty and speed of regulatory processes. Acceleration of activities is most likely to occur in sectors like renewable energy industry and aquaculture (EC, DG-MARE, 2011). Overall, newcomers who gain access to a highly competitive use of space tend to benefit the most from MSP. However, well established sectors may obtain substantial gains as well. For instance, seafloor cable developers in Massachusetts got their project approved 12-24 months faster than expected (Blau and Green, 2015).

After the revision of the literature, we can conclude that quantitative evidences are limited on the relation cause-effect between MSP and economic growth. However, two situations were documented:

Cause	Effect	Reference	Evidence
Regulation MSP: Belgium Master Plan: avoid public opposition and lost planning costs.	New value created (USD 230 million in annual gross revenue).	Blau and Green, 2015 OECD, 2017	Before the plan: costs for developers: USD 13 million in environmental assessments, site surveys, piloting, and more each time a permitting process failed
Regulation (Xiamen, China)	Increase in the socioeconomic net benefit: 9,145 million yuan	Benrong Peng et al., 2006 Wei Huang et al., 2015	Period time 10 years Five sectors considered: port, shipping, fisheries, aquaculture, and tourism. Scenario projections also confirm the effect.

2.5 Key success factors related to MSP

In a sense, this issue embodies the essence of this study, its answer being the ultimate purpose of our research. However, it is unlikely and perhaps too simplistic to identify a direct cause-effect relationship between MSP and the economic growth of one or more sectors of the blue economy *per se*. MSP is a policy where success – like any other given policy – depends on the objectives pursued, the strategy adopted, plus an array of external – and sometimes unpredictable – factors.

More realistically, one may claim to have established a cause-effect relationship between a specific plan in a specific country and the performance of the blue economy in that country. Some of the papers reviewed do indeed seek to tease out the impact of MSP on the blue economy, and they do so by carrying out case studies. Hence, it is possible to assess the impact of MSP on a sector or on a group of sectors. But this comes with an important caveat: correlation is not causation. Some papers quantify the economic costs and benefits of MSP by simply looking at the performance of one or more sectors before and after the entry into force of the plan. However, a more rigorous approach would entail controlling for confounding variables, so as to ensure that the effects observed can be exclusively attributed to MSP, and are not the product of external circumstances. A common way to do so is by concocting alternative scenarios for the same country, one with MSP and one without MSP[15]. Because they depict a fictitious reality, the scenarios are inevitably based on a series of assumptions and retain a certain degree of arbitrariness; the assumptions, however, can be verified and fine-tuned through structured interviews with key stakeholders. Incidentally, this is the same method proposed to develop the case studies under this study.

Data availability is an indispensable requirement for any cause-effect analysis. A weakness of several papers that attempt to quantify the economic benefits of MSP is the limited data available to support conclusions, risking assumptions of causation where there may simply be correlation. In view of the general lack of data that characterises the blue economy, stakeholder interviews play a pivotal role to bridge any gap. Albeit not as rigorous as empirical data, an educated guess from professionals is very useful when dealing with parameters which are inherently difficult to measure.

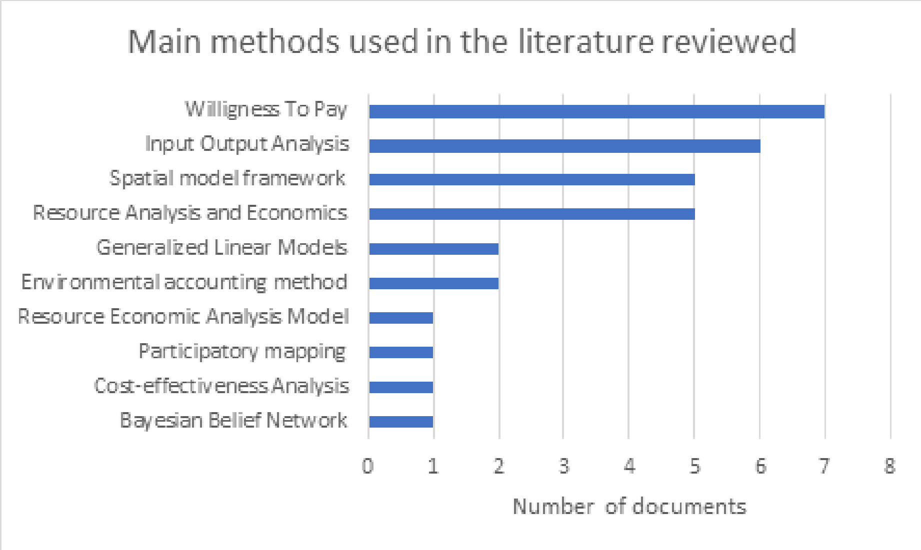
As to the factors that make it possible for MSP to spur economic growth, the literature surveyed is not particularly informative. Most of the papers that quantify the impact of MSP make a reference to the usual qualitative aspects that characterise a good planning process: long-term vision, participatory and inclusive consultation process, good data availability, cross-border coordination, acknowledgment of land-sea interaction. However, these aspects are more than often taken for granted as essential requirements for a successful plan; and they certainly are. But, as of today, to our best knowledge there has been no attempt at establishing a cause-effect relationship between the application (or lack of) of these principles and the impact of the plan on the blue economy.

2.6 Methods applied in the framework of MSP

One of the main aims of the literature analysis was to carry out a critical review of the methods used to quantify the economic benefits of MSP. However, we found that very few papers and reports approached the research question in a way that is comparable to the scope of our study; therefore, the contribution of other studies in terms of methods is not particularly enlightening. In principle, we can conclude that input-output and cost benefit analyses – i.e. the methods proposed for our study – are in line with the literature on the economic benefits of MSP. The figure below summarises the main methods presented in the literature review.

[15] Peng et al. On the measurement of socioeconomic benefits of integrated coastal management (ICM): Application to Xiamen, China, Ocean & Coastal Management 49 (2006).

Figure 14 - Main methods used in literature



The most frequent method is Willingness to Pay (WTP). WTP measures the maximum price that an individual is willing to pay to obtain a product, a service or a good. It is often used to quantify the value non-market goods and services (e.g. ecosystem services, externalities), whose value, absent market prices, is measured by how much a group of individuals are willing to give up to obtain them. The main techniques used in the reviewed literature are 'revealed' and 'stated' preferences and 'travel cost'. These are defined through semi-structured interviews in discrete choice experiments, where people are asked to choose between a set of alternatives. The scope and the aim of our study, i.e. sectorial and national/regional economies growth, discourages the use of this method, which tends to be time-consuming and probably more useful to measure ecosystem services and/or other externalities. However, some contributions might be explored to perform the cost-benefit analysis.

Input-output analysis is the second most frequent method used. In the paper that share most similarities with the scope of our study, 'Regional economic and environmental analysis as a decision support for marine spatial planning in Xiamen' (Huang, W., 2015), an input-output analysis is used to measure the economic impact of Integrated Coastal Zone Management.

Spatial model framework, on the other hand, refers to a series of models that combine econometrics, spatial statistics and GIS tools. Among the methods used are: biodiversity planning assessments (BPAs), DISPLACE, Aquaspace GIS-based model and InVEST framework models. These four models need to be applied in an ad-hoc case, being very data demanding and providing results not necessarily in the scope of our study (e.g. valuation of ecosystem services, forecasting of biological variables).

Resource Economic Analysis and Generalised Linear Models are common methods used in economics through the analysis of time-series of different variables or the cost or revenue structures of certain sectors. Some lessons could be extracted, as well as the data used in the literature (mainly in the papers related to the Scotland case). On the contrary, participatory mapping, environmental accounting method, and the Bayesian Belief Network are clearly out of the scope of our study.

2.7 Positive relations for blue sectors linked to MSP

If one looks at the body of research analysed for this study, there are some sectors that tend to reap more benefits than others, such as offshore wind and marine renewable energy. However, one should not jump too quickly to the conclusion that there might a direct link between MSP and these emerging sectors. MSP is a policy which reflects the objectives pursued by policy-makers when allocating marine space. In the last few years there has been an increasing groundswell of public and policy opinion towards the objectives of environmental conservation. This, together with internationally-agreed emission reduction targets, might persuade a planning authority to those sectors perceived as 'clean' over more established uses of the ocean, such as fishing or extraction of oil and gas.

MSP is a policy of allocating a scarce resource – marine space – among several competing uses. Economists call a 'Pareto improvement'[16] a new allocation that makes at least one individual better off, without making any other individual worse off. In the real world, Pareto improvements are extremely rare, as any re-allocation implies a trade-off. MSP is no exception to this rule; if a portion of marine space is allocated to an activity – say a wind farm – it follows that, in principle, that same portion cannot be allocated to other uses – say oil extraction. The policy can be considered desirable from the social point of view, only if overall benefits (regardless who reaps them) outweigh costs (regardless who bears them). This issue can also be framed in the concept of "opportunity cost", meaning the benefits missed out upon choosing one alternative over the other.

Some of the analysed studies correctly highlight the inevitable existence of trade-offs and opportunity costs, while others overlook them, focusing only on immediately visible costs and benefits. At the same time, a case can be made that a given sector that 'was disadvantaged' from MSP might have suffered even greater economic losses without the plan. The handbook example here is a wind farm that was going to be built on an especially productive fishing ground[17], but thanks to careful planning was built elsewhere.

However, it should also be noted that in the marine environment not every new allocation of space does necessarily lead to a trade-off between two or more sectors. While some sectors inevitably compete for the same space (e.g. fishermen cannot fish in an aquaculture farm), some others can coexist, and under the right circumstances, multi-use of a marine site through co-location of complementary activities can result in more efficient use of ocean space[18].

Trade-offs and opportunity costs could be a plausible explanation to account for the energy sector reaping more benefits from MSP than 'incumbent' industries. Nevertheless, in principle, nothing prevents a planning authority from resolving to privilege established uses of the ocean over emerging activities. In the end, it depends on the objectives which each plan aims to pursue. A potential lesson is that, when quantifying the economic impact of MSP, one should treat each plan as a specific case, resisting the temptation to generalise from past experience. A plan is efficient when it achieves the objectives pursued by the planning authority and when its benefits outweigh its costs, regardless of the sectors that reap the highest benefits.

Furthermore, it is worth mentioning that, in view of the above-mentioned trade-offs, certain planning authorities resolve to compensate the actors that end up being

[16] From the Italian economist Vilfredo Pareto (1848-1923).
[17] Blau J., Green L., Assessing the impact of a new approach to ocean management: Evidence to date from five ocean plans, Marine Policy 56, 2015, pp. 1-8.
[18] Kite-Powell H.L., Economics of Multi-use and Co-location, in Aquaculture Perspective of Multi-Use Sites in the Open Ocean, pp. 233-249, 2017. Please also see the H2020 project MUSES – Multi-Use in European Seas: https://muses-project.com/.

disadvantaged by a plan. This is the case of the Australian and Rhode Island plans, which compensate fishers for their expected losses. However, from the cost-benefit standpoint, these compensation plans are counted as costs if the payments come from the public budget.

Below are listed examples of trade-offs found in the literature reviewed:

- **Fishing activity**: reduction of fishing opportunities and fishing grounds, restricted areas, adverse impacts on fuel cost and profitability due to longer trips from harbour to fishing grounds that affect energy efficiency (e.g in the Baltic Sea; Bastardie et al., 2015).
  Some MSP plans (e.g. Australia or Rhode Island) include compensation to fishermen for their expected losses. In the EU (e.g. NL or DE) losses are expected to be negligible, as fishing revenue is more constrained by overfishing than by lack of space (Blau and Green, 2015). In particular, small-scale fisheries seem to be a sensitive fleet segment to new developments (e.g. offshore aquaculture facilities in Spain; Coccoli, 2018). Case studies provide figures of the likely impact; e.g. in Rhode Island the "complete displacement of commercial fishing would result in estimated direct output impacts to the regional economy of $5 million, leading to $11 million in direct, indirect and induced impacts and a corresponding loss of about 150 jobs" (Hoagland et al., 2015). The impact is greater the more disruptive the change; for instance, zoning in an Australian park in 2004 increased the non-extractive areas from 4.5% to 33% of the park (GBRMPA, 2017).

- **Shipping**: additional fuel cost due to longer routes to avoid offshore energy infrastructures (ABPmer, 2013)

- **Tourism**: reduction in tourist expenditure due to harm to coastal scenery by offshore energy infrastructures (ABPmer, 2013)

- **Sand and gravel extraction** (e.g. Massachusetts and Belgium; Blau and Green, 2015): Planning includes new regulations that limited short-run profits in the interest of conservation and long-term sustainability. For instance, extending fisheries management closures to other industries. In Belgium, increased extraction fees (in 2004) and the 2014 plan will gradually decrease the total amount of extraction permitted.

- **Real State coastal developments and coastal residents** (e.g. if other marine developments impact property prices; Bates, 2017): facilities and infrastructures that potentially generate local or widespread landscape harm (e.g. if wind turbines or aquaculture facilities are developed in the area) as well as an escalation in industrial activity on shore may affect the prices for real state coastal developments; at the same time, coastal planning may provide protection from undesirable development on adjacent properties or areas (Severen et al., 2018)

2.8 Lessons learned

The review of literature confirmed the initial expectations of the research team: apart from isolated initiatives, there have been no systematic and methodologically-rigorous efforts to quantify the costs and benefits of MSP.

There are several explanations to account for the lack of studies on the economic impact of MSP, the most obvious being that, with a few notable exceptions, MSP is still a relatively recent practice, and thus the literature on its economic impact is not extensive. A confirmation for this explanation can be found in the ever-increasing number of publications, especially in the EU, since the entry into force of Directive

2014/89/EU (Figure 2). Because the Directive establishes an obligation for Member States to implement a plan, more and more researchers have been looking into the practice in the last few years. At the same time, one should consider that there is a large body of research on other aspects of MSP such as methodological and process studies. Therefore, MSP as an emerging area of research is not the sole reason for the paucity of information currently available on the economic costs and benefits of MSP.

Another factor that may be limiting current research efforts is that the economic effects of MSP are inherently difficult to gauge, due to the limited quality and availability of data on certain sectors of the blue economy (e.g. offshore wind energy, coastal tourism), and the inability to isolate the impacts of MSP from other factors influencing the performance of the blue economy.

Poor data availability is consistently reported as one of the toughest barriers to economic research on the blue economy. This is mostly due to the current statistical classification systems grouping economic activities according to their function, rather than to where they take place. As a consequence, it is extremely difficult to have access to reliable data for many sectors of the blue economy unless strong assumptions are made.

In the case of MSP, data difficulties are accentuated by the fact that many benefits (or costs) relate to intangible aspects (e.g. conflict resolution, trust building, increased stakeholder participation), whose economic quantification is fraught with uncertainties[19]. Several papers reviewed for this study do indeed propose possible methods to quantify the economic impact of MSP, but either do so at a very theoretical level, or they are applied to a small number of sectors rather than to the complete array of blue economy sectors.

The type of benefits yielded by MSP also plays a role. Amongst other things, MSP often responds to objectives of environmental conservation, hence a wide number of papers and reports focus on quantifying ecosystem benefits, which are out of the scope of this study. While a thorough overview of the full costs and benefits of MSP should not overlook positive and negative externalities – in fact, these may often outweigh the purely economic costs and benefits of a policy – the methods to quantify them are not appropriate for this study, as ecosystem services are out of its scope.

Finally, there is rarely any opportunity for counterfactual evaluation. Generally speaking, the concrete implementation of MSP reflects the unique nature of the blue economy and the circumstances in the planning country/region, and cannot be easily replicated or compared to the same situation without MSP.

2.9 Conclusions

- Despite the rich body of literature reviewed, very few papers and reports can be considered fully relevant to this study. Many authors either focus on qualitative benefits from MSP (without quantifying their impact) or on environmental and ecosystem benefits, which are not in the scope of this study.

- 45% of the reviewed papers and reports relate to Europe or European countries.

[19] See, for instance on shadow prices, Peng et al. On the measurement of socioeconomic benefits of integrated coastal management (ICM): Application to Xiamen, China, Ocean & Coastal Management 49 (2006), p. 99.

- In terms of themes analysed, most papers focus on 'methods' from a theoretical point of view, with only a fraction of the papers dealing with benefits/impacts.

- It follows that this study will be one of the first attempts at quantifying all the costs and benefits of MSP.

- The fishing sector is mentioned in two thirds of the reviewed papers and reports. Tourism and the energy sector are mentioned in one third of the papers and reports. Aquaculture and shipping are also sectors that are frequently looked at.

- Generally speaking, plans have typically not brought major economic benefits to incumbent industries such as commercial and recreational fisheries, tourism and shipping. Rather than being an inherent feature of MSP, this seems to be a policy choice made by the planning authorities.

- Coastal communities are frequently mentioned among the main beneficiaries of MSP, due to increased living standards, environmental improvements, tourism development, etc.

- In terms of methods, most authors used 'willingness to pay', mainly to assign a monetary value to environmental benefits and ecosystem services. Input-Output analysis is the second most frequent method used.

- Most evidence of the economic benefits of MSP is qualitative rather than quantitative. This reinforces the case for a study that carries out a quantitative assessment of the benefits (or costs) generated by MSP. Among the most frequently reported benefits are:

    - Reduction of conflicts between sectors and between stakeholders
    - Greater clarity and certainty (ultimately leading to an improved investment climate)
    - Reduction of transaction costs (including red tape, permitting and licencing costs)
    - Improvement of information collection and retrieval
- It is extremely difficult, if not impossible, to draw general conclusions on the key success factors for MSP, when it comes to its economic impact. More realistically, one may establish a cause-effect relationship between a specific plan in a specific country and the performance of the blue economy in that country. The success factors can be inferred either by looking at common features of successful plans – i.e. those whose benefits outweigh their costs – or through interviews with stakeholders.

- While many papers mention the consideration of land-sea interaction as an indicator of good MSP, none ventures to measure the benefits from land-sea interaction.

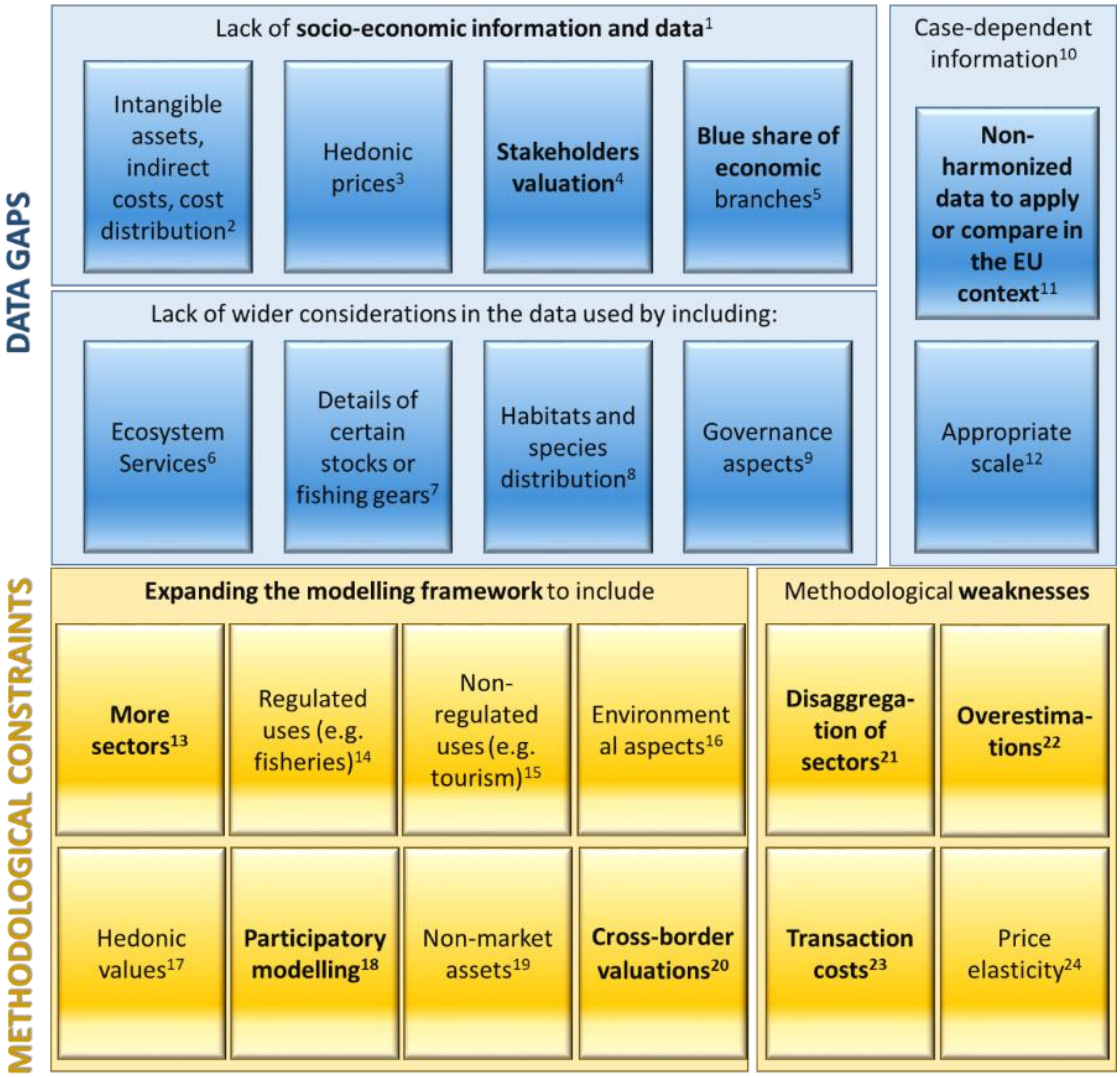
3 Gap analysis

3.1 Discussion

The analysis of the literature reviewed took stock of the knowledge available in terms of evidence of the economic impact linked to MSP. *A priori*, the findings of the literature review should be used to identify areas that have not yet been explored or are under-explored in previous research, applying a sectoral (blue economy sector), conceptual (benefits, success factors, processes) and methodological approach (method used for assessing the impact). However, Task 1 and 2 have highlighted that the literature focusing on evaluating the economic impact of MSP is rather limited. One of the main conclusions of the review process is the poor availability in literature of evidence on quantitative economic benefits linked to MSP. The currently available evidence is dominated by literature on the economic benefits brought by MSP to the energy sector (mainly oil and wind) with references to an efficient use of the marine space by combining certain uses (e.g. aquaculture and fisheries). Most papers and reports merely provides a description of the sector analysed without identifying a cause-effect relationship between the implementation of MSP and the benefits or costs reported.

The gap analysis aimed to identify any existing gaps in research regarding benefits (or costs) from MSP, and propose options to bridge them. The findings will be used to inform and fine-tune the proposed method to develop the case studies (Task 4). The first stage in this analysis was to classify gaps according to their nature (e.g. data, methodological constrains, knowledge void, contradictory evidences). Then, each gap was assessed in terms of relevance for the implementation of the study, generating a preliminary list of gaps for verification. The main groups of gaps are related to data gaps and methodological constraints but both can be disaggregated into specific gaps. Figure 15 provides a visual overview of the gaps identified.

Figure 15 - Main gaps identified in the literature review[20] (in yellow those relevant to our study)



The main gaps can be grouped into two categories: one related to data and one related to methods used. The gaps linked to data can be further grouped into 3 types: those related to the lack of data *per se*; to the characteristics of the data, or to the lack of certain details. This first group embraces gaps on 'intangible assets, indirect costs, cost distribution' (Gaddis, E. B. 2007, Peng et al. 2006), 'hedonic prices' (Guerry, A. D, 2012), 'stakeholders valuation' (Ruiz-Frau, A. et al., 2015; Oliveira Ferreira, M. A., 2016) or lack of data which preclude the identification of the "blue" share of an economic branch (McGilorm, 2009). Stakeholder engagement (including their insights and perceptions), as well as the identification of the 'maritime

[20] [1] Agostini, V. N, 2015; Ban, N. C., 2009; Caldow C, 2015; Brown, C. J., 2016; Rees, S.E., M., 2015; [2] Gaddis, E. B. 2007, Peng et al. 2006; [3] Guerry, A. D, 2012; [4] Ruiz-Frau, A.,et al., 2015; Oliveira Ferreira, M. A., 2016; [5] McGilorm, 2009; [6] Cordier, M., 2011; Verutes et al 2017; [7] F. Picone, 2017; Teixeira et al., 2018; Van de Geer et al., 2013; Metcalfe, K., 2017; [8] Fernandes, M. da L., 2017; Bastardie, F., 2018; [9] Van de Geer et al. 2013; [10] Caldow C, 2015; Peng et al, 2006; [11] Gimpel, A, 2018; Blau, J., 2015; DG-Mare, 2011; [12] Papathanasopoulou, E., 2016; Sangiuliano, S., 2017, Peng et al, 2006; [13] Coccoli, C., 2018.; Freeman, M. C, 2016; Kemal, P., 2017; Jin, D., 2013; Jay, S., 2017; Norwegian Ministry of Environment, 2013; GBRMPA, 2014; McGilorm, 2009. [14] Freeman, M. C, 2016; Reniel B. C., 2017; Sanchirico and Wilen, 2007; Sanchirico et al., 2013. [15] Rees, S.E., 2010; Ruiz-Frau, A., 2013; Deloitte Access Economics, 2017. [16] Gimpel, A., 2013; Klain S.C., 2012; Janßen, H. and Schwarz, F., 2015. [17] Griffin, R., 2015. [18] Ritchie and Ellis, 2010; Klain S.C., 2012. [19] Breen, B., 2014; Hull, S. 2014. [20] Waitt Institute, 2016. [21] Huang, W., 2015. [22] Mason, J., 2012; Huang, W., 2015; RSPB, 2004. [23] DG-Mare, 2011. [24] Nobre A.M., 2009.

proportion' of some economic activities (e.g. transport, energy), are the key elements to be prioritised. The gaps related to the characteristics of the data and their level of detail are related to environmental aspects (e.g. 'ecosystem services', 'habitats and species distribution'), to the specificities of a sector (e.g. fishing gear and areas in fisheries sector) or case-dependent data in non-EU regions.

The other group of gaps, more focused on methodological constraints, refers to models or frameworks that could be expanded and to methodological weaknesses in general. For the first subgroup, the parameters, scope and approaches to expand them are "more sectors" (i.e. expand the analysis' scope with more economic sectors) (Coccoli, C., 2018.; Freeman, M. C, 2016; Kemal, P., 2017; Jin, D., 2013; Jay, S., 2017; Norwegian Ministry of Environment, 2013; GBRMPA, 2014; McGilorm, 2009), "regulated uses" (Freeman, M. C, 2016; Reniel B. C., 2017; Sanchirico and Wilen, 2007; Sanchirico et al., 2013) and "non-regulated uses" (Rees, S.E., 2010; Ruiz-Frau, A., 2013; Deloitte Access Economics, 2017), "environmental aspects" (Gimpel, A., 2013; Klain S.C., 2012; Janßen, H. and Schwarz, F., 2015), "hedonic values" (Griffin, R., 2015), "stakeholders insights" (Ritchie and Ellis, 2010; Klain S.C., 2012), "non-market assets" (Breen, B., 2014; Hull, S. 2014) or "cross-border valuations" (Waitt Institute, 2016). As far as methodological weaknesses are concerned, they are mostly related to overestimation (Mason, J., 2012; Huang, W., 2015; RSPB, 2004), limitations in the disaggregation of sectors in the economic information (e.g. in the input-output tables, in a NACE code) (Huang, W., 2015), difficulties to estimate transaction costs (DG MARE, 2011), the gap of including price elasticity in the model as well as the number of assumptions to monetise the value of coastal tourism (Deloitte Access Economics, 2017).

In terms of improving a model or a simulation framework, there are key elements proposed in literature to bridge the gaps:

- Consideration of opportunity costs (Goti-Aralucea, L., 2017; Van de Geer et al. 2013) and trade-offs (Punt, M. J., et al., 2009; Hoagland P, 2015) in order to evaluate alternative behaviour or decisions linked to a baseline scenario. This allows to know the most preferred alternative given up and assess the costs and benefits related to that alternative.
- Reduction of uncertainty (Mason, J. 2012; DG-Mare, 2011) by conducting sensitivity analysis (Spencer-Cotton et al 2018; Verutes et al 2017), using scenarios with several alternatives of one parameter (e.g. discount rate) to determine the present value of future cash flows or benefits.

When it comes to the case studies, the trade-offs among sectors can be addressed through different scenarios evaluated within the Input-Output analyses. A sensitivity analysis can be developed within the cost-benefit analysis by considering different discount rates.

The next steps in the gap analysis included a gap assessment and prioritisation. Gaps were assessed based on how likely and to what extent they can impact the implementation and outcome of the case studies. Afterwards, gaps were cross-checked against the proposed methodological approach. Priorities were established for each gap: 'low' if the gap did not have any relevance to the goals of the study; 'medium' if the gap had moderate relevance (because it affected or influenced indirectly any step or method); 'high' if the gap was directly related to the methods or data proposed for the case studies. The result of this exercise is included in Table 12 overleaf.

Table 12 - Gap assessment, prioritisation and mitigation strategy

Group	Gap	Description	Priority	How to fill the gap
Data gaps	Intangible assets, indirect costs, cost distribution	Cost accounting lacks detail and comprehensiveness that hamper the assessment of MSP economic impacts.	**Medium**	Secondary information from National Statistics Institutes (NSIs) and sectorial reports. This information is relevant but not essential for the analysis because the approach is sectorial.
	Hedonic prices	The implicit price of non-market goods/services (e.g. landscape views) that are/have been or could be affected by MSP is currently unknown.	**Low**	This topic is out of the scope of the project and does not influence the selection methods for the economic impact analysis
	Stakeholders valuation	What stakeholders consider economic benefit linked to MSP has not been gathered	**High**	The survey/interviews will include specific questions to address this gap (planned in the Task 4).
	"Blue" share of an economic branch	Several sectors (e.g. tourism) do not have a clear cut between land-base and maritime activities. There is no consolidated data gathering	**High**	The survey/interviews will include specific questions to address this gap (planned in the Task 4). In addition, the "Study on the establishment of a framework for processing and analysing of maritime economic data in Europe"[21] developed several methods to calculate the blue share or maritime proportion of the sectors that are not "fully maritime".
	Ecosystem services	Benefits derived from marine ecosystems (e.g. primary production) have not been systematically analysed	**Low**	This topic is out of the scope of the project and it does not influence the selection methods for the economic impact analysis

[21] Cogea et al., Study on the establishment of a framework for processing and analysing of maritime economic data in Europe, 2017.

	Gap	Description	Priority	How to fill the gap
Data gaps	Biological and environmental details	Missing information regarding habitats and species relevant for given sectors (e.g. fisheries or cables)	**Low**	This topic is out of the scope of the project and it does not influence the selection methods for the economic impact analysis
	Governance descriptions	Functional descriptors (decision-making capacity) and assessment of the effectiveness of the governing MSP structure are not available	**Medium**	The description of the case studies will include references to the governance framework where the case is carried out
	Case-dependent information	Case specific features may require gathering primary data for the scope of the study	**Medium**	The sources of data for the case studies allow to collect the information. Qualitative information related to the case will be gathered through interviews
	Appropriate scale	Contextual and case specific features may render the information unsuitable for the MSP scale (i.e. national)	**Low**	The sources of data for the case studies allow to collect the information. Qualitative information related to the case will be gather through interviews.
	Non-harmonised data	Contextual and case specific features may render the information unsuitable for comparative analysis.	**High**	Secondary information from (NSIs) will be used in the Input-Output analysis as well as in the cost-benefit analysis, minimising the effect of this gap. In addition, the indicators and other relevant information will be collected from sectorial reports, considering the harmonisation of data (especially for the US case) as a key step in the analysis process.
Methodological constraints	Expand the analysis' scope with more economic sectors	How to expand from a micro-economic analysis (e.g. prices, demand levels) towards a	**High**	The regulated uses will be defined in the plan of the case study, and their economic

Group	Gap	Description	Priority	How to fill the gap
		macro-economic scope (e.g. a broad set of sectors).		relevance will be assessed in each phase of Task 4. Additionally, the Input-Output analysis is an adequate methodology to include several sectors of an economy (Miller and Blair, 2009)
	Regulated uses	The accuracy of the models is not easily transferable from a narrow scope (e.g. aquaculture) towards an inclusive one (e.g. aquaculture and wind energy).	**Medium**	The sectors will be defined in the plan of the case study, and their economic relevance will be assessed in each phase of Task 4. Additionally, the Input-Output analysis is a proper methodology to include several sectors of an economy (Miller and Blair, 2009)
	Non-regulated uses	The accuracy of the models is not easily transferable from a narrow scope (e.g. sea bottom) towards an inclusive one (e.g. sea bottom and tourism).	**Low**	This topic is out of the scope of the project and does not influence the selection methods for the economic impact analysis
	Environmental aspects	The methods available do not fully consider the environmental parameters	**Low**	This topic is out of the scope of the project and does not influence the selection methods for the economic impact analysis
	Hedonic values	The methods available do not fully consider non-market (e.g. landscape views) parameters	**Low**	This topic is out of the scope of the project and does not influence the selection methods for the economic impact analysis
	Stakeholders insights	The methods available do not easily integrate qualitative insights (e.g. behavioural preferences)	**High**	Interviews with stakeholders will include specific questions to address this gap (planned in Task 4).
	Non-market assets	The methods available do not easily integrate non-market	**Low**	This topic is out of the scope of the project and does not

	Gap	Description	Priority	How to fill the gap
Methodological constraints		assets (e.g. pollution)		influence the selection methods for the economic impact analysis
	Cross-border valuations	Most methods used focus on micro-economics and do not fully consider cross-border issues.	**High**	In the scenario development phase, the cross-border interaction will be included as a potential scenario. The interviews/survey will include questions related to this aspect. This topic will be discussed during the interim meeting
	Overestimation	Lack of granularity[22] of some approaches may hamper the accuracy in the estimation of economic impacts. The double accounting of positive effects could be translated to several sectors.	**High**	The survey/interviews will include specific questions to address this gap (planned in Task 4). Use of generally accepted methods (input-output analysis and cost-benefit analysis) as well as the limitation of assumptions and estimations.
	Disaggregation of sectors	Methodological requirements, in particular Input-Output analysis, are data intensive (volume, sources) and preclude detailed analysis	**High**	The survey/interviews will include specific questions to address this gap (planned in Task 4).
	Transaction costs	Some methodological approaches do not include cost structure (including transaction costs).	**High**	The interviews/survey will include questions related to these aspects in order to focus the cost-benefit analysis on the potential benefits (or losses) for the public administration

[22] Size in which data fields are sub-divided.

	Gap	Description	Priority	How to fill the gap
Methodological constraints				engaged in MSP. However, it should be noted that some of the reviewed papers reports the costs for the public administration to be negligible.
	Delimitation of coastal tourism	Several attempts to set a methodological approach to delimitate coastal tourism have not generated scientific consensus.	**High**	Secondary information from Eurostat, National Statistical Institutes (NSIs) and sectorial reports. The Input-Output analysis will include the economic impact of the MSP sectors, considering also their relation with the service sectors (e.g. tourism activities). Additionally, previous studies related to establish data collection methods for the European Blue Economy will fill in this gap.
	Price elasticity	This parameter is not related to microeconomic approaches, which are not present in the literature review for estimating the economic benefits of MSP.	**Low**	This topic is out of the scope of the project and does not influence the selection methods for the economic impact analysis

3.2 Conclusions

The conclusions of the gap analysis confirm the importance of collecting qualitative information during Task 4 to overcome several of the gaps identified. In particular, the valuation and quantification of the effects caused by the implementation of MSP as well as the identification of benefits (at sectoral level to be included in the input-output analysis) and transaction costs (at public administration level to be included in the cost-benefit analysis). Additionally, the use of official data (mainly from Eurostat[23] in 4 of the 5 case studies) allows to carry out the same type of analysis and develop relevant scenarios to compare the results between them (e.g. cross-border relations).

The literature identifies the **input-output analysis** and **cost-benefit analysis** as the most used methods for estimating the economic effects linked to MSP. In Task 4, both are be applied. On the one hand, the input-output analysis is used to assess the effect on an economy of changes in elements that are exogenous of that economy. On the other hand, the cost-benefit analysis focuses on estimating the net value of implementing MSP for the public administrations by comparing the costs and benefits of this policy against the inexistence of it. Like any other analytical method, the proposed methods have limitations which are classified as high in the gap analysis. In order to overcome them (overestimations, sectorial disaggregation and estimation of transaction costs), the models applied use the most accepted approaches in academia:

- Estimating the multipliers effects of the changes related to MSP using demand-drive models considering changes in final-demand elements (Miller and Blair, 2009) and reducing the number of assumptions and estimations.
- Proposing a series of scenarios with different discount rates to carry out a sensitivity analysis, integrating expert knowledge of companies, policy-makers, marine clusters and other key relevant stakeholders.
- Being cautious when making cause-effects relations between positive economic impact and MSP due to the lack of literature on this matter. Just as we should resist inappropriate extrapolation of results beyond the situations to which they apply (as the Directive 2014/89/EU states), we should also resist universal rejection of analytical procedures that can be informative when their limitations are recognised.

Finally, it should be noted that some knowledge gaps might require consistent, organised research effort beyond the scope of this study (e.g. those related to data collection or valuation of non-market assets). If applicable, the update of this gap analysis will include practical paths to tackle them through on-going actions (e.g. including research topics in the forthcoming working programmes of the European Commission, the European MSP Platform, and the Terms of Reference of the ICES Working Group for Marine Planning, combining data gathered through the Data Collection Framework).

Nevertheless, all things considered, it is believed that the gaps identified do not jeopardise the overall development of the case studies. There are sufficient data sources to cover the economic activities affected by the plans that are analysed. The only sector for which data from primary sources may not be available is cable and pipeline laying, for which data need to be collected either through secondary sources (including commercial providers) or through interviews with business professionals.

In terms of methods, considering that the scope of the study excludes ecosystem services (probably the most problematic area of analysis), no particular limitations are envisaged at this stage.

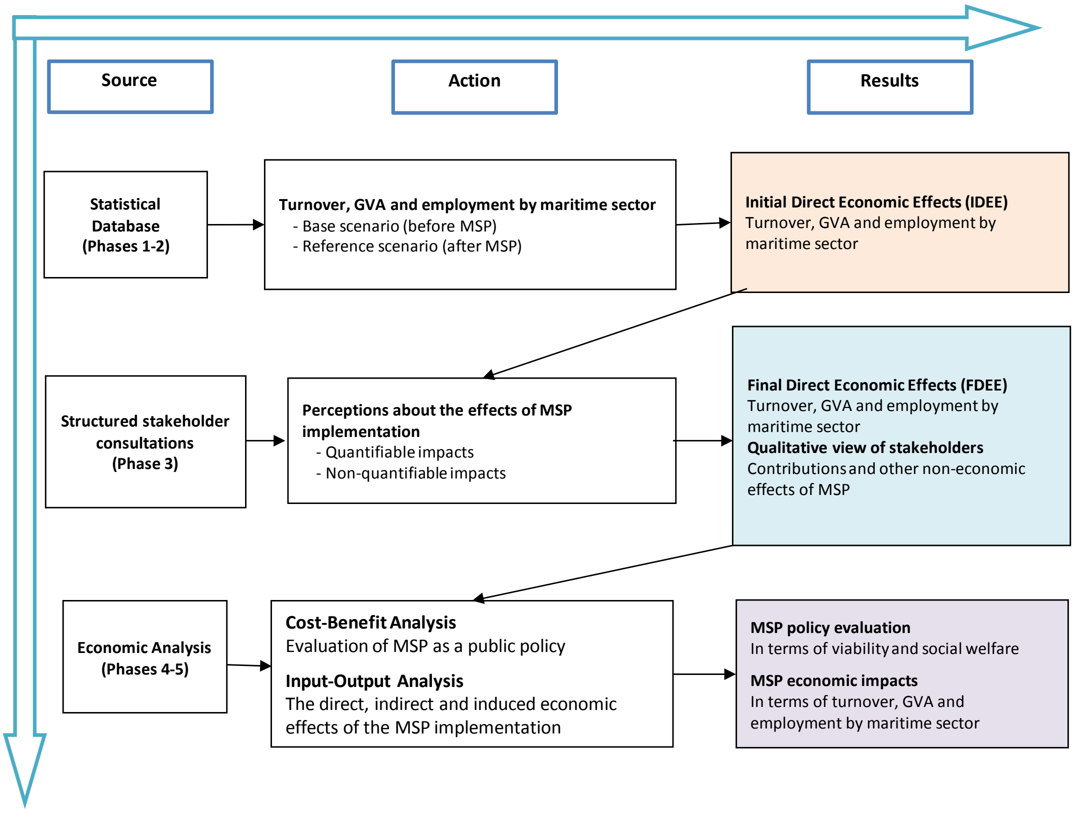
[23] See Structural Business Statistics, available at https://ec.europa.eu/eurostat/web/structural-business-statistics.

4 Case studies

4.1 Methodology

The 5 case studies were carried out through the sequence of activities summarised in the figure below.

Figure 16 - Sequence of activities and expected results



Throughout all the phases of this process, working hypotheses had to be accepted and decisions had to be taken in order to reach the final objective: to obtain an economic evaluation of the impact of the implementation of MSP in the 5 case studies. The objective of this section is to make explicit these assumptions and decisions, since they may condition the results obtained and their interpretation. In this chapter, we follow the chronological sequence shown in the previous figure. In the first section we deal with all the aspects relating to phase 1, referring to the collection of statistical information and its processing. The second section explains the procedure followed for the estimation of the Initial Direct Economic Effects. In the third section we do the same with all the elements of phase 3, linked to the interviews with stakeholders and the estimation of the Direct Final Economic Effects. Finally, the fourth section deals with the elements relating to phases 3 and 4, which refer to the method for estimating economic impacts for the 5 case studies.

4.1.1 Phase 1: available information and its treatment

The first task to be developed is the collection of basic data for the case studies. This basic information refers to the economic activities that make up the blue economy, the variables on which we are interested in having information (production value, value added, employment etc.), the sources of available data and the period of years to be analysed in each case study.

The table below reports the economic activities making up the blue economy, as per the Blue Economy Report of the EU Commission.

Table 13 - Activities of the blue economy

Group	Sector	NACE Rev 2 Code	Marine	Activity
1. Living resources	1.1. Fisheries and aquaculture	A0311	100%	1.1.1. Marine fishing
		A0321	100%	1.1.2. Marine aquaculture
		G4638	100%	1.1.3. Wholesale of other food, including fish, crustaceans and molluscs
		C1020	100%	1.1.4. Processing and preserving of fish, crustaceans and molluscs
		C1089	P	1.1.5. Other food products n.e.c.
		C1091	P	1.1.6. Prepared feeds for farm animals
2. Non-living resources	2.1 Extraction of oil and gas	B0610	P	2.1.1. Extraction of crude petroleum
		B0620	P	2.1.2 Extraction of natural gas
		B0910	P	2.1.3. Support activities for petroleum and natural gas extraction
	2.2 Extraction of aggregates	B0811	P	2.2.1. Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate
		B0812	P	2.2.2. Operation of gravel and sand pits; mining of clays and kaolin
		B0899	P	2.2.3. Other mining and quarrying
	2.3 Salt	B0893	P	2.3.1. Extraction of salt
	2.4 Seabed mining	B0710	P	2.4.1. Mining of iron ores
		B0721	P	2.4.2. Mining of uranium and thorium ores
		B0729	P	2.4.3. Mining of other non-ferrous metal ores
		B0990	P	2.4.4. Support services to other mining and quarrying
3. Shipping	3.1 Maritime transport	H5010	100%	3.1.1. Sea and coastal passenger water transport
		H5020	100%	3.1.2. Sea and coastal freight water transport
		H5229	P	3.1.3. Other transportation support activities
		N3774	100%	3.1.4. Rental and leasing services of water transport equipment
	3.2 Ports	H5210	P	3.2.1. Warehousing and storage services
		H5222	P	3.2.2. Service activities incidental to water transportation
		H5224	P	3.2.3. Cargo handling
4. Shipbuilding and ship repair	4.1 Shipbuilding	C3011	100%	4.1.1. Building of ships and floating structures
		C3012	100%	4.1.2. Building of pleasure and sporting boats
	4.2 Ship repair	C3315	100%	4.2.1. Repair and maintenance of ships and boats
5. Tourism and recreation	5.1 Coastal tourism	H49	P	5.1.1. Land transport
		H51	P	5.1.2. Water transport
		I55	P	5.1.3. Air transport
		I56	P	5.1.4. Acommodation
		N77	P	5.1.5. Renting and leasing of motor vehicles, recreational and sports godos
		N79	P	5.1.6. Travel agency, tour operator reservation service and related activities
6. Renewable energy	6.1 Wind energy	D3511	P	6.1.1. Production of electricity
		D3512	P	6.1.2. Transmission services of electricity
	6.2 Other renewable energy	D3511	P	6.1.1. Production of electricity
		D3512	P	6.1.2. Transmission services of electricity
7. Public activities	7.1 Public activities	O84	P	7.1.1. Public activities
8. Construction	8.1 Construction	F4222	P	8.1.1. Construction of utility projects for electricity and telecommunications
		F4291	P	8.1.2. Construction of water projects
		F4312	P	8.1.3. Site preparation

* 100% = Completely marine activities, P = Partially marine activities

Although up to 41 groups of codified activities can be distinguished as belonging to the blue economy, not all of them are affected by the corresponding national maritime spatial plans. Table 14 summarises the activities that are directly affected by the spatial plan of each of the following case studies: Belgium (BE), Germany-Baltic (DE), Norway-North Sea and Skagerrak (NO), Scotland (SC) and Rhode Island (R-I).

Table 14 - Activities of the blue economy affected by case studies' spatial plans

NACE Rev. 2 Code	Activity	BE	DE	NO	SC	R-I
A0311	1.1.1. Marine fishing	yes	yes	yes	yes	yes
A0321	1.1.2. Marine aquaculture	yes	yes		yes	yes
G4638	1.1.3. Wholesale of other food, including fish, crustaceans and molluscs	yes				yes
C1020	1.1.4. Processing and preserving of fish, crustaceans and molluscs	yes		yes	yes	yes
C1089	1.1.5. Other food products n.e.c.				yes	
C1091	1.1.6. Prepared feeds for farm animals				yes	
B0610	2.1.1. Extraction of crude petroleum		yes	yes	yes	yes
B0620	2.1.2. Extraction of natural gas		yes	yes	yes	yes
B0910	2.1.3. Support activities for petroleum and natural gas extraction		yes	yes	yes	yes
B0811	2.2.1. Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	yes	yes			yes
B0812	2.2.2. Operation of gravel and sand pits; mining of clays and kaolin	yes	yes			yes
B0899	2.2.3. Other mining and quarrying	yes	yes			yes
B0893	2.3.1. Extraction of salt		yes			
B0710	2.4.1. Mining of iron ores		yes	yes		
B0721	2.4.2. Mining of uranium and thorium ores		yes	yes		
B0729	2.4.3. Mining of other non-ferrous metal ores		yes	yes		
B0990	2.4.4. Support services to other mining and quarrying		yes	yes		
H5010	3.1.1. Sea and coastal passenger water transport	yes	yes	yes	yes	yes
H5020	3.1.2. Sea and coastal freight water transport	yes	yes	yes	yes	yes
H5229	3.1.3. Other transportation support activities	yes	yes	yes		yes
N7734	3.1.4. Rental and leasing services of water transport equipment	yes			yes	
H5210	3.2.1. Warehousing and storage services	yes				yes
H5222	3.2.2. Service activities incidental to water transportation	yes				yes
H5224	3.2.3. Cargo handling					yes
C3011	4.1.1. Building of ships and floating structures				yes	yes
C3012	4.1.2. Building of pleasure and sporting boats				yes	yes
C3315	4.2.1. Repair and maintenance of ships and boats				yes	yes
H49	5.1.1. Tourism: Land transport	yes	yes	yes	yes	yes
H51	5.1.2. Tourism: Air transport	yes	yes	yes	yes	yes
I55	5.1.3. Tourism: Accommodation	yes	yes	yes	yes	yes
I56	5.1.4. Tourism: Food and beverage service activities	yes	yes	yes	yes	yes
N77	5.1.5. Tourism: Renting and leasing of motor vehicles, recreational and sports goods	yes	yes	yes	yes	yes
N79	5.1.6. Tourism: Travel agency, tour operator reservation service and related activities	yes	yes	yes	yes	yes
D3511	6.1.1. Production of electricity (Wind Energy)	yes	yes	yes		
D3512	6.1.2. Transmission services of electricity (Wind Energy)	yes	yes	Yes		
D3511	6.1.1. Production of electricity (Other renewable)		yes	Yes		
D3512	6.1.2. Transmission services of electricity (Other renewable)		yes	yes		
O84	7.1.1. Public activities	yes	yes			
F4222	8.1.1. Construction of utility projects for electricity and telecommunications	yes	yes	yes		yes
F4291	8.1.2. Construction of water projects	yes	yes		yes	yes
F4312	8.1.3. Site preparation	yes	yes			yes

4.1.1.1 Indicators and sources of information

The analysis includes collecting economic information on the marine activities affected by the maritime spatial plan in each of the 5 case studies: Belgium, Germany (Baltic Sea), Scotland, Rhode Island and Norway (North Sea and Skagerrak). The recommended time period of data collection is 5 years prior to the effective implementation of the plan and at least 5 years thereafter, depending on the availability of information in the databases and the date of implementation of the corresponding plan in each case study. Table 15 shows the implementation dates for each plan analysed.

Table 15 - Date of implementation of MSP

Activity	Date of implementation
Belgium	March 2014
Germany (Baltic Sea)	December 2009
UK (Scotland)	April 2013
Norway (North Sea and Skagerrak)	March 2015
Rhode Island	May 2011

In order to evaluate the progress of each maritime sector and its possible general economic and social impact, we considered the following relevant indicators for this exercise: Production Value, Value Added at factor cost, and Employment (Employment or FTE Employment, depending on the case). Data are also collected from other indicators relating to input and investment costs that are useful to compare the estimates made and to classify the type of impact produced by MSP. These are Total purchases of goods and services, Personnel costs, and Gross investment in tangible goods).

Given the type of data we need to collect, the sources of information available are diverse and depend on the characteristics of each case study (see Table 16). In general, for fisheries and aquaculture activities in Germany, Belgium and Norway, the Data Collection Framework and Joint Research Centre (DCF/JRC) of the European Commission are the priority source, while for the industrial and service sectors Eurostat's Structural Business Statistics (sbs) are used. In the case of Scotland, the main source of information is the Scottish Government (Marine Scotland, Scottish Annual Business Statistics, Office for National Statistics). In the case of Rhode Island, the primary source of information is The Nation's Coastal Management Agency (NOAA, Office for Coastal Management, DIGITALCOAST).

Table 16 - Basic sources of information

Case study	Sources
Belgium	- Data Collection Framework and Joint Research Centre (*DCF/JRC*) - Structural Business Statistics (sbs), Eurostat - Federal Planning Bureau (FPB) - UEPG
Germany (Baltic Sea)	- Data Collection Framework and Joint Research Centre (*DCF/JRC*) - Structural Business Statistics (sbs), Eurostat
Norway	- Statistics Norway - Structural Business Statistics (sbs), Eurostat
UK (Scotland)	- Marine Scotland, Scottish Annual Business Statistics, Office for National Statistics
Rhode Island	- The Nation’s Coastal Management Agency (NOAA, Office for Coastal Management

In the case of both Scotland and Rhode Island, data from the original source of information already detail their marine or oceanic origin. In the case studies of Belgium and Germany some of the activities considered in the classification are not completely marine (they contain under the same heading NACE Rev.2 data on marine activities with others that are not) and therefore approximations should be used to determine the maritime share of the total activity. In the case of Norway, all of the activities in the plan are marine by definition, except extraction of oil and gas, which in the international classification of economic activities includes both onshore and offshore activities. However, because in Norway oil is extracted only offshore, the problem can be ignored and the activity can be considered as fully marine. For some activity groups it is possible to use proxies combining data from Eurostat’s SBS database with those from Eurostat's PRODCOM database, which contain detailed production data at NACE Rev.2 levels of up to 8 digits. In the remaining activity groups this approach is not possible, so other national sources and expert judgement (through stakeholder interviews) are used to determine the percentage that corresponds to marine activities (for further detail, please refer to the spreadsheets with the calculations). Estimates of the maritime percentage of each activity are made on the basis of the criterion of output value (part of the output value of the NACE activity that is inputted to marine activities). Once this percentage has been determined, it is applied to the rest of the indicators relating to this activity (GVA, employment, etc.). In addition, the German case study only covers the Baltic Sea area, and the Norwegian case study only covers the North Sea and Skagerrak area, so regional data sources had to be consulted to determine the relative weight of activity in that area.

Simultaneously with the activities of collecting the above-mentioned basic data, it is necessary to have other relevant information in order to carry out the subsequent analysis of each case study under the two perspectives proposed, the Input-Output Analysis and the Cost-Benefit Analysis.

For Input-Output Analysis, it is important to have the most recent information possible from the Input-Output Framework of the country or region, at least from the Symmetric input-output tables[24] at basic prices (Domestic and Total).

For Belgium, Germany and Norway, the Symmetric input-output tables at basic prices (industry by industry, Code: naio_10_cp1750, or product by product, Code: naio_10_cp1700) are available in Excel format on Eurostat's website. Specifically, in the case of Belgium, the Symmetric input-output tables are available for the years 2010 and 2015. In the case of Germany, Tables are available for all years from 2010 to 2015. And for Norway we have information for the years 2010, 2014 and 2015.

For Scotland, the Scottish Government, through its Office for National Statistics, provides information on Scotland's regional Input-Output framework for the period 1998-2015, also in Excel format.

The case of Rhode Island is more complicated, as there is no public and free access to the information of the Input-Output framework, nor does the Federal Government offer the Symmetric input-output table at basic prices (industry by industry) in the desired format for the United States of America as a whole. Therefore, in this case we have to resort to the OECD database that offers this information in Excel format for the US as a whole (2010-2016).

The classifications of the activity sectors in the available Input-Output Tables do not necessarily coincide with the NACE Rev.2 activity groups shown in the above tables. In many cases, several of the marine activities are grouped under a single sector of activity. In order to be able to make direct and indirect impact and total impact estimates through the Input-Output methodology, it is necessary to operate with the sectoral groupings of the corresponding Input-Output frameworks for each case study. For the cases of Belgium, Germany and Norway the sectoral correspondences are shown in Table 17. For the cases of Scotland and Rhode Island, the sectoral correspondences of marine activities and the input-output sectors are shown in Table 18 and Table 19, respectively.

[24] The symmetric industry by industry input-output tables show inter-industry transactions, that is, all purchases of an industry from all other industries as well as expenditures on imports and the components of value added such as wages and gross operating surplus.

Table 17 - Correspondence between NACE activities and Industrial sectors of the Eurostat Input-output Tables: Cases of Belgium, Germany and Norway

NACE Rev. 2 Code	Activity (Eurostat)	Input-Output Industries (Eurostat)
A0311	1.1.1. Marine fishing	A03 - Fishing and aquaculture
A0321	1.1.2. Marine aquaculture	
G4638	1.1.3. Wholesale of other food, including fish, crustaceans and molluscs	G46 - Wholesale trade, except of motor vehicles and motorcycles
C1020	1.1.4. Processing and preserving of fish, crustaceans and molluscs	C10-12 - Manufacture of food products; beverages and tobacco products
C1089	1.1.5. Other food products n.e.c.	
C1091	1.1.6. Prepared feeds for farm animals	
B0610	2.1.1. Extraction of crude petroleum	B - Mining and quarrying
B0620	2.1.2. Extraction of natural gas	
B0910	2.1.3. Support activities for petroleum and natural gas extraction	
B0811	2.2.1. Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	
B0812	2.2.2. Operation of gravel and sand pits; mining of clays and kaolin	
B0899	2.2.3. Other mining and quarrying	
B0893	2.3.1. Extraction of salt	
B0710	2.4.1. Mining of iron ores	
B0721	2.4.2. Mining of uranium and thorium ores	
B0729	2.4.3. Mining of other non-ferrous metal ores	
B0990	2.4.4. Support services to other mining and quarrying	
H5010	3.1.1. Sea and coastal passenger water transport	H50 - Water transport
H5020	3.1.2. Sea and coastal freight water transport	
H5229	3.1.3. Other transportation support activities	H52 - Warehousing and support activities for transportation
N7734	3.1.4. Rental and leasing services of water transport equipment	N77 - Rental and leasing activities
H5210	3.2.1. Warehousing and storage services	H52 - Warehousing and support activities for transportation
H5222	3.2.2. Service activities incidental to water transportation	
H5224	3.2.3. Cargo handling	
C3011	4.1.1. Building of ships and floating structures	C30 - Manufacture of other transport equipment
C3012	4.1.2. Building of pleasure and sporting boats	
C3315	4.2.1. Repair and maintenance of ships and boats	C33 - Repair and installation of machinery and equipment
H49	5.1.1. Tourism: Land transport	H49 - Land transport and transport via pipelines
H51	5.1.2. Tourism: Air transport	H51 - Air transport
I55	5.1.3. Tourism: Accommodation	I - Accommodation and food service activities
I56	5.1.4. Tourism: Food and beverage service activities	
N77	5.1.5. Tourism: Renting and leasing of motor vehicles, recreational and sports goods	N77 - Rental and leasing activities
N79	5.1.6. Tourism: Travel agency, tour operator reservation service and related activities	N 79 - Travel agency, tour operator reservation service and related activities
D3511	6.1.1. Production of electricity (Wind Energy)	D - Electricity, gas, steam and air conditioning supply
D3512	6.1.2. Transmission services of electricity (Wind Energy)	
D3511	6.1.1. Production of electricity (Other renewable)	
D3512	6.1.2. Transmission services of electricity (Other renewable)	
O84	7.1.1. Public activities	O - Public administration and defence; compulsory social security
F4222	8.1.1. Construction of utility projects for electricity and telecommunications	F - Construction
F4291	8.1.2. Construction of water projects	
F4312	8.1.3. Site preparation	

Table 18 - Correspondence between NACE activities and Industrial sectors of the Input-output Tables for Scotland

NACE Rev. 2 Code	Activity (Eurostat)	Input-Output industries (Scottish Government. Office for National Statistics)
A0311	1.1.1. Marine fishing	A 03.1 Marine and freshwater fishing
A0321	1.1.2. Marine aquaculture	A 03.2 Marine and freshwater aquaculture
G4638	1.1.3. Wholesale of other food, including fish, crustaceans and molluscs	G46 - Wholesale trade, except of motor vehicles and motorcycles
C1020	1.1.4. Processing and preserving of fish, crustaceans and molluscs	C 10.2-3 Processed and preserved fish, crustaceans, molluscs, fruit and vegetables
C1089	1.1.5. Other food products n.e.c.	C 10.8 Other food products
C1091	1.1.6. Prepared feeds for farm animals	C 10.9 Prepared animal feeds
B0610	2.1.1. Extraction of crude petroleum	B 06-08 Crude petroleum, natural gas and metal ores; other mining and quarrying
B0620	2.1.2. Extraction of natural gas	
B0910	2.1.3. Support activities for petroleum and natural gas extraction	
B0811	2.2.1. Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	
B0812	2.2.2. Operation of gravel and sand pits; mining of clays and kaolin	
B0899	2.2.3. Other mining and quarrying	
B0893	2.3.1. Extraction of salt	
B0710	2.4.1. Mining of iron ores	
B0721	2.4.2. Mining of uranium and thorium ores	
B0729	2.4.3. Mining of other non-ferrous metal ores	
B0990	2.4.4. Support services to other mining and quarrying	B 09 Mining support services
H5010	3.1.1. Sea and coastal passenger water transport	H 50 Water transport services
H5020	3.1.2. Sea and coastal freight water transport	
H5229	3.1.3. Other transportation support activities	H 52 Support services for transport
N7734	3.1.4. Rental and leasing services of water transport equipment	H 77 Rental and leasing services
H5210	3.2.1. Warehousing and storage services	H 52 Support services for transport
H5222	3.2.2. Service activities incidental to water transportation	
H5224	3.2.3. Cargo handling	
C3011	4.1.1. Building of ships and floating structures	C 30 Other transport equipment
C3012	4.1.2. Building of pleasure and sporting boats	
C3315	4.2.1. Repair and maintenance of ships and boats	C 33 Repair & maintenance
H49	5.1.1. Tourism: Land transport	H 49.3-5 Other land transport
H51	5.1.2. Tourism: Air transport	H51 - Air transport
I55	5.1.3. Tourism: Accommodation	I 55 Accommodation
I56	5.1.4. Tourism: Food and beverage service activities	I56 Food & beverage services
N77	5.1.5. Tourism: Renting and leasing of motor vehicles, recreational and sports goods	H 77 Rental and leasing services
N79	5.1.6. Tourism: Travel agency, tour operator reservation service and related activities	N 79 Travel & related services
D3511	6.1.1. Production of electricity (Wind Energy)	D 35.1 Electricity
D3512	6.1.2. Transmission services of electricity (Wind Energy)	
D3511	6.1.1. Production of electricity (Other renewable)	
D3512	6.1.2. Transmission services of electricity (Other renewable)	
O84	7.1.1. Public activities	O 84 Public administration & defence
F4222	8.1.1. Construction of utility projects for electricity and telecommunications	F 41-43 Construction
F4291	8.1.2. Construction of water projects	
F4312	8.1.3. Site preparation	

Table 19 - Correspondence between NAICS activities (USA) and industrial sectors of the Input-output Tables for the case of Rhode Island

NAICS Codes	Activity (NOAA, Office for Coastal Management)	I-O Code	Input-Output industries (OECD)
1141	Fishing	113FF	Forestry, fishing, and related activities
1125	Fish Hatcheries and Aquaculture		
4452	Seafood markets	445	Food and beverage stores
3117	Seafood Processing	311FT	Food and beverage and tobacco products
2111	Oil and gas exploration and production	211	Oil and gas extraction
2123	Limestone, sand and gravel	212	Mining, except oil and gas
4831	Marine passenger transportation	483	Water transportation
4831	Marine freight		
3345	Search and Navigation Equipment	334	Computer and electronic products
4931	Warehousing	493	Warehousing and storage
4883	Marine transportation services	487OS	Other transportation and support activities
3366	Ship Building and Repair	3364OT	Other transportation equipment
3366	Boat Building and Repair		
7225	Eating and drinking places	722	Food services and drinking places
7211	Hotels and Lodging	721	Accommodation
7139	Amusement and Recreation Services	713	Amusements, gambling, and recreation industries
7121	Zoos and Aquaria	711AS	Performing arts, spectator sports, museums, and related activities
7139	Marine	713	Amusements, gambling, and recreation industries
7212	Recreational Vehicle Parks and Campsites	721	Accommodation
3399	Sporting Goods	339	Miscellaneous manufacturing
4412	Boat Dealers	441	Motor vehicle and parts dealers
4872	Scenic water tours	487OS	Other transportation and support activities
2379	Marine Related Construction	23	Construction

These Input-Output Tables do not contain employment data for each of the sectors covered in each case study. Therefore, if one wants to estimate the impact on employment through input-output analysis, it is necessary to incorporate information on Employment or Employees in full time equivalent units (FTE).

In the cases of Belgium, Germany and Norway we used Eurostat's National accounts employment data by industry (up to NACE A*64) [nama_10_a64_e], which gives us information on sectoral Total employment (domestic concept) for the period 2008-2016.

In the Scottish case we estimate sectoral employment from the Industry by Industry table at basic prices and the Type I multipliers for employment (in this case in FTE) offered by the Office for National Statistics of the Scottish Government in its Input-Output Tables.

In the case of Rhode Island, we use again the Total Employment data provided by the OECD for the whole of the United States of America.

To avoid that exchange rates may distort the estimates made, we use different monetary units of measurement, on condition that the monetary units of the basic variables and the Input-Output framework from the original statistical sources are the same. Thus, for example, for the cases of Belgium, Germany and Norway, Eurostat provides us with information on the basic variables and the Input-Output framework in euros, hence in these case studies the unit chosen is euro. For the Scottish case the original sources offer us the information in pounds sterling and for the case of Rhode Island in US dollars, hence we use these units for their corresponding case studies.

To compare variables across different years, it is necessary to homogenise the units of measurement by using a benchmark that measures the evolution of prices. As a basic reference we used the implicit GDP deflator in euros, with 2010 chosen as the base year. In Eurostat this variable is known as Price index (implicit deflator), 2010=100, euro (code PD10_EUR). This indicator for Belgium, Germany and Norway as a whole is used as a deflator to homogenise the monetary units in euros in 2010 (at 2010 prices) of these three case studies (see Table 9). In the case of Scotland, the information is not available at regional level, so the implicit GDP deflator for the United Kingdom as a whole is used to express the monetary variables in Pounds Sterling for 2010. For Rhode Island the information at regional (state) level is not available either, so the Implicit GDP Deflator for the United States of America as a whole is used to homogenise the monetary units in US dollars for the year 2010 (for the latter case the information was compiled from the World Bank database: World Development Indicators).

Table 20 - GDP Price index (implicit deflator) used, 2010=100

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belgium	97.39	98.15	100.00	102.00	104.02	105.10	105.85	106.91	108.84	110.65
Germany	97.53	99.25	100.00	101.07	102.63	104.64	106.49	108.59	110.07	111.76
Norway	96.91	86.56	100.00	109.64	118.15	116.01	108.76	98.66	93.96	97.22
Scotland	98.25	100.33	100.00	102.41	104.50	107.24	109.65	109.21	111.40	113.60
Rhode Island	98.05	98.79	100.00	102.09	104.05	105.87	107.88	109.03	110.22	112.32

For the cost-benefit analysis, it is necessary to know the interest rate of the long-term public debt (10 years) of each country in which each case study is carried out. This allows us to use this interest rate as a social discount rate. For the EU countries, the source of data is Eurostat (code: TEIMF050). For Norway, the source is Norges Bank. For Rhode Island, the source is the US Department of the Treasury.

4.1.1.2 The data collected in the 5 case studies

For the 5 case studies, we collect information on the basic variables corresponding to the activities related to the sea and contemplated under the regulation of their corresponding national or regional MSP initiatives.

The variable on which we focus is production value, since it is the relevant variable for the subsequent estimation exercise. In general, and for all the case studies, it should be noted that:

- No reliable information is found on the production value of the public sector activity linked to the sea and affected by MSP.
- There are many difficulties in finding disaggregated information on the production and distribution of electricity generated at sea (wind, tides, etc.).
- With the exception of Rhode Island, there is also a paucity of disaggregated information on tourism activities linked to the sea.
- For the case of Rhode Island, value added is available for each ocean sector, but not production value.
- Occasionally there is a lack of some sectors in some years, which causes discontinuity in the time series and difficulties for the evaluation of production trends in the affected sectors.
- For Belgium, Germany and Scotland data are only available for the period 2008-2016. In the case of Norway for the period 2008-2017 and in the case of Rhode Island for the period 2005-2016.

Given the difficulty of finding information on the Public Sector and given that only in the case of Germany and Belgium these activities are contemplated within the regulation of their spatial plans, it is decided not to consider these activities for the analysis carried out.

For production and distribution of marine electricity, especially offshore wind energy, sectorial information is used. The sources are Wind Europe's[25] annual reports and the German national association of wind producers "Deutsche WindGuard GmbH"[26]. The number of MW installed and connected to the grid allows to estimate the production volume, which is then related with the average price of electricity (from Eurostat), and then, the value of production is calculated.

In order to obtain a sectoral distribution of production linked to marine tourism activities, certain assumptions have to be made. In the case of Scotland, it is decided to distribute the total value of its annual marine tourism production in accordance with the annual sectoral distribution data for all tourism activities in Scotland (information compiled in the Scottish Government's Annual Business Survey).

In the case of Norway, the value of tourism activities is available, but at a level of disaggregation not suitable for input-output analysis. In particular the transport sector – at least its part related to tourism activities – is not broken down by mode of transport. Thus, a distribution is made between the different activities according to the distribution of the production of the transport sector in Norway as a whole, according to the tourism data provided by Eurostat.

In the case of Germany, coastal tourism activities are disaggregated using data at NUTS-2 level on the nights spent at tourist accommodation establishments. This allows to disaggregate the tourism indicators from the total of the country. A similar approach is used for shipping, where the gross weight of goods transported and the number of passengers make it possible to disaggregate the data for the Baltic regions of Germany. Finally, the Baltic share of Germany's fishing volume is estimated using the information available in EUMOFA of landing by ports. In particular, the data from the ports of Sassnitz, Heiligenhafen, Neu Mukran, Kappeln are compared with total landings in the country in order to obtain the Baltic proportion of this activity.

The National Oceanic and Atmospheric Administration (NOAA) provides data on ocean activities in Rhode Island on the value added generated by each sector, but not on production value or total turnover. In this case, the reference variable has to be estimated on the basis of the average value added per unit of sector output generated for the US as a whole. This information is obtained from the Bureau of Economic Analysis, US Department of Commerce, US Government.

In order to avoid discontinuities in the data series, when for a given year data is not reported, it is decided to assign the data corresponding to the latest available year before. As mentioned above, these discontinuities in the time series prevent us from having an adjusted view of the trends followed in the sector affected by this lack of specific information. It is likely that the production value of a sector will resemble the previous year's data more than a null value due to lack of information. Assuming the same value as for the next year, we are reducing the error in time series, thus minimising the errors that can be carried forward in the subsequent phases of impact estimation.

In the cases of Belgium, Germany and Norway, the availability of information for only a short period of years makes it preferable to use an alternative method to construct their baseline scenarios. Instead of elaborating their baseline scenarios based on the evolution and sectoral trends of the years prior to the implementation of MSP, another criterion is used: to compare the evolution of the activity of the marine sectors in

[25] https://windeurope.org/about-wind/statistics/offshore/
[26] https://www.windguard.com/wind-energy-statistics.html

these three cases with the evolution of marine activity in surrounding countries that did not implement MSP in their respective jurisdictions. These criteria are explained in more detail below in another section.

With all these caveats, the data collected on the value of production for the sectors of activity linked to the sea and concerned by the respective national or regional MSPs are shown in Tables 21 to 25.

Table 21 - Belgium: Evolution of the production value of marine activities included in the spatial plan. (Units: million current Euros)

NACE Codes	2008	2009	2010	2011	2012	2013	2014	2015	2016
A0311	2.7	2.4	2.6	2.8	2.6	2.3	2.8	2.8	2.7
A0321	0.7	4.2	*4.2*	*4.2*	*1.0*	1.0	1.0	0.3	0.5
G4638	31.9	44.5	43.6	44.0	43.7	40.4	44.3	45.7	43.6
C1020	16.3	15.2	13.4	15.0	18.1	19.3	19.8	21.3	23.7
B0811	34.5	15.3	53.4	65.8	60.0	44.2	38.4	26.1	32.4
B0812	*253.9*	253.9	277.8	*277.8*	185.2	262.4	277.5	256.9	297.7
H5020	*823.2*	823.2	547.6	*547.6*	4,883.9	2,127.0	1,921.2	2,560.9	2,407.5
H5229	1,064.1	944.4	1,241.7	965.8	936.2	472.7	443.5	515.5	462.6
N7734	*133.4*	133.4	*133.4*	192.6	231.0	266.9	88.8	156.2	261.0
H5210	189.6	181.2	235.4	392.2	438.4	180.0	171.5	181.8	249.1
H5222	933.9	1,134.0	*1,134.0*	992.8	1,267.0	1,095.6	1,072.7	1,544.9	1,579.4
I55	1,050.4	1,050.4	1,050.4	826.9	826.9	810.2	873.2	858.9	696.5
I56	982.2	855.1	926.0	984.6	949.6	1,084.0	1,097.9	1,127.3	1,119.6
N79	3,204.6	3,180.8	3,255.8	3,462.6	3,704.7	3,744.7	4,004.5	4,149.2	4,116.2
D3511		4.69	36.56	74.03	150.48	247.40	389.83	423.47	459.41
F4291	1,089.8	1,308.2	2,490.6	2,585.2	2,388.9	2,577.7	2,577.6	3,513.7	3,240.3

Only data for sectors for which information is available are shown.
In italics, data assigned according to the proximity criterion.
Source: for fishing and aquaculture activities the Data Collection Framework and Joint Research Centre (DCF/JRC) of the European Commission were used. Eurostat's Structural Business Statistics (sbs) were used for the rest of the industrial and services sectors.

Table 22 - Germany: Evolution of the production value of marine activities included in the spatial plan. (Units, million current Euros)

NACE Codes	2008	2009	2010	2011	2012	2013	2014	2015	2016
A0311	63.0	46.8	53.5	72.8	80.6	119.4	110.3	113.3	115.3
B0811	11.9	1.4	7.8	3.1	1.2	0.8	0.7	3.4	3.5
B0812	21.2	1.7	12.1	4.8	1.9	1.2	1.0	4.6	4.2
B0899	1.4	0.2	1.1	0.5	0.2	0.1	0.1	0.4	0.3
H5010	82.9	378.4	223.0	696.3	876.4	876.1	1,620.7	1,691.5	2,045.5
H5020	4,274.5	2,618.9	3,784.9	3,348.9	3,959.7	4,802.4	3,510.3	3,113.3	2,232.0
H5229	8,668.2	5,278.2	6,842.4	6,678.3	7,487.6	9,824.8	8,552.9	5,902.8	6,853.9
H49	3,123.1	2,835.8	2,959.7	3,140.6	3,170.7	3,273.3	3,390.9	3,565.8	3,615.8
H51	835.7	836.5	942.4	932.5	953.7	953.8	1,086.7	997.1	1,123.4
I55	909.3	994.7	1,036.8	1,138.6	1,205.6	1,144.1	1,269.4	1,404.8	1,502.2
I56	1,471.6	1,941.7	1,996.2	2,172.1	2,175.0	2,127.2	2,446.3	2,707.3	2,948.0
N79	430.8	426.3	484.2	525.5	529.0	591.0	558.0	610.9	562.9
D3511						3.9	2.8	33.4	36.0

Only data for sectors for which information is available are shown.
In italics, data assigned according to the proximity criterion.
Source: for fishing and aquaculture activities the Data Collection Framework and Joint Research Centre (DCF/JRC) of the European Commission were used. Eurostat's Structural Business Statistics (sbs) were used for the rest of the industrial and services sectors.

Table 23 - Norway: Evolution of the production value of marine activities included in the spatial plan. (Units, million current Euros)

NACE Codes	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
A0311	420.3	391.9	522.3	620.8	554.4	478.4	478.5	521.5	566.3	520.5
C1020	1,006.0	850.5	1,182.5	1,330.5	1,378.0	1,360.8	1,335.9	1,605.9	1,882.3	*1,882.3*
B0610*	138,336.8	*138,336.8*	*150,833.0*	150,833.0	161,494	141,322.3	126,023.5	55,607.0	43,237.2	54,759.8
B0620	0.0	0.0	0.0	0.0	*6260.9*	6,260.9	5,379.9	6,468.0	5,187.7	5,617.7
B0910	7,637.1	10,378.4	11,198.7	12,219.1	14,897.5	16,932.9	16,678.1	15,363.2	12,051.3	10,097.1
H5020**	12,982.6	10,447.1	12,289.5	12,894.8	14,829.3	14,544.0	14,993.6	15,027.6	13,487.8	13,442.9
H5229	2,045.4	1,800.4	2,141.8	2,353.6	2,623.4	2,632.5	2,462.2	2,266.2	1,862.1	2,088.1
H49	*467.9*	*467.9*	*467.9*	467.9	*467.9*	529.3	518.5	459.5	461.8	*461.8*
H50	*268.7*	*268.7*	*268.7*	268.7	*268.7*	304.0	307.5	319.2	350.6	*350.6*
H51	*826.4*	*826.4*	*826.4*	826.4	*826.4*	934.8	958.1	937.7	849.0	*849.0*
I55	*1,978.3*	*1,978.3*	*1,978.3*	1,978.3	*1,978.3*	2,183.3	2,022.7	1,846.4	1,749.2	*1,749.2*
I56	*3,319.4*	*3,319.4*	*3,319.4*	3,319.4	*3,319.4*	3,663.5	3,397.0	3,097.0	2,987.5	*2,987.5*
N77	*137.0*	*137.0*	*137.0*	137.0	*137.0*	155.0	152.0	143.7	160.4	*160.4*
N79	*966.3*	*966.3*	*966.3*	966.3	*966.3*	1,093.1	1,016.3	930.1	926.0	*926.0*
R90-92	*1,053.6*	*1,053.6*	*1,053.6*	1,053.6	*1,053.6*	1,225.5	1,200.4	1,158.7	1,198.1	*1,198.1*

Only data for sectors for which information is available are shown.
In italics, data assigned according to the proximity criterion.
* For the period 2008-2012 oil and gas extraction data are grouped in sector B0610.
** Passenger water transport are considered in Tourism (H50).
Source: for fishing and aquaculture activities the Data Collection Framework and Joint Research Centre (DCF/JRC) of the European Commission. Eurostat's Structural Business Statistics (sbs) were used for the rest of the industrial and services sectors.

Table 24 - Scotland: Evolution of the production value of marine activities included in the spatial plan. (Units, million current Pounds GB)

NACE Codes	2008	2009	2010	2011	2012	2013	2014	2015	2016
A0311	280.4	283.6	317.0	276.2	321.8	345.6	466.7	427.6	424.2
A0321	220.6	275.0	290.7	212.5	257.2	317.5	368.6	359.3	517.3
C1020	1,079.1	1,423.8	1,431.0	1,294.8	1,320.1	1,579.1	1,658.3	1,519.4	1,634.6
C1089	425.2	406.7	434.6	503.9	560.8	616.0	624.1	510.6	559.3
C1091	191.1	232.5	246.2	228.4	233.8	300.8	381.2	337.7	391.3
B0610	17,139.0	21,491.0	24,865.8	22,115.9	19,939.9	16,979.2	12,383.9	11,787.1	14,922.8
B0620	3,513.8	4,673.9	4,365.3	3,780.5	3,954.1	3,346.3	4,061.0	3,505.5	3,901.4
B0910	6,775.0	7,162.0	6,226.0	5,971.0	6,215.0	6,372.0	6,240.3	6,863.0	4,483.0
H5010	311.0	374.0	259.0	382.0	328.0	365.0	338.0	223.0	168.0
H5020	439.0	366.0	328.0	380.0	267.0	366.0	276.0	242.0	178.0
N7734	21.0	20.0	11.0	13.0	12.0	12.0	13.0	18.0	14.0
C3011	738.5	*738.5*	1,329.8	1,317.5	1,385.9	1,084.8	1,261.6	1,470.8	884.3
C3315	59.0	*59.0*	81.0	96.5	122.6	133.4	145.0	158.2	113.6
H49*	892.0	746.0	830.0	871.0	937.0	996.0	1,013.0	913.0	1,031.0
F4291	538.0	602.0	449.0	592.0	852.0	1,022.0	837.0	863.0	672.0

Only data for sectors for which information is available are shown.
In italics, data assigned according to the proximity criterion.
* Data corresponding to all marine tourism activities.
Source, Scottish Government, Scottish Annual Business Statistics, Office for National Statistics.

Table 25 - Rhode Island: Evolution of the production value of marine activities included in the spatial plan. (Units, million current US Dollars)

NAICS Codes	2008	2009	2010	2011	2012	2013	2014	2015	2016
1141	128.3	123.7	88.5	83.5	80.6	83.4	85.8	92.1	82.0
1125	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4452	9.7	8.7	8.2	11.4	11.8	12.6	14.9	15.3	16.6
3117	78.6	102.6	106.8	99.2	74.9	83.7	90.7	90.7	80.1
2111	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2123	51.9	51.2	52.1	65.5	51.1	33.1	27.5	42.3	33.5
4831	31.2	32.7	27.6	0.0	26.5	0.0	0.0	0.0	0.0
4831	995.3	761.7	627.5	684.5	541.6	664.2	650.7	669.4	782.3
3345	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4931	71.7	82.8	91.4	94.7	95.9	117.2	154.1	167.9	165.9
4883	23.0	33.4	31.6	38.7	34.9	35.5	34.7	37.5	39.1
3366	394.6	357.2	416.0	446.8	418.9	436.6	444.8	548.4	574.2
3366	176.8	147.4	183.9	154.7	94.2	91.9	83.4	94.8	97.2
7225	1,439.5	1,478.3	1,494.5	1,495.5	1,445.4	1,529.0	1,606.2	1,707.2	1,791.7
7211	536.8	560.3	446.3	611.5	594.4	651.7	692.8	800.5	801.9
7139	56.9	59.1	61.2	54.8	48.9	55.3	53.0	49.1	59.6
7121	89.3	89.0	72.7	68.5	71.4	81.3	79.9	80.7	80.3
7139	73.3	90.1	99.6	104.6	97.9	98.9	99.8	103.4	105.2
7212	0.7	0.9	0.8	1.1	1.2	1.4	1.4	1.5	1.8
3399	6.4	7.6	6.9	10.0	9.0	10.0	10.4	10.3	14.2
4412	41.9	48.7	46.6	44.3	34.6	45.1	43.2	45.3	49.2
4872	10.2	11.0	14.3	13.3	11.3	11.4	12.1	10.9	10.6
2379	82.4	38.7	30.0	20.5	13.1	27.1	20.0	27.2	38.6

Source, The National Oceanic and Atmospheric Administration (NOAA), Office for Coastal Management, DIGITALCOAST, and Bureau of Economic Analysis, U.S. Department of Commerce, U.S. Government.

4.1.2 Phase 2: estimation of Initial Direct Economic Effects

In order to estimate the economic impact of the implementation of a public policy, a preliminary counterfactual exercise must be carried out to answer the question 'what would have happened, had the policy not been implemented?'. In other words, we need to construct a hypothetical scenario against which we can compare the actual data collected against the evolution the blue economy.

4.1.2.1 The real evolution of maritime activities

As mentioned above, in order to homogenise the units of measurement and thus facilitate comparison between different data, it was decided to use the GDP Price index (implicit deflator) of each country, taking 2010 as the base year (see Table 20). The implementation date, reported for each case study in Table 15, enables us to view the evolution of maritime activities for the adoption of the baseline scenario (prior to the implementation of MSP) and the reference scenarios (after the implementation of MSP). The results obtained are reported in Tables 26 to 30 (years when MSP is in force with a light blue background).

Table 26 - Belgium: Evolution of the production value of marine activities before and after MSP. (Units, million constant Euros, €$_{2010}$)

NACE Codes	2008	2009	2010	2011	2012	2013	2014	2015	2016

NACE Codes	2008	2009	2010	2011	2012	2013	2014	2015	2016
A0311	2.7	2.4	2.6	2.7	2.5	2.2	2.6	2.6	2.4
A0321	0.7	4.3	4.2	4.1	0.9	0.9	0.9	0.3	0.4
G4638	32.7	45.3	43.6	43.1	42.0	38.4	41.8	42.7	40.0
C1020	16.7	15.5	13.4	14.7	17.4	18.4	18.7	20.0	21.7
B0811	35.5	15.5	53.4	64.5	57.7	42.1	36.3	24.4	29.8
B0812	260.7	258.7	277.8	272.3	178.0	249.7	262.2	240.3	273.5
H5020	845.2	838.7	547.6	536.9	4,695.3	2,023.7	1,815.0	2,395.5	2,212.0
H5229	1,092.6	962.2	1,241.7	946.8	900.1	449.7	419.0	482.2	425.1
N7734	137.0	135.9	133.4	188.8	222.1	253.9	83.9	146.1	239.8
H5210	194.7	184.6	235.4	384.5	421.4	171.2	162.1	170.0	228.9
H5222	958.9	1,155.4	1,134.0	973.3	1,218.1	1,042.4	1,013.4	1,445.1	1,451.2
I55	1,078.5	1,070.2	1,050.4	810.7	795.0	770.9	824.9	803.4	639.9
I56	1,008.5	871.2	926.0	965.3	912.9	1,031.4	1,037.2	1,054.5	1,028.7
N79	3,290.3	3,240.7	3,255.8	3,394.6	3,561.7	3,562.9	3,783.1	3,881.2	3,782.0
D3511	0,0	4,8	36,6	72,6	144,7	235.4	368.3	396.1	422.1
F4291	1,119.0	1,332.8	2,490.6	2,534.5	2,296.7	2,452.5	2,435.1	3,286.7	2,977.2
TOTAL	10,073.7	10,138.2	11,446.5	11,209.5	15,466.5	12,345.6	12,304.6	14,391.0	13,774.9

Only data for sectors for which information is available are shown.
Light blue background, years when MSP is in force.
Source, Own elaboration based on data from Table 21 and Eurostat's GDP Price index.

Table 27 - Germany: Evolution of the production value of marine activities before and after MSP. (Units, million constant Euros, €$_{2010}$)

NACE Codes	2008	2009	2010	2011	2012	2013	2014	2015	2016
A0311	64.6	47.1	53.5	72.1	78.5	114.1	103.6	104.3	104.8
B0811	12.2	1.4	7.8	3.1	1.2	0.8	0.6	3.2	3.2
B0812	21.7	1.7	12.1	4.8	1.8	1.1	1.0	4.2	3.9
B0899	1.4	0.2	1.1	0.4	0.2	0.1	0.1	0.4	0.3
H5010	85.0	381.3	223.0	688.9	854.0	837.2	1,522.0	1,557.7	1,858.3
H5020	4,382.6	2,638.7	3,784.9	3,313.4	3,858.4	4,589.2	3,296.5	2,867.0	2,027.7
H5229	8,887.4	5,318.2	6,842.4	6,607.6	7,296.0	9,388.8	8,032.0	5,435.8	6,226.6
H49	3,202.0	2,857.3	2,959.7	3,107.3	3,089.5	3,128.0	3,184.3	3,283.7	3,284.9
H51	856.8	842.9	942.4	922.6	929.3	911.4	1,020.6	918.3	1,020.6
I55	932.3	1,002.3	1,036.8	1,126.5	1,174.7	1,093.3	1,192.1	1,293.7	1,364.7
I56	1,508.8	1,956.4	1,996.2	2,149.1	2,119.3	2,032.8	2,297.4	2,493.1	2,678.2
N79	441.7	429.5	484.2	519.9	515.5	564.8	524.0	562.6	511.4
D3511						3.7	2.6	30.8	32.7
TOTAL	20,396.5	15,477.1	18,344.0	18,515.8	19,918.4	22,665.5	21,176.8	18,554.7	19,117.3

Only data for sectors for which information is available are shown.
Grey background, years when MSP is in force.
Source, Own elaboration based on data from Table 22 and Eurostat's GDP Price index.

Table 28 - Norway: Evolution of the production value of marine activities before and after MSP. (Units, million constant Euros, €$_{2010}$)

NACE Codes	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
A0311	433.7	452.7	522.3	566.2	469.3	412.3	440.0	528.6	602.7	535.3
C1020	1,038.1	982.6	1,182.5	1,213.5	1,166.4	1,173.0	1,228.4	1,627.7	2,003.3	1,936.1
B0610*	142,750.7	159,819.8	150,833.0	137,571.1	136,690.2	121,823.3	115,874.1	56,361.7	46,016.6	56,323.9
B0620					5,299.3	5,397.0	4,946.6	6,555.8	5,521.2	5,778.2
B0910	7,880.8	11,990.1	11,198.7	11,144.7	12,609.4	14,596.6	15,334.9	15,571.7	12,826.0	10,385.5
H5020**	13,089.9	11,725.9	11,992.0	11,489.7	12,299.9	12,253.3	13,497.5	14,924.8	14,036.3	13,519.1
H5229	2,110.7	2,080.0	2,141.8	2,146.6	2,220.5	2,269.3	2,263.9	2,297.0	1,981.8	2,147.7
H49	482.8	540.6	467.9	426.8	396.1	456.3	476.7	465.7	491.5	475.0
H50	277.3	310.4	268.7	245.1	227.4	262.0	282.8	323.5	373.2	360.7
H51	852.7	954.7	826.4	753.7	699.4	805.8	881.0	950.5	903.5	873.2
I55	2,041.4	2,285.5	1,978.3	1,804.3	1,674.4	1,882.1	1,859.8	1,871.4	1,861.6	1,799.2
I56	3,425.3	3,834.9	3,319.4	3,027.6	2,809.6	3,158.0	3,123.4	3,139.0	3,179.6	3,072.9
N77	141.4	158.3	137.0	125.0	116.0	133.6	139.8	145.7	170.7	165.0
N79	997.2	1,116.4	966.3	881.4	817.9	942.3	934.4	942.8	985.5	952.4
R90-92	1,087.2	1,217.2	1,053.6	960.9	891.8	1,056.4	1,103.8	1,174.4	1,275.1	1,232.3
TOTAL	**176,916.1**	**197,812.7**	**187,185.4**	**172,628.0**	**178,639.3**	**166,905.3**	**162,675.6**	**107,187.0**	**92,547.1**	**99,864.2**

Only data for sectors for which information is available are shown.
Light blue background, years when MSP is in force.
Source, Own elaboration based on data from Table 23 and Eurostat's GDP Price index.

Table 29 - Scotland: Evolution of the production value of marine activities before and after MSP. (Units, million constant Pounds GB, £$_{2010}$)

NACE Codes	2008	2009	2010	2011	2012	2013	2014	2015	2016
A0311	285.4	282.7	317.0	269.7	308.0	322.3	425.6	391.5	380.8
A0321	224.5	274.1	290.7	207.5	246.1	296.1	336.2	329.0	464.3
C1020	1,098.4	1,419.1	1,431.0	1,264.3	1,263.3	1,472.5	1,512.4	1,391.3	1,467.3
C1089	432.8	405.4	434.6	492.0	536.7	574.4	569.2	467.5	502.0
C1091	194.5	231.7	246.2	223.0	223.7	280.5	347.7	309.2	351.2
B0610	17,445.1	21,420.5	24,865.8	21,595.0	19,082.1	15,833.4	11,294.1	10,793.0	13,395.3
B0620	3,576.6	4,658.6	4,365.3	3,691.4	3,784.0	3,120.5	3,703.6	3,209.8	3,502.1
B0910	6,896.0	7,138.5	6,226.0	5,830.4	5,947.6	5,942.0	5,691.2	6,284.2	4,024.1
H5010	316.6	372.8	259.0	373.0	313.9	340.4	308.3	204.2	150.8
H5020	446.8	364.8	328.0	371.0	255.5	341.3	251.7	221.6	159.8
N7734	21.4	19.9	11.0	12.7	11.5	11.2	11.9	16.5	12.6
C3011	751.7	736.1	1,329.8	1,286.5	1,326.3	1,011.6	1,150.6	1,346.8	793.8
C3315	60.1	58.8	81.0	94.2	117.3	124.4	132.2	144.9	102.0
H49*	907.9	743.6	830.0	850.5	896.7	928.8	923.9	836.0	925.5
F4291	547.6	600.0	449.0	578.1	815.3	953.0	763.3	790.2	603.2
TOTAL	33,205.3	38,726.6	41,464.4	37,139.3	35,128.0	31,552.4	27,421.8	26,735.7	26,834.7

Only data for sectors for which information is available are shown.
Light blue background, years when MSP is in force.
Source, Own elaboration based on data from Table 24 and Eurostat's GDP Price index.

Table 30 - Rhode Island: Evolution of the production value of marine activities before and after MSP. (Units, million constant US Dollars, \$$_{2010}$)

NAICS Codes	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
1141	141,1	132,1	92,0	85,2	81,6	83,4	84,1	88,5	77,4	84,3	82,5	141,1
1125	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	2,6	0,0	0,0
4452	10,6	9,3	8,5	11,6	11,9	12,6	14,6	14,7	15,7	12,2	16,6	10,6
3117	86,5	109,5	111,0	101,1	75,8	83,7	88,9	87,2	75,6	83,4	85,1	86,5
2111	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2123	57,1	54,7	54,1	66,9	51,7	33,1	27,0	40,7	31,7	73,4	90,8	57,1
4831	34,3	34,9	28,7	0,0	26,9	0,0	0,0	0,0	0,0	0,0	0,0	34,3
4831	1.095,2	813,2	652,6	698,2	548,2	664,2	637,4	643,3	738,9	671,9	576,1	1.095,2
3345	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
4931	78,9	88,4	95,1	96,6	97,1	117,2	151,0	161,4	156,7	159,8	140,7	78,9
4883	25,3	35,7	32,9	39,5	35,3	35,5	34,0	36,0	37,0	36,0	37,3	25,3
3366	434,2	381,3	432,6	455,7	424,0	436,6	435,7	527,0	542,4	780,0	1.092,1	434,2
3366	194,5	157,4	191,2	157,8	95,4	91,9	81,7	91,1	91,8	98,1	121,8	194,5
7225	1.584,0	1.578,2	1.554,1	1.525,2	1.463,1	1.529,0	1.573,3	1.640,8	1.692,3	1.757,2	1.824,2	1.584,0
7211	590,7	598,1	464,1	623,6	601,6	651,7	678,6	769,4	757,5	600,4	636,4	590,7
7139	62,6	63,1	63,6	55,9	49,4	55,3	51,9	47,2	56,3	54,1	53,0	62,6
7121	98,2	95,0	75,6	69,9	72,3	81,3	78,3	77,6	75,8	71,2	70,8	98,2
7139	80,6	96,2	103,6	106,7	99,1	98,9	97,8	99,4	99,4	101,1	100,6	80,6
7212	0,8	0,9	0,8	1,2	1,3	1,4	1,3	1,4	1,7	2,7	5,1	0,8
3399	7,1	8,1	7,2	10,2	9,1	10,0	10,2	9,9	13,4	19,4	39,2	7,1
4412	46,1	52,0	48,4	45,2	35,0	45,1	42,3	43,6	46,4	46,9	53,0	46,1
4872	11,2	11,8	14,9	13,6	11,4	11,4	11,8	10,5	10,0	9,1	9,6	11,2
2379	90,6	41,3	31,2	20,9	13,3	27,1	19,5	26,1	36,5	31,6	31,9	40,4
TOTAL	4.729,7	4.361,3	4.062,3	4.184,7	3.803,5	4.069,5	4.119,2	4.415,8	4.556,4	4.695,7	5.066,8	5.324,8

4.1.2.2 Hypothetical scenarios for comparisons

The Hypothetical Scenarios against which the actual evolution of the data can be compared can be constructed in two ways:

- By analysing the simultaneous evolution of spatial-planning-affected activities in other nearby economies that have not applied MSP. This makes it possible to compare the evolution and trends of activity in those (unregulated) economies with the same activities in the economy under study (regulated).

- The previous evolution of the activities affected by the new regulation is analysed before its application and the observed trends are projected for the future.

In economics, it is common to apply both procedures.

Under the first criterion, one should select neighbouring economies with a similar economic and social context, in which there is no MSP. Eight economies were selected for this exercise in the North Sea and Baltic Sea, namely the ones of Estonia, Latvia[27], Lithuania, Sweden, Finland, Poland, Denmark and France.

Using similar criteria to those used for the data in our 5 case studies, and using Eurostat as the main source, information is compiled on the evolution of value of production in the period 2008-2016 of the set of activities that can be linked to the sea and be the object of public regulation through a spatial plan. To establish comparisons over this period of time, all the data are collected in millions of euros and homogenised into euros (value) for the year 2010 using the GDP Price index (implicit deflator) of each of the 8 economies involved (information provided by Eurostat databases). The result of this laborious process is summarised in Table 31 overleaf.

[27] To be noted that Latvia subsequently approved its Maritime Spatial Plan in May 2019.

Table 31 - Evolution of the combined production value of sea-related activities in Estonia, Latvia, Lithuania, Sweden, Finland, Poland, Denmark and France. (Units, million constant Euros 2010)

NACE Codes	2008	2009	2010	2011	2012	2013	2014	2015	2016
A0311	1,383.0	1,100.1	1,190.5	1,621.9	1,426.7	1,452.8	1,386.0	1,480.8	1,607.1
A0321	993.2	1,014.4	883.3	1,021.3	1,024.3	993.5	934.9	943.4	1,061.9
G4638	3,828.8	3,540.1	3,964.3	3,592.8	3,835.5	4,054.4	6,988.0	6,987.4	7,042.2
C1020	6,855.1	6,789.5	6,822.2	7,239.8	7,578.3	8,055.3	8,359.4	8,595.4	9,396.0
C1041	4,467.1	4,434.2	4,199.1	6,767.8	6,719.3	6,279.6	6,066.5	6,004.2	6,082.4
C1085	5,160.8	5,130.0	4,990.7	5,252.2	5,213.8	5,159.3	5,182.7	5,271.5	5,799.3
C1089	8,614.3	8,244.4	6,525.3	6,185.5	6,396.6	6,439.5	6,810.0	6,920.1	7,164.1
C1091	11,719.5	12,066.2	11,411.0	12,588.0	13,116.4	14,255.6	14,373.1	13,502.9	12,891.9
M72.11	1,766.6	1,639.6	1,648.2	1,673.0	1,902.3	1,864.4	2,184.3	2,421.2	2,779.5
B0610	10,142.7	6,727.6	7,565.4	8,608.8	7,665.3	7,102.2	6,033.5	6,076.6	3,499.8
B0620	2.4	2.5	2.3	17.3	17.1	31.0	30.8	30.5	33.2
B0910	843.2	969.9	1,154.5	1,302.9	1,266.4	1,226.4	1,183.9	1,221.0	1,070.8
B0811	1,274.4	1,170.1	1,190.3	1,539.5	1,314.7	1,319.1	1,200.9	1,213.9	1,222.0
B0812	7,899.4	7,277.0	7,432.9	7,908.2	7,598.4	7,311.5	6,542.2	5,877.1	5,700.7
B0899	345.8	314.2	367.0	492.5	373.8	382.5	359.1	385.9	366.5
B0893	267.5	250.8	260.9	259.7	230.2	271.3	272.7	270.0	244.4
C1084	2,687.5	2,661.2	2,623.1	2,778.0	2,895.9	2,988.5	3,175.1	3,235.7	3,332.6
B0710	910.2	981.9	2,725.0	2,929.6	2,608.7	2,395.2	1,997.0	1,468.2	1,724.7
B0721									
B0729	273.3	318.6	668.1	653.8	870.6	851.2	837.8	825.6	823.5
B0990	92.1	110.5	217.2	333.1	281.0	413.6	414.8	520.8	636.7
E3600	15,826.3	14,982.8	16,496.3	16,287.2	15,891.1	15,181.5	14,660.9	14,962.5	14,978.6
H5010	5,071.2	4,644.3	5,079.2	5,312.8	5,055.6	5,352.0	5,403.6	5,995.0	6,181.0
H5020	41,235.7	37,746.1	38,806.1	38,277.1	39,726.6	38,857.2	38,327.6	38,802.2	34,642.8
H5229	60,340.7	49,933.2	54,469.3	57,451.1	56,757.7	55,981.9	56,952.0	58,969.8	54,805.7
K6512	45,184.3	46,081.5	43,911.6	43,203.1	42,057.1	41,688.7	40,383.4	41,173.7	40,754.7
K6520	3,664.0	3,639.9	3,526.7	3,505.9	3,421.4	3,397.7	5,531.3	4,810.7	4,936.4
N7734	658.9	797.0	631.6	657.1	705.0	702.6	688.0	811.5	697.2
H5210	11,459.3	11,771.0	11,940.5	12,995.7	13,899.7	13,983.9	13,833.1	13,464.8	14,414.2
H5222	2,758.2	2,655.1	2,796.0	2,884.5	3,005.1	3,294.4	3,352.0	3,348.9	3,514.5
H5224	5,555.1	5,277.4	5,595.2	5,678.0	6,193.0	6,332.5	6,050.5	5,817.7	5,761.6
C2811	19,915.2	19,843.2	16,809.1	17,559.3	17,897.0	15,551.3	15,166.3	14,010.1	14,310.1
C3011	7,999.3	7,699.7	6,054.5	6,014.9	6,496.1	6,254.8	6,179.3	6,793.9	7,099.9
C3012	2,139.8	1,758.5	1,884.9	2,111.4	1,712.1	1,560.8	1,611.6	1,865.7	2,078.1
C3230	1,176.4	1,081.6	1,122.9	1,197.4	1,083.2	1,052.8	1,096.9	1,072.6	1,179.1
C3315	2,594.5	2,131.4	2,097.4	2,083.4	1,984.5	2,107.1	2,739.5	2,805.9	2,674.2
E3831	883.5	805.2	1,202.3	1,242.4	997.7	634.8	596.2	537.5	572.8
G4614	2,570.2	2,340.8	2,094.3	2,547.4	2,623.5	2,811.5	3,267.8	2,898.6	2,634.2
H49	151,724.9	139,526.9	143,111.4	149,854.7	150,793.3	152,255.5	146,093.4	147,500.8	166,419.4
H51	31,508.9	29,201.0	29,769.3	31,295.6	31,554.3	31,028.3	29,949.3	31,405.2	30,583.7
I55	31,681.2	29,748.7	30,678.1	32,179.5	31,883.3	32,151.6	33,212.2	35,156.2	35,242.0
I56	72,125.6	72,681.5	77,242.6	81,295.6	81,037.5	83,400.3	86,781.8	88,089.3	91,906.9
D3511	77,197.0	77,857.4	76,505.6	77,209.6	74,056.8	75,099.8	73,168.8	72,896.6	71,582.1
D3512	8,239.6	7,848.7	7,558.0	7,329.2	7,444.6	7,360.2	7,296.9	7,290.0	7,295.8
E3812	720.4	637.0	576.8	524.2	666.5	771.7	744.5	863.6	757.8
E3900	734.7	693.6	796.4	882.7	1,101.3	1,228.7	1,224.9	1,435.9	1,410.5
O84									
F4222	7,308.5	7,390.3	7,511.9	8,393.7	8,679.9	9,063.9	8,684.2	9,414.6	9,451.2
F4291	3,231.4	3,112.2	3,354.3	2,792.4	2,612.1	2,774.0	2,622.9	2,929.3	2,082.3
F4312	19,381.4	17,770.6	18,373.9	20,193.9	20,617.8	21,805.7	18,986.8	18,937.8	20,131.6

Blank, Data not available.
Source, Structural Business Statistics (sbs) Eurostat.

Based on this information, we can calculate the Annual Variation Rate (AVR) of the production value for the maritime activities of all the 8 countries in our sample. By eliminating extreme atypical values (which we consider to exist when the corresponding AVR exceed 25% or is lower than -25%), Hypothetical Reference Scenarios can be constructed for each of the case studies. These Hypothetical Reference Scenarios show the trends experienced by sectors linked to the ocean in those 8 countries without MSP during the period in which such regulation was already being applied in our case studies.

While these 8 countries with which to make comparisons are a good – or at least the best available – benchmark for the Belgian, German and Norwegian cases, they are not equally as good for the other two case studies. Scotland and Rhode Island cannot be compared against Baltic and North Sea countries. This leads us to adopt the second criterion for the analysis, that is to establish a baseline scenario based on the real evolution of maritime activities in the years prior to the implementation of MSP.

For the case studies of Belgium, Germany and Norway, Table 32 shows the evolution trends of marine activities for the corresponding hypothetical baseline scenario. For example, for Belgium the baseline scenario comprises a 3-year period (2014-2016) in which the maritime spatial plan was already in force. The figure of 3.59% reported for marine fishing implies that the production value of marine fishing grew by exactly the same average annual rate in the 8 countries without MSP during the same period. Thus, had MSP not been applied in Belgium, we assume that marine fishing in Belgium would have had an evolution similar to the average of the 8 surrounding countries without MSP. The same applies to Germany, whose baseline scenario is 7 years (period 2010-16), and Norway, whose baseline scenario is 4 years (period 2013-16).

Table 32 - Trends in the evolution of Production Value in sea-related activities in the hypothetical baseline scenario for Belgium, Germany and Norway.

NACE Codes	Activity	Belgium 2014-16	Germany 2010-16	Norway 2013-16
A0311	1.1.1. Marine fishing	3.59%	1.46%	3.15%
A0321	1.1.2. Marine aquaculture	2.53%	1.08%	1.14%
G4638	1.1.4. Wholesale of other food, including fish, crustaceans and molluscs	0.39%	2.64%	2.16%
C1020	1.1.5. Processing and preserving of fish, crustaceans and molluscs	5.30%	4.78%	5.55%
C1041	1.1.6. Manufacture of oils and fats	-1.04%	-2.61%	-2.42%
C1085	1.1.7. Prepared meals and dishes	4.06%	1.85%	2.78%
C1089	1.1.8. Other food products n.e.c.	3.63%	-1.58%	2.89%
C1091	1.1.9. Prepared feeds for farm animals	-3.25%	1.14%	-0.27%
M 72.11	1.2.1. Research and experimental development on biotechnology	14.27%	8.08%	10.20%
B0610	2.1.1. Extraction of crude petroleum	-7.17%	-1.07%	-7.23%
B0620	2.1.2. Extraction of natural gas	2.42%	-0.35%	2.42%
B0910	2.1.3. Support activities for petroleum and natural gas extraction	-4.21%	1.90%	-3.95%
B0811	2.2.1, Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	-2.40%	-3.29%	-1.72%
B0812	2.2.2. Operation of gravel and sand pits; mining of clays and kaolin	-7.90%	-3.26%	-6.87%
B0899	2.2.3. Other mining and quarrying	-1.22%	-1.44%	-0.34%
B0893	2.3.1. Extraction of salt	-3.32%	0.01%	1.97%
C1084	2.3.2. Manufacture of condiments and seasonings	3.72%	3.29%	3.59%
B0710	2.4.1. Mining of iron ores	0.42%	-2.16%	-2.45%
B0721	2.4.2. Mining of uranium and thorium ores			
B0729	2.4.3. Mining of other non-ferrous metal ores	-1.09%	-1.53%	-1.38%
B0990	2.4.4. Support services to other mining and quarrying	11.27%	2.30%	11.27%
E3600	2.3.1. Water collection, treatment and supply	-0.42%	0.10%	-1.43%
H5010	3.1.1. Sea and coastal passenger water transport	5.00%	4.29%	5.22%
H5020	3.1.2. Sea and coastal freight water transport	-3.61%	-1.11%	-3.26%
H5229	3.1.5. Other transportation support activities	-0.60%	1.46%	-0.79%
K6512	3.1.6. Non-life insurance	-0.73%	-1.72%	-0.77%
K6520	3.1.7. Reinsurance	-5.21%	-2.87%	-3.70%
N7734	3.1.8. Rental and leasing services of water transport equipment	0.60%	-1.14%	0.36%
H5210	3.2.1. Warehousing and storage services	1.10%	3.02%	0.98%
H5222	3.2.2. Service activities incidental to water transportation	2.20%	4.13%	4.06%
H5224	3.2.3. Cargo handling	-3.09%	1.37%	-1.75%
C2811	4.1.1. Engines and turbines, except aircraft, vehicle and cycle engines	-2.65%	-4.28%	-5.27%
C3011	4.1.2. Building of ships and floating structures	4.41%	-0.64%	2.38%
C3012	4.1.3. Building of pleasure and sporting boats	10.14%	3.12%	5.39%
C3230	4.1.4. Sports goods	3.96%	1.43%	2.27%
C3315	4.2.1. Repair and maintenance of ships and boats	-1.14%	-0.52%	1.30%
E3831	4.2.2. Dismantling of wrecks	-3.12%	-5.14%	-3.12%
G4614	4.2.3. Agents involved in the sale of machinery, industrial equipment, ships and aircraft	-1.40%	2.44%	0.74%
H49	5.1.1. Tourism, Land transport	3.25%	2.66%	2.68%
H51	5.1.2. Tourism, Air transport	-0.41%	0.71%	-0.72%
I55	5.1.3. Tourism, Accommodation	3.13%	2.48%	2.56%

NACE Codes	Activity	Belgium 2014-16	Germany 2010-16	Norway 2013-16
I56	5.1.4. Food and beverage service activities	3.30%	3.43%	3.20%
N77	5.1.5. Tourism, Renting and leasing of motor vehicles, recreational and sports goods	0.60%	-1.14%	0.36%
N79	5.1.6. Tourism, Travel agency, tour operator reservation service and related activities	-0.41%	0.71%	-0.72%
D3511	6.1.1. Production of electricity	-1.58%	-1.18%	-0.83%
D3512	6.1.2. Transmission services of electricity	-0.29%	-1.02%	-0.50%
E3812	7.1.1. Collection of hazardous waste	0.07%	-0.43%	4.00%
E3900	7.1.2. Remediation activities and other waste management services	5.05%	11.02%	6.68%
O84	7.1.3. General public administration activities and Defence			
F4222	8.1.1. Construction of utility projects for electricity and telecommunications	1.54%	3.69%	2.26%

Blank, Data not available.
Source, Own elaboration from Eurostat's Structural Business Statistics (sbs).

For the Scottish and Rhode Island case studies we have statistical information (from the aforementioned sources) on the evolution of marine activities for a sufficient number of years prior to the implementation of their respective plans. Thus, for these two cases their hypothetical baseline scenarios are constructed by calculating the average evolution trends of each marine sector in the 5 years prior to the implementation of their corresponding MSP processes.

The results of the hypothetical baseline scenario for Scotland and Rhode Island can be seen in Table 33 and Table 34, respectively. In these cases, the % expressed in each table indicates the average annual evolution observed in the 5 years prior to the implementation of the plan, that is 2010-2014 for Scotland and 2006-2010 for the case of Rhode Island. A hypothetical 2% variation would indicate that in that period, the evolution of the production value of a given sector was growing at an average rate of 2% per annum. Consequently, we can assume that without the implementation of MSP, this sector of activity would continue to evolve at a similar annual rate of growth.

Table 33 - Trends in the evolution of Production Value in sea-related activities regulated in their MSP in the hypothetical baseline scenario for Scotland.

NACE Codes	Activity	2010-2014
A0311	1.1.1. Marine fishing	9.63%
A0321	1.1.2. Marine aquaculture	5.98%
C1020	1.1.5. Processing and preserving of fish, crustaceans and molluscs	1.68%
C1089	1.1.8. Other food products n.e.c.	7.12%
C1091	1.1.9. Prepared feeds for farm animals	9.29%
B0610	2.1.1. Extraction of crude petroleum	-10.88%
B0620	2.1.2. Extraction of natural gas	-3.61%
B0910	2.1.3. Support activities for petroleum and natural gas extraction	-4.29%
H5010	3.1.1. Sea and coastal passenger water transport	-11.84%
H5020	3.1.2. Sea and coastal freight water transport	-13.59%
N7734	3.1.8. Rental and leasing services of water transport equipment	-7.11%
C3011	4.1.2. Building of ships and floating structures	-2.54%
C3315	4.2.1. Repair and maintenance of ships and boats	13.29%
F4291	8.1.2. Construction of water projects	0.14%

Source, Own elaboration based on Scottish Government, Office for National Statistics.

Table 34 - Trends in the evolution of Production Value in activities related to the sea and regulated in its MSP in the hypothetical baseline scenario for Rhode Island

NAICS Codes	Activity	2006-10
1141	Fishing	-9.23%
1125	Fish Hatcheries and Aquaculture	
4452	Seafood markets	4.75%
3117	Seafood Processing	0.89%
2111	Oil and gas exploration and production	
2123	Limestone, sand and gravel	-8.11%
4831	Marine passenger transportation	-8.00%
4831	Marine freight	-7.77%
3345	Search and Navegation Equipment	
4931	Warehousing	8.49%
4883	Marine transportation services	8.65%
3366	Ship Building and Repair	0.52%
3366	Boat Building and Repair	-11.65%
7225	Eating and drinking places	-0.66%
7211	Hotels and Lodging	3.61%
7139	Amusement and Recreation Services	-2.02%
7121	Zoos and Aquaria	-3.06%
7139	Marine	4.53%
7212	Recreational Vehicle Parks and Campsites	12.67%
3399	Sporting Goods	8.75%
4412	Boat Dealers	1.13%
4872	Scenic water tours	1.42%
2379	Marine Related Construction	-8.78%

Blank, Data not available.
Source, Own elaboration from The Nation's Coastal Management Agency (NOAA).

4.1.2.3 Estimation of Initial Direct Economic Effects

Applying the evolution trends of Production Value in sea-related activities for our 5 case studies, we obtain the results presented in the tables below.

Table 35 - Hypothetical scenario without MSP in Belgium, Value of Production in activities linked to the sea and regulated in the spatial plan. (Units, million constant Euros 2010)

NACE Codes	Activity	2014	2015	2016
A0311	Marine fishing	2.3	2.4	2.4
A0321	Marine aquaculture	0.9	1.0	1.0
G4638	Wholesale of other food, including fish, crustaceans and molluscs	38.6	38.7	38.9
C1020	Processing and preserving of fish, crustaceans and molluscs	19.4	20.4	21.5
B0811	Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	41.1	40.1	39.1
B0812	Operation of gravel and sand pits; mining of clays and kaolin	229.9	211.8	195.1
H5020	Sea and coastal freight water transport	1,950.6	1,880.1	1,812.1
H5229	Other transportation support activities	447.0	444.4	441.7
N7734	Rental and leasing services of water transport equipment	255.5	257.0	258.5
H5210	Warehousing and storage services	173.1	175.0	177.0
H5222	Service activities incidental to water transportation	1,065.3	1,088.8	1,112.7
I55	Tourism, Accommodation	795.0	819.9	845.6
I56	Tourism, Food and beverage service activities	1,065.4	1,100.5	1,136.8
N79	Tourism, Travel agency, tour operator reservation service and related activities	3,548.2	3,533.7	3,519.2
D3511	Production of electricity: Wind Energy	231.7	228.0	224.4
F4291	Construction of water projects	2,529.0	2,607.8	2,689.2
	TOTAL	**12,392.9**	**12,449.4**	**12,515.0**

Only data for sectors for which information is available are shown.
Source, Own elaboration from data in Table 26 and Table 32.

Table 36 - Hypothetical scenario without MSP in Germany, Value of Production in activities linked to the sea and regulated in the spatial plan. (Units, million constant Euros 2010)

NACE Codes	Activity	2010	2011	2012	2013	2014	2015	2016
A0311	Marine fishing	47.8	48.5	49.2	50.0	50.7	51.4	52.2
B0811	Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	1.4	1.3	1.3	1.2	1.2	1.2	1.1
B0812	Operation of gravel and sand pits; mining of clays and kaolin	1.7	1.6	1.6	1.5	1.5	1.4	1.4
B0899	Other mining and quarrying	0.2	0.2	0.2	0.2	0.2	0.2	0.1
H5010	Sea and coastal passenger water transport	397.6	414.6	432.4	450.9	470.3	490.4	511.4
H5020	Sea and coastal freight water transport	2,609.3	2,580.3	2,551.5	2,523.1	2,495.0	2,467.1	2,439.7
H5229	Other transportation support activities	5,395.7	5,474.3	5,554.1	5,635.0	5,717.1	5,800.4	5,885.0
H49	Tourism, Land transport	2,933.3	3,011.3	3,091.4	3,173.6	3,258.1	3,344.7	3,433.7
H51	Tourism, Air transport	848.9	855.0	861.1	867.2	873.4	879.7	885.9
I55	Tourism, Accommodation	1,027.1	1,052.5	1,078.6	1,105.3	1,132.7	1,160.7	1,189.5
I56	Tourism, Food and beverage service activities	2,023.5	2,093.0	2,164.8	2,239.0	2,315.9	2,395.3	2,477.5
N79	Tourism, Travel agency, tour operator reservation service and related activities	432.6	435.6	438.8	441.9	445.1	448.2	451.4
D3511	Production of electricity	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TOTAL	**15,719.1**	**15,968.3**	**16,224.9**	**16,489.0**	**16,760.9**	**17,040.8**	**17,328.9**

Only data for sectors for which information is available are shown.
Source, Own elaboration from data in Table 27 and Table 32.

Table 37 - Hypothetical scenario without MSP in Norway, Value of Production in activities linked to the sea and regulated in the spatial plan. (Units, million constant Euros 2010)

NACE Codes	Activity	2013	2014	2015	2016
A0311	1.1.1. Marine fishing	484.0	499.3	515.0	531.2
C1020	1.1.5. Processing and preserving of fish, crustaceans and molluscs	1,231.1	1,299.5	1,371.6	1,447.8
B0610	2.1.1. Extraction of crude petroleum	126,812.8	117,649.1	109,147.6	101,260.5
B0620	2.1.2. Extraction of natural gas	5,427.4	5,558.6	5,692.9	5,830.5
B0910	2.1.3. Support activities for petroleum and natural gas extraction	12,111.6	11,633.4	11,174.1	10,732.9
H5020	3.1.2. Sea and coastal freight water transport	12,142.7	11,747.0	11,364.3	10,994.0
H5229	3.1.5. Other transportation support activities	2,203.0	2,185.7	2,168.4	2,151.3
H49	5.1.1. Tourism, Land transport	406.7	417.5	428.7	440.2
H50	3.1.1. Tourism, Water transport	239.3	251.8	264.9	278.8
H51	5.1.2. Tourism, Air transport	694.4	689.3	684.3	679.4
I55	5.1.3. Tourism, Accommodation	1,717.3	1,761.2	1,806.3	1,852.5
I56	5.1.4. Tourism, Food and beverage service activities	2,899.6	2,992.4	3,088.3	3,187.2
N77	5.1.5. Tourism, Renting and leasing of motor vehicles, recreational and sports goods	116.4	116.8	117.2	117.7
N79	5.1.6. Tourism, Travel agency, tour operator reservation service and related activities	812.0	806.1	800.3	794.5
R90-92	5.1.7.Tourism, Culture and entertainment	885.3	878.9	872.5	866.2
	TOTAL	**168,183.5**	**158,486.7**	**149,496.7**	**141,164.7**

Only data for sectors for which information is available are shown.
Source, Own elaboration from data in Table 28 and Table 32.

Table 38 - Hypothetical scenario without MSP in Scotland, Value of Production in activities linked to the sea and regulated in the spatial plan. (Units, million constant GB Pounds 2010)

NACE Codes	Activity	2015	2016
A0311	1.1.1. Marine fishing	466.6	511.5

NACE Codes	Activity	2015	2016
A0321	1.1.2. Marine aquaculture	356.3	377.6
C1020	1.1.5. Processing and preserving of fish, crustaceans and molluscs	1,537.7	1,563.5
C1089	1.1.8. Other food products n.e.c.	609.7	653.2
C1091	1.1.9. Prepared feeds for farm animals	380.0	415.3
B0610	2.1.1. Extraction of crude petroleum	10,065.3	8,970.2
B0620	2.1.2. Extraction of natural gas	3,569.8	3,440.8
B0910	2.1.3. Support activities for petroleum and natural gas extraction	5,447.1	5,213.5
H5010	3.1.1. Sea and coastal passenger water transport	306.2	304.1
H5020	3.1.2. Sea and coastal freight water transport	241.3	231.2
N7734	3.1.8. Rental and leasing services of water transport equipment	11,0	10,2
C3011	4.1.2. Building of ships and floating structures	1,312.8	1,498.0
C3315	4.2.1. Repair and maintenance of ships and boats	156.3	184.7
H-I	5.1.1. Coastal Tourism	965.6	1,009.2
F4291	8.1.2. Construction of water projects	826.9	895.7
	TOTAL	**26,252.5**	**25,278.5**

Only data for sectors for which information is available are shown.
Source, Own elaboration from data in Table 29 and Table 33.

Table 39 - Hypothetical scenario without MSP in Rhode Island, Value of Production in activities linked to the sea and regulated in the spatial plan. (Units, million constant US $ 2010)

NAICS Codes	Activity	2011	2012	2013	2014	2015	2016
1141	Fishing	75.7	68.7	62.4	56.6	51.4	46.7
1125	Fish Hatcheries and Aquaculture	0.0	0.0	0.0	0.0	0.0	0.0
4452	Seafood markets	13.2	13.8	14.5	15.2	15.9	16.6
3117	Seafood Processing	84.5	85.2	86.0	86.7	87.5	88.3
2111	Oil and gas exploration and production	0.0	0.0	0.0	0.0	0.0	0.0
2123	Limestone, sand and gravel	30.4	27.9	25.6	23.6	21.7	19.9
4831	Marine passenger transportation	0.0	0.0	0.0	0.0	0.0	0.0
4831	Marine freight	612.6	565.0	521.1	480.6	443.3	408.9
3345	Search and Navegation Equipment	0.0	0.0	0.0	0.0	0.0	0.0
4931	Warehousing	127.1	137.9	149.6	162.3	176.1	191.0
4883	Marine transportation services	38.6	41.9	45.5	49.5	53.8	58.4
3366	Ship Building and Repair	438.9	441.2	443.5	445.8	448.1	450.5
3366	Boat Building and Repair	81.2	71.7	63.4	56.0	49.5	43.7
7225	Eating and drinking places	1,518.8	1,508.8	1,498.7	1,488.8	1,478.9	1,469.1
7211	Hotels and Lodging	675.2	699.6	724.8	750.9	778.0	806.1
7139	Amusement and Recreation Services	54.2	53.1	52.1	51.0	50.0	49.0
7121	Zoos and Aquaria	78.9	76.4	74.1	71.8	69.6	67.5
7139	Marine	103.4	108.0	112.9	118.0	123.4	129.0
7212	Recreational Vehicle Parks and Campsites	1.6	1.8	2.0	2.2	2.5	2.8
3399	Sporting Goods	10.9	11.8	12.8	14.0	15.2	16.5
4412	Boat Dealers	45.6	46.1	46.7	47.2	47.7	48.3
4872	Scenic water tours	11.6	11.8	11.9	12.1	12.3	12.4
2379	Marine Related Construction	24.8	22.6	20.6	18.8	17.1	15.6
	TOTAL	**4,027.1**	**3,993.5**	**3,968.3**	**3,951.3**	**3,942.0**	**3,940.3**

Only data for sectors for which information is available are shown.
Source, Own elaboration from data in Table 30 and Table 34.

The above tables show projections of results in hypothetical scenarios in which MSP was not implemented in each of the 5 case studies. These projections are then compared against the actual evolution of maritime activities affected by MSP (data shown in the shaded columns of Tables 26 to 30). The difference between the two values (the real value minus the hypothetical value) is what we call Initial Direct Economic Effects. In other words, these are estimates of the direct impact that the implementation of MSP might have had in each case study.

For Belgium these estimated Initial Direct Economic Effects are detailed in Table 40. As can be seen, the first year of MSP implementation in Belgium case seems to have had negative effects, reducing the value of the regulated activity by around 88.3

million €2010. In the following two years, 2015 and 2016, marine activities affected by MSP recovered, with positive effects clearly outweighing negative ones.

In Germany (see Table 41), the Initial Direct Economic Effects appear to have been positive for all the years considered.

In the case of Norway, the estimated Initial Direct Economic Effects are negative for most of the years of the 2013-2017 period (see Table 42), mainly due to the downward trend of the oil and gas industry.

In Scotland, unlike Norway, the plan implemented in 2015 seems to have favoured the sectors linked to the extraction of oil and gas to the detriment of the other sectors (see Table 43).

Finally, in the case of Rhode Island, the estimated Initial Direct Economic Effects are generally quite positive (see Table 44), although some marine activities have been benefitted more than others.

Table 40 - Initial Direct Economic Effects in Belgium, Value of Production in activities linked to the sea and regulated in the maritime spatial plan. (Units, million constant Euros 2010)

NACE Codes	Activity	2014	2015	2016
A0311	Marine fishing	0.4	0.3	0.0
A0321	Marine aquaculture	0.0	-0.7	-0.6
G4638	Wholesale of other food, including fish, crustaceans and molluscs	3.3	4.0	1.2
C1020	Processing and preserving of fish, crustaceans and molluscs	-0.7	-0.4	0.3
B0811	Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	-4.8	-15.7	-9.3
B0812	Operation of gravel and sand pits; mining of clays and kaolin	32.2	28.5	78.5
H5020	Sea and coastal freight water transport	-135.6	515.4	399.9
H5229	Other transportation support activities	-28.0	37.8	-16.7
N7734	Rental and leasing services of water transport equipment	-171.6	-110.9	-18.7
H5210	Warehousing and storage services	-11.0	-5.0	52.0
H5222	Service activities incidental to water transportation	-51.9	356.3	338.4
I55	Tourism, Accommodation	30	-16	-206
I56	Tourism, Food and beverage service activities	-28	-46	-108
N79	Tourism, Travel agency, tour operator reservation service and related activities	235	347	263
D3511	Production of electricity: Wind Energy	136.6	168.1	197.7
F4291	Construction of water projects	-93.9	678.9	288.0
	TOTAL	**-88.3**	**1,941.7**	**1,259.8**

Source, Own elaboration from data in Table 26 and Table 35.

Table 41 - Initial Direct Economic Effects in Germany, Value of Production in activities linked to the sea and regulated in the maritime spatial plan. (Units, million constant Euros 2010)

NACE Codes	Activity	2010	2011	2012	2013	2014	2015	2016
A0311	Marine fishing	5.6	23.5	29.3	64.1	52.9	52.9	52.6
B0811	Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	6.4	1.7	-0.1	-0.5	-0.5	2.0	2.1
B0812	Operation of gravel and sand pits; mining of clays and kaolin	10.4	3.2	0.3	-0.4	-0.5	2.8	2.5

NACE Codes	Activity	2010	2011	2012	2013	2014	2015	2016
B0899	Other mining and quarrying	0.9	0.3	0.0	0.0	-0.1	0.3	0.2
H5010	Sea and coastal passenger water transport	-174.6	274.3	421.6	386.3	1,051.7	1,067.2	1,346.9
H5020	Sea and coastal freight water transport	1,175.5	733.2	1,306.9	2,066.2	801.6	399.8	-411.9
H5229	Other transportation support activities	1,446.7	1,133.3	1,741.9	3,753.8	2,314.9	-364.6	341.7
H49	Tourism, Land transport	26.4	96.0	-1.9	-45.6	-73.7	-61.0	-148.8
H51	Tourism, Air transport	93.4	67.6	68.3	44.2	147.1	38.6	134.6
I55	Tourism, Accommodation	9.7	74.0	96.1	-12.0	59.4	133.0	175.3
I56	Tourism, Food and beverage service activities	-27.3	56.1	-45.5	-206.2	-18.5	97.8	200.7
N79	Tourism, Travel agency, tour operator reservation service and related activities	51.6	84.3	76.7	122.9	78.9	114.4	60.0
D3511	Production of electricity				3.7	2.6	30.8	32.7
	TOTAL	**2,624.87**	**2,547.47**	**3,693.47**	**6,176.49**	**4,415.84**	**1,513.85**	**1,788.37**

Only data for sectors for which information is available are shown.
Source, Own elaboration from data in Table 27 and Table 36.

Table 42 - Initial Direct Economic Effects in Norway, Value of Production in activities linked to the sea and regulated in the maritime spatial plan. (Units, million constant Euros 2010)

NACE Codes	Activity	2013	2014	2015	2016
A0311	Marine fishing	-71.7	-59.3	13.5	71.5
C1020	Processing and preserving of fish, crustaceans and molluscs	-58.1	-71.1	256.0	555.5
B0610	Extraction of crude petroleum	-4,989.5	-1,775.0	-52,785.9	-55,243.8
B0620	Extraction of natural gas	-30.3	-611.9	862.9	-309.3
B0910	Support activities for petroleum and natural gas extraction	2,485.0	3,701.5	4,397.6	2,093.1
H5020	Sea and coastal freight water transport	394,6	2,039.1	3,867.3	3,360.8
H5229	Other transportation support activities	66.3	78.2	128.6	-169.6
H49	Tourism, Land transport	49.6	59.2	37.0	51.2
H50	Tourism, Water transport	22.7	31.0	58.6	94.4
H51	Tourism, Air transport	111.4	191.6	266.1	224.2
I55	Tourism, Accommodation	164.8	98.5	65.1	9.1
I56	Tourism, Food and beverage service activities	258.4	131.0	50.7	-7.6
N77	Tourism, Renting and leasing of motor vehicles, recreational and sports goods	17.2	23.0	28.4	53.0
N79	Tourism, Travel agency, tour operator reservation service and related activities	130.3	128.3	142.5	191.0
R90-92	Tourism, Culture and entertainment	171.1	224.9	301.9	408.9
	TOTAL	**-1,278.2**	**4,188.9**	**-42,309.6**	**-48,617.7**

Only data for sectors for which information is available are shown.
Source, Own elaboration from data in Table 28 and Table 37.

Table 43 - Initial Direct Economic Effects in Scotland, Value of Production in activities linked to the sea and regulated in the maritime spatial plan. (Units, million constant GB Pounds 2010)

NACE Codes	Activity	2015	2016
A0311	Marine fishing	-75.1	-130.7
A0321	Marine aquaculture	-27.3	86.8
C1020	Processing and preserving of fish, crustaceans and molluscs	-146.4	-96.2
C1089	Other food products n.e.c.	-142.2	-151.1
C1091	Prepared feeds for farm animals	-70.7	-64.0
B0610	Extraction of crude petroleum	727.7	4,425.0
B0620	Extraction of natural gas	-359.9	61.3
B0910	Support activities for petroleum and natural gas extraction	837.1	-1,189.4
H5010	Sea and coastal passenger water transport	-102.0	-153.3
H5020	Sea and coastal freight water transport	-19.7	-71.4
N7734	Rental and leasing services of water transport equipment	5.5	2.3
C3011	Building of ships and floating structures	33.9	-704.2

NACE Codes	Activity	2015	2016
C3315	Repair and maintenance of ships and boats	-11,4	-82.7
H-I	Coastal Tourism	-129.6	-83.7
F4291	Construction of water projects	-36.6	-292.5
	TOTAL	**483.2**	**1,556.2**

Only data for sectors for which information is available are shown.
Source, Own elaboration from data in Table 29 and Table 38.

Table 44 - Initial Direct Economic Effects in Rhode Island, Value of Production in activities linked to the sea and regulated in the maritime spatial plan. (Units, million constant US $ 2010)

NAICS Codes	Activity	2011	2012	2013	2014	2015	2016
1141	Fishing	8.3	19.8	15.0	27.7	31.1	45.6
1125	Fish Hatcheries and Aquaculture	0.0	0.0	0.0	2.6	0.0	2.4
4452	Seafood markets	1.4	0.8	1.2	-3.0	0.7	34.1
3117	Seafood Processing	4.4	2.0	-10.4	-3.3	-2.4	2.5
2111	Oil and gas exploration and production	0.0	0.0	0.0	0.0	0.0	0.0
2123	Limestone, sand and gravel	-3.4	12.8	6.0	49.9	69.2	49.0
4831	Marine passenger transportation	0.0	0.0	0.0	0.0	0.0	0.0
4831	Marine freight	24.8	78.3	217.8	191.2	132.8	255.8
3345	Search and Navegation Equipment	0.0	0.0	0.0	0.0	0.0	0.0
4931	Warehousing	23.8	23.5	7.1	-2.5	-35.4	-48.3
4883	Marine transportation services	-4.6	-5.9	-8.6	-13.5	-16.5	-20.7
3366	Ship Building and Repair	-3.2	85.9	98.9	334.2	644.0	567.6
3366	Boat Building and Repair	0.5	19.4	28.4	42.1	72.3	79.8
7225	Eating and drinking places	54.5	132.0	193.6	268.4	345.3	476.6
7211	Hotels and Lodging	3.4	69.8	32.7	-150.5	-141.7	-109.3
7139	Amusement and Recreation Services	-2.4	-6.0	4.3	3.1	3.0	8.7
7121	Zoos and Aquaria	-0.5	1.1	1.7	-0.6	1.2	5.6
7139	Marine	-5.6	-8.6	-13.6	-16.9	-22.8	-28.5
7212	Recreational Vehicle Parks and Campsites	-0.2	-0.4	-0.3	0.4	2.6	3.0
3399	Sporting Goods	-0.7	-1.9	0.6	5.5	24.0	31.9
4412	Boat Dealers	-3.3	-2.6	-0.2	-0.3	5.2	6.4
4872	Scenic water tours	0.2	-1.3	-1.9	-3.0	-2.7	-2.4
2379	Marine Related Construction	-5.2	3.6	15.9	12.8	14.8	24.8
	TOTAL	**92.2**	**422.3**	**588.1**	**744.4**	**1.124.8**	**1.384.4**

Only data for sectors for which information is available are shown.
Source, Own elaboration from data in Table 30 and Table 39.

4.1.3 Phase 3: stakeholder consultation

It is evident that the evolution of industries linked to the ocean is also conditioned by the situation and evolution of the economy as a whole and by other specific circumstances in each sector. In other words, even if in the previous phase we detect significant changes in the indicators selected for the analysis of economic effects, we cannot not be certain that these changes are directly linked or are the effect of the implementation of MSP. For this reason, stakeholders (CEOs, business organisations, government agencies, etc.) should be consulted, as they have the best knowledge of their respective industries and of the specific circumstances that condition the annual production results.

The teams responsible for each case study drew up a list of stakeholders to be consulted. The guiding principle is that sector associations are to be preferred, as they are the voice of a multitude of companies / operators. Ideally, at least one sector association per maritime activity should be interviewed in each country.

The consultations are structured in two parts. The first part attempts to gather qualitative perceptions about the effects of the implementation of MSP. The second seeks to attain a quantitative evaluation of the impacts of MSP on various economic variables. The questions are elaborated to capture the perceptions, opinions and assessments of the stakeholders; possible answers are based on a Likert scale. The questionnaires used are shown below.

Questions	Answers	Comments
1) In general terms I consider that MSP in (country) has had positive social and environmental effects.	□ Totally agree □ Pretty much agree □ Neither agree nor disagree □ Pretty much disagree □ Totally disagree	Justification of the answer Arguments offered etc...
2) The implementation of MSP in (country) has reduced conflicts between different maritime industries.	□ Totally agree □ Pretty much agree □ Neither agree nor disagree □ Pretty much disagree □ Totally disagree	Identify conflicting industries or activities
3) The implementation of MSP in (country) has improved access to information on maritime activities.	□ Totally agree □ Pretty much agree □ Neither agree nor disagree □ Pretty much disagree □ Totally disagree	Concrete cases
4) The implementation of MSP in (country) has reduced administrative, legal and management costs in your activity.	□ Totally agree □ Pretty much agree □ Neither agree nor disagree □ Pretty much disagree □ Totally disagree	Concrete cases
5) The implementation of MSP in (country) has improved business expectations in your activity.	□ Totally agree □ Pretty much agree □ Neither agree nor disagree □ Pretty much disagree □ Totally disagree	Concrete cases
6) The implementation of PSM in (country) has increased investor interest or accelerated investments in your industrial sector.	□ Totally agree □ Pretty much agree □ Neither agree nor disagree □ Pretty much disagree □ Totally disagree	Concrete cases

This method makes it possible to capture the perceptions of stakeholders about MSP, identify the main elements of satisfaction and dissatisfaction, evaluate strengths and weaknesses, and obtain an overview of how MSP is perceived by a given sector.

Furthermore, stakeholders are also shown information on the evolution of some economic indicators related to their sector of activity or industry.

As far as partially maritime activities are concerned, stakeholders are first asked to determine the % of the total value of the production that can be considered maritime.

Activity	Unit	Period									
		-5	-4	-3	-2	-1	0	1	2	3	...
	Production value										
	Maritime %										

The interviewees are shown the evolution of the production value of their sector in current euros and the Annual Real Variation Rate. Based on this information, they have to determine to what extent the trend observed has been influenced by the implementation of MSP.

Activity	Unit	Period									
		-5	-4	-3	-2	-1	0	1	2	3	...
	Production value (million €)										
	AVR of Marine Production value (%)										
	Are there changes in trends or rhythms?										
	- More than 75% of the change attributable to MSP										
	- Between 50% and 75%.										
	- Between 25% and 50%										
	- Less than 25%.										

If the interviewee answers that they do not observe changes in the trends due MSP or if the trend is negative, they are asked whether and to what extent the implementation of MSP might have slowed or reversed potential negative trends, using the same scale (more than 75%, between 50% and 75%, ...).

This type of questionnaire makes it possible to have an assessment of the economic effects of MSP by the main parties involved and with the best knowledge of the reality of each maritime sector. The valuations served to design the scenarios that we propose for the estimation of the impacts through the two indicated methodologies, cost-benefit analysis and input-output analysis.

For the subsequent development of the cost-benefit analysis, it is essential to have an interview with one or more representatives of the public administration responsible for the elaboration, development and implementation of MSP.

For the cost-benefit analysis one needs to know the revenues and costs of the policy being evaluated. The impact on income can be assessed by monitoring the income (Value Added) earned with MSP, but the valuation of costs is more difficult to obtain. Although the economic literature posits that the costs for the administration are relatively low, it does not seem assumable that they are null. For costs one needs to know how MSP is financed assuming that those resources would have an opportunity cost (they could be employed for alternative uses). These resources may come from disbursements from the public administration or the private sector through fees, quotas, etc.

Based on the sequential classification that we carried out in task 2, the implementation and subsequent development of the MSP requires the contribution of resources in each of the 3 phases that we defined (preparation, elaboration and application). Therefore, the interviews can be used to collect information on these costs and apportion them across the different phases of the MSP process. In this case we have two options for presenting the questionnaire:

Activity	Unit	Period		
		N-(...)	N	N+(...)
Preparation	Costs of initial studies to prepare MSP (both internal (Administration) and outsourced to external consultants)			
Elaboration	Costs associated with the creation of some Agency(s) in charge of the implementation of MSP (budgetary allocation to pay human and material resources). Costs arising from expropriations or compensation for loss of rights. Investment in environmental regeneration			
Implementation	Costs associated with the supervision of MSP			

4.1.4 Phase 4: economic analysis

After determining the impact of MSP on the blue economy (see previous step), it is possible to quantify its impact on the rest of the economy, through input-output (I-O) analysis. Furthermore, by weighing overall costs and benefits, a cost-benefit analysis can be carried out to assess the viability of MSP as a public policy.

4.1.4.1 The Input-Output methodology

The impact of MSP is not limited to the blue economy. First of all, it should be noted that blue economy sectors can carry out their activities only by purchasing goods and services from other, non-maritime, economic sectors. Secondly, part of the labour income generated by marine activities is, in turn, spent on satisfying the everyday consumption needs of households. These connections and ramifications result in increased output, income, and employment in the rest of the economy. These effects can be estimated through to the I-O multipliers from the traditional perspective where final demand is the driving force of the economy[28]. This type of analysis undertakes a counterfactual exercise—in other words, it aims to evaluate socioeconomic outcomes derived from changes in final demand, changes that may be linked to the implementation of MSP.

Three classes of effects are relevant in this context; the first includes direct effects, the second consists of indirect effects, and the third includes induced effects. Direct effects include the impact of the activities themselves (level of output, contribution to GDP and employment). Indirect refers to outcomes in the sectors that provide inputs for maritime sectors and to the subsequent, related outcomes for their respective supplier sectors. In contrast, by induced effect we refer to the effect of income on household expenditures and on gross capital formation.

The basic structure of a symmetric input-output table (SIOT) can be represented algebraically, so we can derive the respective supply and demand models. Suppose that, in a given economy, we can distinguish n homogenous branches of activity. Then the total value of the domestic output of activity i (x_i) can be devoted either to the intermediate consumption of that economy's other activity (z_{ij}) or to satisfying final demand (f_i),

$$\mathrm{x_i} = \mathrm{z_{i1}} + \mathrm{z_{i2}} + \cdots + \mathrm{z_{ij}} + \cdots + \mathrm{z_{in}} + \mathrm{f_i} \quad ; \quad 1 \leq \mathrm{i,j} \leq \mathrm{n} \qquad (1)$$

Generalising over the n activities and using matrix algebra, expression (1) can be written as $(\mathbf{I}-\mathbf{A})\,\mathbf{x}=\mathbf{f}$; here **f** is the matrix column for final demand, **x** is the matrix column of total outputs, **I** is a diagonal unit matrix with n-rows and n-columns, and **A** is the matrix that reflects the technical coefficients ($a_{ij} = z_{ij}/X_j$). Based on that, we get the following expression,

$$\mathbf{x} = (\mathbf{I}-\mathbf{A})^{-1}\ \mathbf{f} = \mathbf{L}\,\mathbf{f} \qquad (2)$$

Expression two is known as Leontief demand model and where the matrix $\mathbf{L}$ is the inverse Leontief matrix. This inverse matrix consists of the so-called total requirements (l_{ij}), which represent the total value of the input from sector i that is needed (directly and indirectly) to produce a unit from sector j destined for satisfying final demand. By adding the elements in column j of the inverse Leontief matrix, we can see how much production is necessary from all an economy's sectors in order to serve a unit increase in the final demand of products (goods or services) generated by sector j. We refer to this sum of elements as the simple output multiplier (MO_j),

$$\mathrm{m(o)_j} = \sum_{\mathrm{i=1}}^{\mathrm{n}} \mathrm{l_{ij}} \qquad (3)$$

This term reflects the direct and indirect effect of variation in the final demand of a sector (here, marine industries) on the economic system's overall output.

In order to estimate the induced effects, this basic model is often extended with household final consumption expenditure made endogenous; this aggregate generates capacity that is used as input of the productive sectors. In this model input-output closed with respect to households, an expanded matrix of technical coefficients ($\bar{\mathbf{A}}$) and an extended Leontief inverse matrix ($\bar{\mathbf{L}}$) will be generated, both with n+1 rows

[28] See Miller, Ronald E. and Peter D. Blair. Input-Output Analysis: Foundations and Extensions, 2nd edition. Cambridge University Press, 2009;

Leontief, W., Input-Output Economics. 2nd ed., New York: Oxford University Press, 1986.

and n+1 columns. The elements of $\bar{\mathbf{L}}$ ($\bar{l}_{ij}$) incorporate the impacts total (direct, indirect and induced). The sum of the n-first elements of each columns of $\bar{\mathbf{L}}$ will represent the effects total multipliers of the output on each one of the productive n-sectors, and referred to truncated total output multipliers ($\overline{m}[o(t)]_j$)

$$\overline{m}\,[o(t)]_j = \sum_{i=1}^{n} \overline{l_{ij}} \qquad (4)$$

We can similarly estimate the simple and truncated added value or income multipliers, $m(r)_j$ y $\overline{m}[r(t)]_j$. The simple multiplier accounts for the direct and indirect effects on income due to variation in the final demand of sector j, and the total truncated multiplier accounts for the total effects,

$$m(r)_j = \sum_{i=1}^{n} v_{i\,n}\, l_{ij} \qquad (5)$$

$$\overline{m}\,[r(t)]_j = \sum_{i=1}^{n} v_{i\,n}\, \overline{l_{ij}} \qquad (6)$$

where $v_{c\,i}$ represents the capacity to generate value added (v_i) per unit of product from sector i ($v_{ci} = v_i/x_i$).

Likewise, the inverse Leontief matrix can be used in order to obtain the employment requirements by activity to estimate the employment multipliers, $m(e)_j$ and $\overline{m}[e(t)]_j$. These multipliers reflect the direct and indirect effects and total effects, respectively, on employment stemming from increases in the final demand of sector j,

$$m(e)_j = \sum_{i=1}^{n} e_{i\,n}\, l_{ij} \qquad (7)$$

$$\overline{m}\,[e(t)]_j = \sum_{i=1}^{n} e_{i\,n}\, \overline{l_{ij}} \qquad (8)$$

Here e_{ci} is the employment technical coefficient, which represents the number of sector-i employees (e_i) needed to generate a unit of output in that sector i ($e_{ci} = e/x_i$). The sum of all the employment requirements then indicates the total employment generated in the economy due to production increases in sector j.

Because the technical coefficients of an economy to which the input-output models apply are presumably stable in the medium term, algebraic approach lends itself well to simple estimation exercises.

4.1.4.2 Vectors of Initial Direct Economic Impact

As can be deduced from the previous methodology, in order to estimate indirect and induced effects on the economy as a whole, one needs to construct vectors with a direct impact on the final demand of each I-O sector.

In phase 2, the Initial Direct Economic Effects derived from the implementation of MSP were estimated (see Tables 40 to 44). It can be assumed that this variation in the Production Value of each marine activity has a direct impact on final demand.

As mentioned above, the classification of activities is not strictly coincident with the industries contemplated in the Input-Output Framework. Therefore, from the tables of correspondence between activities and input-output sectors (see Table 17, Table 18, and Table 19) we will be able to construct these vectors of direct impact on the final demand of each I-O sector affected by MSP. For the rest of the non-maritime activities, it is assumed that the implementation of MSP has not had direct effects on the value of its production.

Consequently, for each of the years considered, it is possible to obtain a direct impact vector composed of a matrix of 1 column and as many rows as sectors or industries are contemplated in their corresponding Input-Output Table. In this matrix there are elements other than zero, those corresponding to the sectors that include some of the maritime activities affected by MSP. The results obtained for our 5 case studies are shown in Tables 45 to 49.

Table 45 - Belgium: Direct Impact Vector (Units, million constant Euros 2010)

Activity, I-O sectors	2014	2015	2016
A03 - Fishing and aquaculture	0.3	-0.4	-0.6
B - Mining and quarrying	27.4	12.8	69.2
C10-12 - Manufacture of food products; beverages and tobacco products	-0.7	-0.4	0.3
D - Electricity, gas, steam and air conditioning supply	136.6	168.1	197.7
F - Construction	-93.9	678.9	288.0
G46 - Wholesale trade, except of motor vehicles and motorcycles	82.0	99.9	28.9
H50 - Water transport	-135.6	515.4	399.9
H52 - Warehousing and support activities for transportation	3.3	4.0	1.2
I - Accommodation and food service activities	1.8	-62.5	-313.8
N77 - Rental and leasing activities	-171.6	-110.9	-18.7
N 79 - Travel agency, tour operator reservation service and related activities	234.9	347.5	262.8
Total sectors linked to Maritime Economy	**-88.3**	**1,941.7**	**1,259.8**

Only the rows of the Impact Vector matrix other than zero are shown.
Source, Own elaboration from data in Table 17 and Table 40

Table 46 - Germany: Direct Impact Vector (Units, million constant Euros 2010)

Activity, I-O sectors	2010	2011	2012	2013	2014	2015	2016
A03 - Fishing and aquaculture	5.6	23.5	29.3	64.1	52.9	52.9	52.6
B - Mining and quarrying	17.7	5.2	0.2	-0.9	-1.1	5.1	4.7
D - Electricity, gas, steam and air conditioning supply	0.0	0.0	0.0	3.7	2.6	30.8	32.7
H49 - Land transport and transport via pipelines	26.4	96.0	-1.9	-45.6	-73.7	-61.0	-148.8
H50 - Water transport	1,000.9	1,007.4	1,728.4	2,452.5	1,853.3	1,467.1	934.9
H51 - Air transport	93.4	67.6	68.3	44.2	147.1	38.6	134.6
H52 - Warehousing and support activities for transportation	1,446.7	1,133.3	1,741.9	3,753.8	2,314.9	-364.6	341.7
I - Accommodation and food service activities	-17.6	130.1	50.6	-218.2	40.9	230.8	375.9
N 79 - Travel agency, tour operator reservation service and related activities	51.6	84.3	76.7	122.9	78.9	114.4	60.0
Total sectors linked to Maritime Economy	**2,624.9**	**2,547.5**	**3,693.5**	**6,176.5**	**4,415.8**	**1,513.9**	**1,788.4**

Only the rows of the Impact Vector matrix other than zero are shown.
Source, Own elaboration from data in Table 17 and Table 41

Table 47 - Norway: Direct Impact Vector (Units, million constant Euros 2010)

Activity, I-O sectors	2013	2014	2015	2016	2017
A03 - Fishing and aquaculture	-71.7	-59.3	13.5	71.5	-12.6
B - Mining and quarrying	-2,534.8	1,314.6	-47,525.4	-53,460.1	-37,736.3
C10-12 - Manufacture of food products; beverages and tobacco products	-58.1	-71.1	256.0	555.5	407.9
H49 - Land transport and transport via pipelines	49.6	59.2	37.0	51.2	23.0
H50 - Water transport	417.4	2,070.0	3,925.9	3,455.2	3,258.4
H51 - Air transport	111.4	191.6	266.1	224.2	198.8
H52 - Warehousing and support activities for transportation	66.3	78.2	128.6	-169.6	13.3
I - Accommodation and food service activities	423.2	229.5	115.9	1.5	-317.2
N77 - Rental and leasing activities	17.2	23.0	28.4	53.0	46.9
N 79 - Travel agency, tour operator reservation service and related activities	130.3	128.3	142.5	191.0	163.7

Activity, I-O sectors	2013	2014	2015	2016	2017
R90-92 - Culture and entertainment	171.1	224.9	301.9	408.9	372.4
Total sectors linked to Maritime Economy	**-1,278.2**	**4,188,9**	**-42,309.6**	**-48,617.7**	**-33,581.7**

Only the rows of the Impact Vector matrix other than zero are shown.
Source, Own elaboration from data in Table 17 and Table 42.

Table 48 - Scotland: Direct Impact Vector (Units, million constant GB Pounds 2010)

Input-Output Classification (SIC2007)	2013	2014
A 03.1 Marine and freshwater fishing	-75.1	-130.7
A 03.2 Marine and freshwater aquaculture	-27.3	86.8
B 06-08 Crude petroleum, natural gas and metal ores; other mining and quarrying	367.7	4,486.4
B 09 Mining support services	837.1	-1,189.4
C 10.2-3 Processed and preserved fish, crustaceans, molluscs, fruit and vegetables	-146.4	-96.2
C 10.8 Other food products	-142.2	-151.1
C 10.9 Prepared animal feeds	-70.7	-64.0
C 30 Other transport equipment	33.9	-704.2
C 33 Repair & maintenance	-11.4	-82.7
F 41-43 Construction	-36.6	-292.5
H 50 Water transport services	-121.7	-224.8
I 55 Accommodation services	-22.8	-17.5
I 56 Food and beverage serving services	-76.3	-35.7
N 77 Rental and leasing services	5.5	2.3
N 79 Travel agency, tour operator and other reservation services and related services	-11.9	-15.4
R 91 Creative, arts and entertainment services	-9.5	-1.8
R 93 Sports services and amusement and recreation services	-9.0	-13.4
Total sectors linked to Maritime Economy	**483.2**	**1,556.2**

Only the rows of the Impact Vector matrix other than zero are shown.
Source, Own elaboration from data in Table 18 and Table 43.

Table 49 - Rhode Island: Direct Impact Vector (Units, million constant US dollars 2010)

IO Code	TIO I-O Sectors OECD	2011	2012	2013	2014	2015	2016
01T03	Forestry, fishing, and related activities	8.3	19.8	15.0	30.4	31.1	47.9
05T06	Mining and extraction of energy producing products	0.0	0.0	0.0	0.0	0.0	0.0
07T08	Mining and quarrying of non-energy producing products	-3.4	12.8	6.0	49.9	69.2	49.0
10T12	Food products, beverages and tobacco	4.4	2.0	-10.4	-3.3	-2.4	2.5
26	Computer, electronic and optical products	0.0	0.0	0.0	0.0	0.0	0.0
30	Other transport equipment	-2.7	105.2	127.3	376.3	716.3	647.4
31T33	Other manufacturing; repair and installation of machinery and equipment	-0.7	-1.9	0.6	5.5	24.0	31.9
35T39	Electricity, gas, water supply, sewerage, waste and remediation services	0.0	0.0	0.0	0.0	0.0	0.0
41T43	Construction	-5.2	3.6	15.9	12.8	14.8	24.8
45T47	Wholesale and retail trade; repair of motor vehicles	-1.9	-1.7	0.9	-3.3	5.9	40.5
49T53	Transportation and storage	44.3	94.6	214.3	172.3	78.2	184.4
55T56	Accomodation and food services	57.6	201.5	225.9	118.4	206.2	370.3
84	Public administration and defence; compulsory social security	0.0	0.0	0.0	0.0	0.0	0.0
90T96	Arts, entertainment, recreation and other service activities	-8.5	-13.4	-7.6	-14.4	-18.6	-14.3
	Total Ocean Economy	**92.2**	**422.3**	**588.1**	**744.4**	**1,124.8**	**1,384.4**

Only the rows of the Impact Vector matrix other than zero are shown.
Source, Own elaboration from data in Table 19 and Table 44.

4.1.4.3 The estimation of indirect, induced and total impact

For each year, facing these annual vectors of Direct Impact (VID) with the Domestic Leontief Reverse Matrix of each case we will obtain an estimate of Direct and Indirect Impacts (IDI).

$$\mathbf{IDI} = (\mathbf{I}-\mathbf{A})^{-1} \quad \mathbf{VID} = \mathbf{L} \quad \mathbf{VID}$$

Incorporating final private consumption of households as if it were a productive sector, we will be able to estimate the Matrix of extended domestic Technical Coefficients and, in turn, the Reverse Matrix of extended domestic Leontief. In order to construct this Extended Matrix for the 5 case studies, we assume final consumption of households as column n+1. Row n+1 is constructed by distributing final consumption of households by each sector, according to the relative weight of each input-output sector in the contribution to the economy's overall value added.

Facing the annual vectors of direct impact (VID) with the Reverse Matrix of extended Domestic Leontief we will obtain an estimation of Total Impacts (IT=Direct, Indirect and Induced).

$$\mathbf{IT} = (\mathbf{I} - \overline{\mathbf{A}})^{-1} \quad \mathbf{VID} = \overline{\mathbf{L}} \quad \mathbf{VID}$$

Applying the coefficients of Value Added per unit of output ($v_{ci} = v_i/x_i$) and usage per output unit ($e_{ci} = e/x_i$) for each sector of the economy, we will be able to estimate these impacts in terms of value added and employment.

Adding up the effects in each sector we will obtain the total economic impact on the economy as a whole.

For each of the years following the implementation of MSP, we will have a disaggregated estimate of economic impacts for the 65 sectors of the economy covered by the I-O framework for Belgium, Germany and Norway. In the case of Scotland, 98 sectors are considered and in the case of Rhode Island, 36. This information is relevant, since it will be possible to see how many sectors of the economy, apparently far from the blue economy, will be affected by the indirect and induced effects of maritime activities.

For each year after MSP and for each scenario contemplated, the estimation of the economic effects may be reflected in a synthetic manner, differentiating the direct impacts from the indirect and induced ones. Induced impacts are obtained by the difference between Totals (IT) and Direct and Indirect (IDI). Indirect impacts are obtained by the difference between Direct and Indirect Impacts (IDI) and Direct Impact Vectors (VID).

Induced Impacts = IT - IDI

Indirect Impacts = IDI - VID

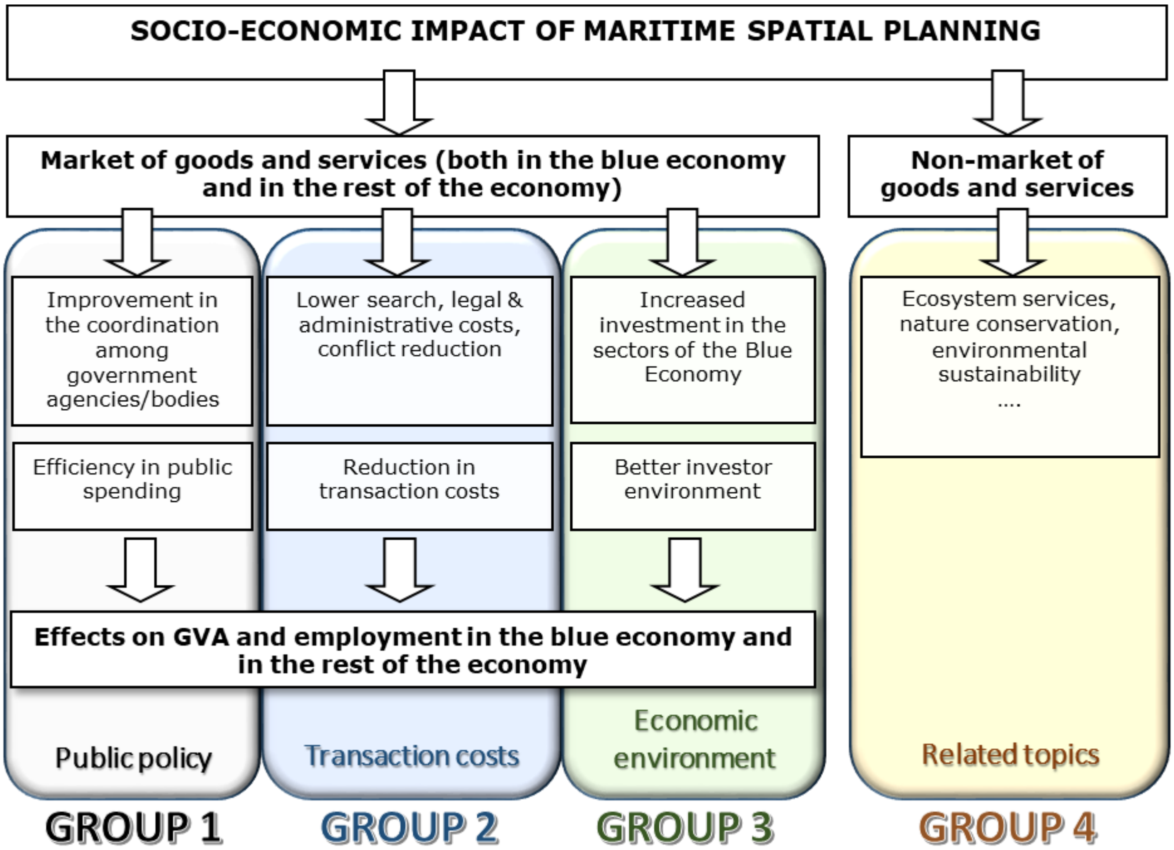
Direct impacts = VID

It should be noted that the Input-Output Tables are not always available for all the years of the case studies. In the Belgian case, of the 3 years analysed after the implementation of MSP (from 2014 to 2016), we only have the Input-Output Table for 2015, hence we assume that the technical coefficients for the years 2014 and 2016 were similar to those of 2015. For the 7 years analysed of the German case (from 2010 to 2016) we had Input-Output Tables for all years except the last one, so for 2016 we had to assume that of the previous year (2015). For the 5 years of the Norwegian case (from 2013 to 2017) we had Tables for the intermediate years, which forced us to assume the table of 2014 for the year 2013 and 2016 for the year 2017. For the two years of the Scottish case (2015 and 2016) we assume the only tables available, those of 2015. Finally, for the 6 years of the case of Rhode Island (from 2011 to 2016) we did not have Tables for the last year (2016), so we had to apply those of the previous year (2015).

4.1.5 Phase 5: the evaluation of MSP effects

After estimating the economic impact of MSP, its effects can be evaluated. It is possible to perform an analysis that attempts to identify and qualify the type of economic effect.

Figure 17 - Scope and groups of the socio-economic impact studies analysed



As noted above, MSP can enable better use of marine resources and provide greater certainty and predictability for all sea-related activities. This situation has obvious environmental, sustainability and nature preservation benefits. These are non-market goods and services beyond the scope of this project.

On the other hand, MSP can also bring direct economic benefits by improving the efficiency of public expenditure of the various governmental organisations with competence in maritime space. The public administration of the country that implements MSP will incur various costs (preliminary studies for its implementation, financing of specialised agencies for its development and monitoring, etc.), which may be offset by the increase in tax revenue linked to the foreseeable increase in the economic activity of the maritime industries. These effects can be evaluated with a cost-benefit analysis for the public administration.

In addition, MSP can provide direct economic benefits linked either to a reduction in transaction costs for the economic agents involved in maritime industries, or by improving the economic climate for investment in marine activities. These are tangible economic benefits in market goods and services, which are the subject of this analysis. In order to try to evaluate these benefits we need to select some economic indicators that can capture the commented effects.

On the one hand, it seems clear that the reduction in transaction costs will in the short run lead to lower intermediate consumption of goods and services per unit output in the maritime industries. On the other hand, in the long run the improvement in the investment climate should be noted with a positive and faster evolution of the net investment of the maritime industries and, consequently, with an increased production capacity.

Given the macroeconomic identity,

Production Value (PV) = Value Added (VA) + Intermediate Consumption (IC)

[Production value = Value Added + Total purchases of goods and services]

the increase in value added (income) generated by a maritime economic activity may come from an increase in the value of its production or from savings in intermediate consumption (or by both simultaneously).

Given that we have data on the three variables (PV, AV and IC) for each marine activity and each year of the study period, we can assume that the increases in sectoral income linked to savings in intermediate consumption are a reduction in transaction costs (effects of group 2 of Figure 17), while the remaining increases in sectoral income will be associated with the improvement in the economic environment favoured by MSP (effects of group 3 of Figure 17).

In addition, after the interviews with the stakeholders involved in MSP, we will obtain valuable information, both qualitative and quantitative, with which we can interpret and qualify the results obtained in relation to the economic MSP.

4.2 Limitations

Like any economic exercise, this study comes with some limitations and caveats. Generally speaking, limitations exist may be due to a wide range of factors, such constraints on design and / or methodology, lack of data or participation, constraints on generalisability, applications to practice, unanticipated challenges, etc. All of these factors may impact on the findings or limit their interpretation (Price and Murnan, 2004). Nevertheless, as recommended by the participants in a workshop organised to review the results of this study, it is of particular significance to clearly list the limitations of the methods applied, so to be fully transparent as to what the results of the study can prove and to what they cannot prove. Moreover, listing limitations might also encourage other researchers to devise alternative methods and solutions to cope with the problems identified.

The main issues related to the limitation and assumptions are detailed as follows:

Lack of previous studies on the topic: the number of prior research studies on quantification of economic benefits of MSP is limited. Therefore, there is not a significant number of theoretical foundations for the topic analysed. The literature and gaps identified in the first three chapters of this report introduce the need for further development in the area of study.

Identification of the sectors in statistics and production trends of the maritime sectors: four out of five case studies (Rhode Island, Norway, Germany and Scotland) have a regional scope, that is they are not national plans. This caused some difficulties in the aggregation/disaggregation of the data collected. In particular, the economic sectors addressed in the plans do not necessarily coincide with the NACE Rev.2 activity groups, because in many instances NACE groups offshore and onshore activities under the same code (e.g. energy, oil and gas). Assumptions had to be made to determine the “maritime share” of certain activities. These approximations were estimated in the following order:

i. Using information on production included in Eurostat Structural Business Statistics, when information at 8 digits was available for each NACE Rev.2 activity.

ii. Sector and secondary information (e.g. Blue Economy reports of DG-Mare) with information on the annual production levels. This was the source for offshore renewable energy.

iii. Expert judgement from the stakeholders.

When possible, the same criteria used in the EU Commission's Blue Economy Report were used. However, in many cases other criteria had to be developed due to the regional dimension of our case studies.

The problem with developing assumptions and proxies in lieu of using actual data is that the figures obtained are by definition less reliable. At the same time, it should also be noted that our calculations were submitted to business professionals during the interviews, and no major objections were raised.

Lack of data: The time series used for the economic analysis had occasional gaps, i.e. for some years data were not reported or were confidential. To avoid discontinuity, gaps for a given year were filled by using the data from the latest previous year available (proximity criterion). As mentioned above, discontinuity in the time series prevented us from having an adjusted view of the trends of the sectors affected by lack of information. At the same time, it should be noted that a trend is more realistically reconstructed by filling an occasional gap by using information from the previous year, rather than by a null value as a consequence of lack of data.

Scenarios development: One of the methods to estimate the impact of MSP on the blue economy of a country was to compare the actual performance of the sectors affected by the plan against a counterfactual scenario in which MSP has not been implemented. There are multiple methods to concoct counterfactual scenarios in economics, and these are used to identify the effects of an exogenous policy (MSP) and external shocks (economic impacts on maritime sectors). However, the selection of the best method is contingent on data availability and context. Therefore, it was necessary to use a method that could be applied with the available resources and in the timeframe agreed (March - July 2019). It was decided to look at the economy of 8 EU countries close enough to those of our case studies but without a spatial plan in force (Estonia, Latvia, Lithuania, Sweden, Finland, Poland, Denmark and France) and collect data on the evolution of their blue economy. It was thus assumed that, absent MSP, each sector of the blue economy of our case-study countries / regions would have had the same performance as the average of the same sector in the 8 countries.

However, it should be noted that the 8 countries are not perfectly comparable to each of our case studies, although averaging the performance of their blue economy certainly gives more robust results. Furthermore, it should also be noted that this method seems to assume that any change in the performance of a sector is due exclusively to MSP, whereas in actuality a wide range of factors might have had an impact. Nevertheless, it should also be noted that the results from the counterfactual scenarios were submitted to the attention of local stakeholders and business professionals during interviews, to elicit their feedback on the role that MSP had on the performance of a sector. Had there been a change attributable to any factor other than MSP, they would have most certainly pointed it out.

Stakeholder consultation: The aforementioned interviews aimed to inject qualitative information into a mostly quantitative framework, so to adjust the scenarios developed by the study team. Overall, these of quali-quantitative approaches are interesting because they are more balanced than methods based only on "hard data", and they also make it possible to adjust any bias due to the method used to stakeholders' perception.

However, there is an important caveat. Stakeholders' perception becomes a useful ally of a researcher in so far as the subset of subjects interviewed is representative of the entire population. Generally speaking, it was decided to interview business associations rather than individual companies, as, in theory, their voice is representative of a wider number of entities. In practice, however, in some cases, a very limited number of subjects agreed to be interviewed, and this of course might undermine the reliability and impartiality of the responses obtained. Each case study reports information on how many stakeholders responded our survey.

Economic crisis: For many case-study countries, the period analysed coincided, at least partly, with the great recession. It has been argued by external reviewers that a correct estimation of the impact of MSP on the blue economy should control for external factors such as an economic downturn. While there is no doubt that the great recession negatively affected the (blue) economy of the case-study countries, it might be argued that the method adopted automatically adjusted for it. Because the great recession was a global phenomenon, nearly all countries in the world were affected by it, albeit to different extents. In the counterfactual scenarios, the performance of the blue economy of a case study country was compared against the averaged performance of a set of 8 EU Member States, all of which were also affected by the great recession. In this sense, the crisis certainly had an impact on the blue economy – and possibly a negative one – but it is safe to consider that that impact is neutral when it comes to measuring the economic impact of MSP.

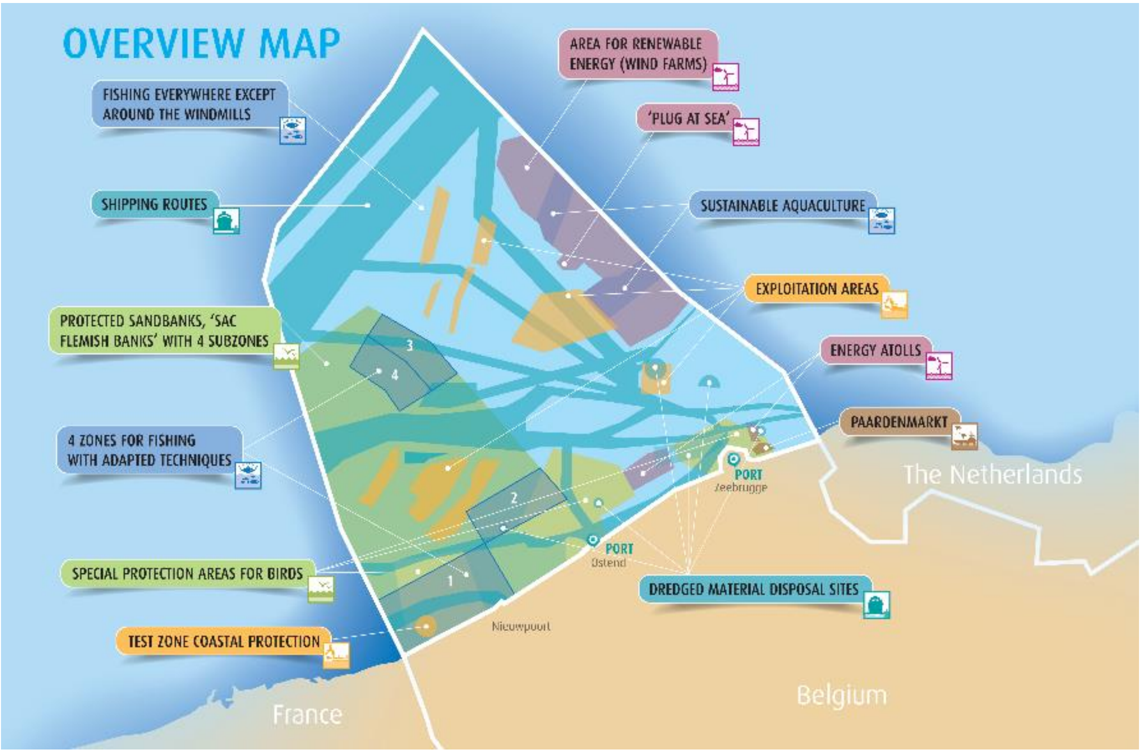
Quantifying all impacts: It has been noted that the method used for the case study does not capture the entire spectrum of benefits and costs generated by MSP. On the one hand, the cost-benefit analysis does not take into account environmental benefits, as these were out of the scope of the study. On the other hand, the social impact of MSP is quantified only in terms of additional employment, whereas a wide range of more "qualitative" benefits escape our valuation. Thus, it should be kept in mind that, when taken into account, these additional benefits (and costs) accrue to the economy on top of those measured in this study.

4.3 Belgium

4.3.1 Introduction

Belgium has a very small maritime area under its national jurisdiction, corresponding to about 0.5% of the North Sea and covering 3,454 km². The Belgian part of the North Sea (BPNS) is surrounded by sea areas under the jurisdiction of the Netherlands, the United Kingdom and France, and is one of the most intensively used seas in the world. Sectors such as shipping, tourism, fisheries and sand exploitation make use of what the sea has to offer. Several activities may conflict with one another and may also have an impact on the environment. With a view to balancing competing economic activities in such a small maritime zone, the Belgian authorities drew up a maritime spatial plan for the Belgian part of the North Sea. In Europe, Belgium was a pioneer in the actual implementation (2003), followed by a fully legally binding MSP in 2014, being valid until 2020. The legal basis for MSP was established in 2012 by amending the 1999 Marine Environmental Protection Act (MEPA). The plans themselves are taken as Royal Decrees and must legally be renewed every six years. The next plan was published in 2019 (Royal Decree of 22 May 2019), and will enter into force on 20 March 2020. Several Belgian authorities are involved in setting up MSPs, being coordinated by the Federal Public Service for the Environment (the Marine Environment Section) and politically, the Minister for the North Sea is responsible. Over the MSP cycles, the Belgian MSP process is moving away from the *ad hoc* planning approach and considering anticipatory action for new uses of the sea and the seabed. The present study takes the current plan (2014-2020) into account.

Figure 18 - Maritime spatial plan for the Belgian part of the North Sea. Source: Something is moving at sea. Federal Public Service Health, Food Chain Safety and Environment, March 2014.



4.3.2 Background and contex

The history of the Belgian MSP-process is very well documented by Olsen et al., 201429. Belgium started with the first 'MSP exercise' in 2003, with the appointment of a federal Minister for the North Sea. Belgium functions as a multi-level government with authorities divided among local, regional and federal levels. No fewer than 17 governmental institutions have some form of competence at sea. The federal Minister for the North Sea was mandated to spatially coordinate all activities and competences at sea, except for fisheries which is regional (Flemish) competence. At that time a first Masterplan was developed with actually combined several pollical decisions concerning marine matters that were taken by the federal Council of Ministers and implemented by a number of Royal decrees. In other words, the Masterplan, which can be seen as a 'pre-MSP' was drawn up on an ad hoc basis, taking into account the individual and selective demands of sectoral organizations and individual stakeholders. In 2012, a new boost in the MSP-process was given by the Minister for the North Sea. A new MSP was being developed, departing from the previous Masterplan, but with a clear aim to establish a legally binding MSP and process. The draft spatial plan, based on informal and formal consultations with stakeholders, was subject to a series of administrative consultations and advice from a new Advisory Commission on MSP (including all 17 governmental institutions). The Belgian MSP comprises the coordinates of all delimitated zones for the activities that are allowed and limited or prohibited in the BPNS, including some new zones for future activities. (Olsen et al. 2014). The plan has to be renewed every six years and the MSP-process for the next MSP was started mid 2017 with (informal) consultation rounds. Mid November 2017, the MSP-process for the next MSP was formally started by submitting a pre-draft plan to the Advisory Commission on MSP. Formal public consultation rounds took place during Summer 2018, with final publication of the RD in May 2019. The second MSP will enter into force in March 2020 and will be valid for six years. Highlights of the new plan are the focus on multi-use, the creation of new zones for renewable energy production and the creation of zones for commercial and industrial use.

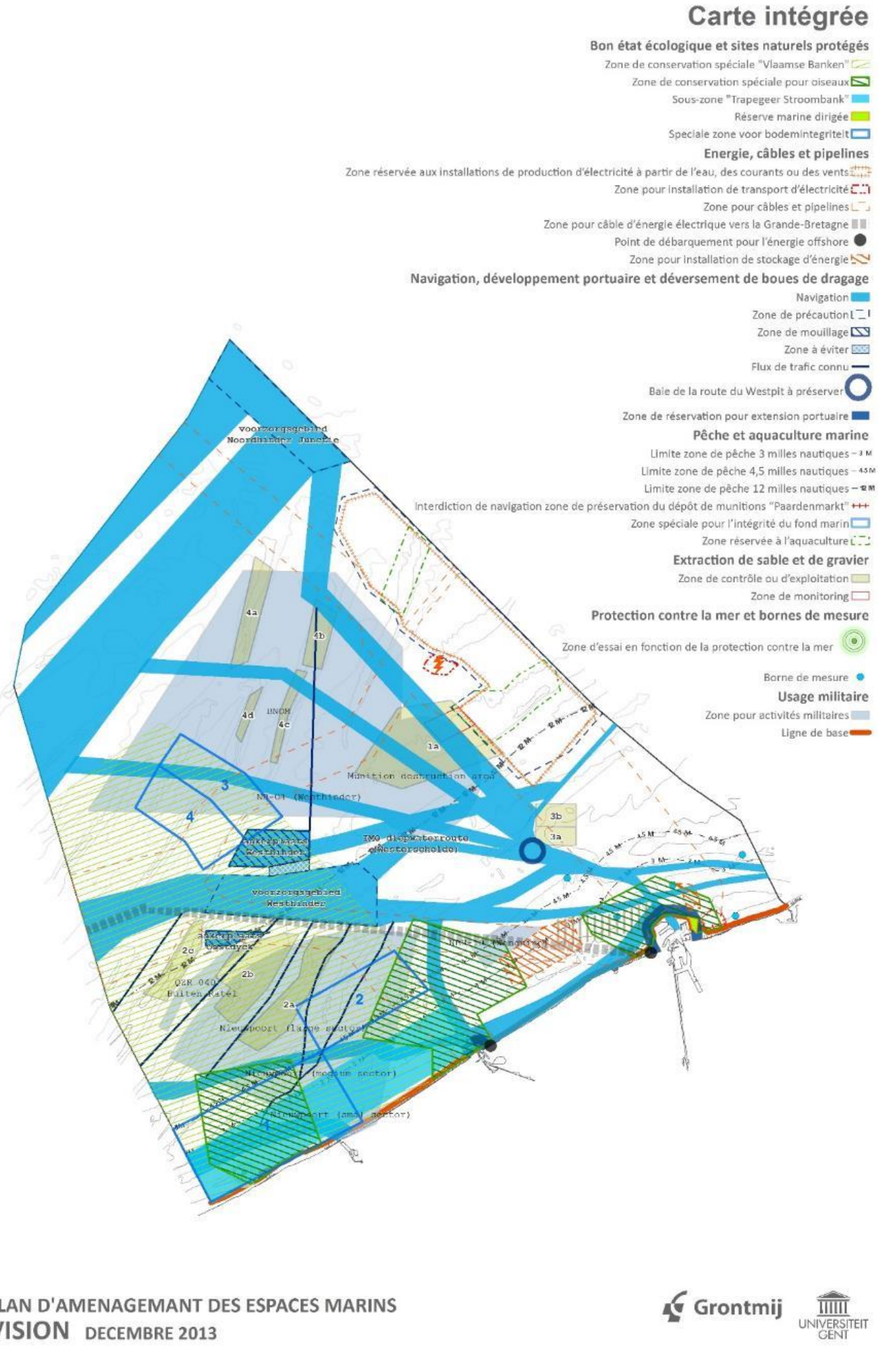
The Royal Decree defining the Belgian MSP specifically mentions the following sectors that are affected by the plan[30]:

- Shipping
- Ports
- Mineral extraction
- Offshore renewable energy production
- Fishing
- Aquaculture
- Tourism (incl. recreational sports)
- Underwater cultural heritage
- Nature protection
- Military
- Scientific research
- Submarine cables and pipelines

[29] Olsen E, Fluharty D, Hoel AH, Hostens K, Maes F and Pecceu E (2014) Integration at the Round Table: Marine Spatial Planning in Multi-Stakeholder Settings. PLoS ONE 9(10): e109964. doi:10.1371/journal.pone.0109964

[30] Note that not all sectors can be considered as economic sectors.

Figure 19 - Vision plan included in the Maritime Spatial Plan of Belgium of 2014



4.3.3 SWOT Analysis

Table 50 - SWOT Analysis of MSP in Belgium

Belgium

Strengths

- Strong focus on sustainability, multi-use and blue growth
- Adaptive planning with 6 years cycles;
- Effective consultation process involving several actors at government and business level
- Advisory Council with all administrations that have a link to the Belgian part of the North Sea
- Evaluation of first plan finished;

Weaknesses

- Large focus on established sectors such as fisheries
- Weak connection to adjacent coastal management programme
- Lack of economic monitoring

Opportunities

- The MSP process could build on a long history of ocean planning (Masterplan 2003);
- Offshore wind was a major driver of bleu economy and of the MSP process;

Threats

- Conflicts with established sectors (e.g. fisheries) and upcoming sectors;
- Viable aquaculture on large scale is economically difficult (low prices);
- Climate change: coastal defence issues will change the coastal area and influence the MSP process in the future.

4.3.4 Quantitative data

We collected statistical data for three groups of economic indicators:

- General economic indicators: number of enterprises, production value, total purchases of goods and services, and value added at factor cost.
- Employment indicators: persons employed, unpaid persons employed, employees, and employees in full-time equivalent units.
- Indicators regarding costs of inputs and investment: gross operating surplus, total purchases of goods and services, personnel costs, wages and salaries, social security costs, gross investment in tangible goods, and net investment in tangible goods.

The data on these economic indicators were collected from the following statistical databases: the Data Collection Framework for Fisheries of the Joint Research Centre (DCF/JRC), Eurostat (sbs and PRODCOM databases), the Federal Planning Bureau, and UEPG (Union Européenne des Producteurs de Granulats). A time series of economic data was created for the economic activities that are most closely linked to the Blue Economy and that may directly be concerned or affected by the Belgian Maritime Spatial Plan.

The series would ideally cover a period 5 years before and 5 years after the entry into force of the Belgian MSP. Since the latter is in force since March 2014, our time series ranges from 2008 until 2016 inclusive. The longer the plan has been in force, the more reliable the conclusions will be.

Table 51 - Activities of the Blue Economy affected by MSP of Belgium

NACE Rev.2 Codes	Activity
A0311	Marine fishing
A0321	Marine aquaculture
G4638	Wholesale of other food, including fish, crustaceans and mollusks
C1020	Processing and preserving of fish, crustaceans and mollusks
B0811	Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate
B0812	Operation of gravel and sand pits; mining of clays and kaolin
B0899	Other mining and quarrying
H5010	Sea and coastal passenger water transport
H5020	Sea and coastal freight water transport
H5229	Other transportation support activities
N7734	Rental and leasing services of water transport equipment
H5210	Warehousing and storage services
H5222	Service activities incidental to water transportation
H49	Tourism: Land transport
H51	Tourism: Air transport
I55	Tourism: Accommodation
I56	Tourism: Food and beverage service activities
N77	Tourism: Renting and leasing of motor vehicles, recreational and sports goods
N79	Tourism: Travel agency, tour operator reservation service and related activities
D3511	Production of electricity (Wind Energy)
D3512	Transmission services of electricity (Wind Energy)
O84	Public activities
F4222	Construction of utility projects for electricity and telecommunications
F4291	Construction of water projects
F4312	Site preparation

Since not all activities considered in the classification are completely marine, approximations were used to determine the maritime share of the total activity based on the value of the production attributable to marine activities (calculated by combining data from Eurostat sbs and PRODCOM databases, or by consulting other sources and/or based on expert/stakeholder judgement). This percentage was then applied to the rest of the indicators (GVA, employment, etc.) relating to this activity. In this study, efforts were mainly focused on the indicator "Production value".

Table 52 shows the production values (maritime proportion applied) for the marine activities for which information was available. Discontinuities in the data series were tackled by applying the proximity criterion in which the data corresponding to the nearest year was assigned, always prevailing that of the previous year (numbers in italic in Table 52).

Table 52 - Belgium: Evolution of the production value of marine activities included in the maritime spatial plan. (Units: million current Euros)

NACE Codes	2008	2009	2010	2011	2012	2013	2014	2015	2016
Marine fishing	2.7	2.4	2.6	2.8	2.6	2.3	2.8	2.8	2.7
Marine aquaculture	0.7	4.2	*4.2*	*4.2*	*1.0*	1.0	1.0	0.3	0.5
Wholesale of other food, including fish, crustaceans and molluscs	31.9	44.5	43.6	44.0	43.7	40.4	44.3	45.7	43.6
Processing and preserving of fish, crustaceans and molluscs	16.3	15.2	13.4	15.0	18.1	19.3	19.8	21.3	23.7
Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	34.5	15.3	53.4	65.8	60.0	44.2	38.4	26.1	32.4
Operation of gravel and sand pits; mining of clays and kaolin	*253.9*	253.9	277.8	*277.8*	185.2	262.4	277.5	256.9	297.7
Sea and coastal freight and passenger water transport	*823.2*	823.2	547.6	*547.6*	4,883.9	2,127.0	1,921.2	2,560.9	2,407.5
Other transportation support activities	1,064.1	944.4	1,241.7	965.8	936.2	472.7	443.5	515.5	462.6
Rental and leasing services of water transport equipment	*133.4*	133.4	*133.4*	192.6	231.0	266.9	88.8	156.2	261.0
Warehousing and storage services	189.6	181.2	235.4	392.2	438.4	180.0	171.5	181.8	249.1
Service activities incidental to water transportation	933.9	1,134.0	*1,134.0*	992.8	1,267.0	1,095.6	1,072.7	1,544.9	1,579.4
Tourism: Accommodation	1,050.4	1,050.4	1,050.4	826.9	826.9	810.2	873.2	858.9	696.5
Tourism: Food and beverage service activities	982.2	855.1	926.0	984.6	949.6	1,084.0	1,097.9	1,127.3	1,119.6
Tourism: Travel agency, tour operator reservation service and related activities	3,204.6	3,180.8	3,255.8	3,462.6	3,704.7	3,744.7	4,004.5	4,149.2	4,116.2
Production of electricity		4.69	36.56	74.03	150.48	247.40	389.83	423.47	459.41
Construction of water projects	1,089.8	1,308.2	2,490.6	2,585.2	2,388.9	2,577.7	2,577.6	3,513.7	3,240.3

Only data for sectors for which information is available are shown.
In *italics*, data assigned according to the proximity criterion.
Source: For fishing and aquaculture activities, the Data Collection Framework and Joint Research Centre (DCF/JRC) of the European Commission was consulted. Eurostat's Structural Business Statistics (sbs) were used for the rest of the industrial and services sectors.

4.3.4.1 Shipping

Although with a relatively small coastline, Belgium is home to the port of Antwerp, one of the busiest in Europe as well as in the world. Various types of shipping can be distinguished in Belgian waters, each with their own specificities. First and foremost, there is international global traffic by merchant vessels, which is of great importance for global trade and indispensable for prosperity in Belgium. Some of the busiest sailed shipping traffic streams in global merchant traffic cross through the BPNS. 'Short sea shipping' concerning intra-European traffic is also important for the sustainable development of Belgian and European transport and traffic mobility. Ferry passenger traffic is also present. It plays an important role in connecting Belgium to neighbouring destinations, but in terms of dimensions it is not comparable to freight transport. To be noted that the data from Table 52 group together passenger and freight transport. There are breaks in the time series, and in some cases Eurostat reports data as confidential. Generally speaking, from 2012 on data on freight transport are always available. The huge increase in production value from 2011 to 2012 is due to lack of data on freight transport. This shows that overall the value of freight transport tends to dwarf that of passenger transport in Belgium.

4.3.4.2 Construction of water projects (ports)

The ports of Antwerp, Ghent, Zeebrugge and Ostend form the Belgian North Sea port cluster. They are located within a radius of 50 km, which creates one of the primary bridgeheads for maritime trade connections between the various continents and the European hinterland. The data from Table 52 shows an increasing trend in production value. This is in line with the main ports in the Northern port range, as one of the trends after the economic crisis of the early 2010's has been to increasingly expand ships' length and draught so to achieve better economies of scale. Ports need to adapt and renovate to accommodate larger ships and this reflects in increased production value of constructing water projects.

4.3.4.3 Mineral extraction, dredging and mining

These activities cannot be singled out individually through Eurostat data, although they are included under 'Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate' and 'Operation of gravel and sand pits; mining of clays and kaolin'. Dredging is necessary to keep the Belgian seaports accessible. The channels have to deal with mud sedimentation and dredging must take place the whole year round in the channels and ports themselves. Sand and gravel extraction is only possible in the BPNS in a number of areas established by law, called control zones. The quality and diversity of the sand depends on the place of extraction, considering that each sandbank has a specific grain size distribution and different shell content. A specific concession is required to be able to extract sand and/or gravel. Both industries are well developed in Belgium and the fact that overall they were on an increasing trend in the most recent years of the time series is most certainly linked to project developments in the port and in the wind energy sectors.

4.3.4.4 Fishing and aquaculture

Fishing and aquaculture are both small industries in Belgium, although the former plays an important part in some communities. The Belgian fleet is dominated by trawlers, both beam and demersal trawlers. Although the Belgian national fleet remained in a net loss making position, in 2014 its economic performance compared to previous years improved and the trend continued into the following years, as fuel prices remained lower than in previous years and fish prices were relatively high.

In Belgium marine aquaculture is a modest and small-scale activity. The breeding possibilities are limited because the BPNS has no bays, estuaries, etc. and the coastline is used for recreational purposes, and in addition it is formed by natural habitats and ports. Nevertheless, since 2005 there have been several years of experimentation with aquaculture (mussel breeding) in the BPNS. However, for various reasons these experiments were not a commercial success (among others due to other ships passing through), so that the licence (including the accompanying zones) was suspended. Therefore, production was phased out, as clearly shown in the data.

4.3.4.5 Coastal tourism

Despite intense economic activity in the North Sea, the Belgian coast also offers opportunity for coastal tourism. The data shows that tourism has been on a relatively stable trend, with only minor upward and downwards fluctuations year after year. As often happens in many other countries, Tourism at the coast is by far the most important economic activity in the coastal region, and has therefore grown to become a tourist-recreational network. The sea is very important in this regard, not only as something to experience, but also as a unique environment for recreational activities. MSP does not seem to have a direct relation with the performance of the sector, although a decline is noted in the production value of the accommodation sector.

4.3.4.6 Wind energy

Despite the small coast, there was an active and growing offshore wind industry in Belgium, long before the entry into force of the spatial plan. The federal government began the first Belgian offshore wind park in the North Sea in 2003, and in 2004 created a 156-km^2 area in the Belgian exclusive economic zone in international waters for wind parks. The first wind turbines were installed in this area in 2009.

Table 53 – Evolution of offshore wind capacity installed in Belgium

	2009	2010	2011	2012	2013	2014	2015	2016
Offshore power capacity (MW)	32	197	197	381	708	708	712	712
Offshore electricity production (GW)	0.082	0.190	0.709	0.854	1.540	2.216	2.613	2.390
Capacity factor (%)	29.7%	11.0%	41.2%	25.6%	24.8%	35.8%	41.9%	38.3%

Source: IEA Wind, 2018.

The wind energy sector creates excellent economic opportunities. Being active in this industry has also created opportunities for export. In addition to wind park constructions, there is a need to build grid infrastructure, grid connections, and connections with neighboring countries. The impact on employment is substantial, and jobs are created in the design, construction, maintenance, and replacement of wind parks, in addition to the permanent workforce, often in areas with few job opportunities.

4.3.4.7 From data to estimations

To homogenise the units of measurements and thus facilitate comparison between the different data, the Gross Domestic Product (GDP) Price Index (implicit deflator) was applied to the data taking 2010 as the base year for the monetary units (Table 54). The indication of the year of MSP implementation (from 2014 onwards, columns in grey) allows viewing the evolution of marine activities before and since MSP.

Table 54 - Belgium: Evolution of the production value of marine activities before and after MSP. (Units: million constant Euros, €$_{2010}$)

NACE Codes	2008	2009	2010	2011	2012	2013	2014	2015	2016
Marine fishing	2.7	2.4	2.6	2.7	2.5	2.2	2.6	2.6	2.4
Marine aquaculture	0.7	4.3	4.2	4.1	0.9	0.9	0.9	0.3	0.4
Wholesale of other food, including fish, crustaceans and mollusks	32.7	45.3	43.6	43.1	42.0	38.4	41.8	42.7	40.0
Processing and preserving of fish, crustaceans and mollusks	16.7	15.5	13.4	14.7	17.4	18.4	18.7	20.0	21.7
Quarrying of ornamental and building stone, limestone, gypsum,	35.5	15.5	53.4	64.5	57.7	42.1	36.3	24.4	29.8

NACE Codes	2008	2009	2010	2011	2012	2013	2014	2015	2016
chalk and slate									
Operation of gravel and sand pits; mining of clays and kaolin	260.7	258.7	277.8	272.3	178.0	249.7	262.2	240.3	273.5
Sea and coastal freight and passenger water transport	845.2	838.7	547.6	536.9	4,695.3	2,023.7	1,815.0	2,395.5	2,212.0
Other transportation support activities	1,092.6	962.2	1,241.7	946.8	900.1	449.7	419.0	482.2	425.1
Rental and leasing services of water transport equipment	137.0	135.9	133.4	188.8	222.1	253.9	83.9	146.1	239.8
Warehousing and storage services	194.7	184.6	235.4	384.5	421.4	171.2	162.1	170.0	228.9
Service activities incidental to water transportation	958.9	1,155.4	1,134.0	973.3	1,218.1	1,042.4	1,013.4	1,445.1	1,451.2
Tourism: Accommodation	1,078.5	1,070.2	1,050.4	810.7	795.0	770.9	824.9	803.4	639.9
Tourism: Food and beverage service activities	1,008.5	871.2	926.0	965.3	912.9	1,031.4	1,037.2	1,054.5	1,028.7
Tourism: Travel agency, tour operator reservation service and related activities	3,290.3	3,240.7	3,255.8	3,394.6	3,561.7	3,562.9	3,783.1	3,881.2	3,782.0
Production of electricity	0,0	4,8	36,6	72,6	144,7	235.4	368.3	396.1	422.1
Construction of water projects	1,119.0	1,332.8	2,490.6	2,534.5	2,296.7	2,452.5	2,435.1	3,286.7	2,977.2
TOTAL	10,073.7	10,138.2	11,446.5	11,209.5	15,466.5	12,345.6	12,304.6	14,391.0	13,774.9

Light blue background: years in which MSP is already implemented

In the next step, a baseline scenario was developed to calculate hypothetical production values for marine activities in case MSP had not been implemented (Table 55). These hypothetical values were then subtracted from the real production values to calculate the Initial Direct Economic Effects (IDEE) of MSP, of which the result is shown in Table 56. The IDEEs are estimates of the direct impact the implementation of MSP could have had. For Belgium, the first year of the implementation of MSP seems to have had negative effects, reducing the value of the regulated activities by around 88.3 million Euros €2010. In the following two years, marine activity regulated by MSP recovered, with positive effects clearly outweighing negative ones.

Table 55 - Hypothetical scenario without MSP in Belgium: Value of Production in activities linked to the sea and regulated in the maritime spatial plan. (Units: million constant Euros, €$_{2010}$)

NACE Codes	Activity	2014	2015	2016
A0311	Marine fishing	2.3	2.4	2.4
A0321	Marine aquaculture	0.9	1.0	1.0
G4638	Wholesale of other food, including fish, crustaceans and molluscs	38.6	38.7	38.9
C1020	Processing and preserving of fish, crustaceans and molluscs	19.4	20.4	21.5
B0811	Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	41.1	40.1	39.1
B0812	Operation of gravel and sand pits; mining of clays and kaolin	229.9	211.8	195.1
H5020	Sea and coastal freight water transport	1,950.6	1,880.1	1,812.1
H5229	Other transportation support activities	447.0	444.4	441.7
N7734	Rental and leasing services of water transport equipment	255.5	257.0	258.5
H5210	Warehousing and storage services	173.1	175.0	177.0
H5222	Service activities incidental to water transportation	1,065.3	1,088.8	1,112.7
I55	Tourism, Accommodation	795.0	819.9	845.6
I56	Tourism, Food and beverage service activities	1,065.4	1,100.5	1,136.8

NACE Codes	Activity	2014	2015	2016
N79	Tourism, Travel agency, tour operator reservation service and related activities	3,548.2	3,533.7	3,519.2
D3511	Production of electricity: Wind Energy	231.7	228.0	224.4
F4291	Construction of water projects	2,529.0	2,607.8	2,689.2
	TOTAL	**12,392.9**	**12,449.4**	**12,515.0**

Table 56 - Initial Direct Economic Effects in Belgium: Value of Production in activities linked to the sea and regulated in the maritime spatial plan. (Units: million constant Euros, €$_{2010}$)

NACE Codes	Activity	2014	2015	2016
A0311	Marine fishing	0.4	0.3	0.0
A0321	Marine aquaculture	0.0	-0.7	-0.6
G4638	Wholesale of other food, including fish, crustaceans and molluscs	3.3	4.0	1.2
C1020	Processing and preserving of fish, crustaceans and molluscs	-0.7	-0.4	0.3
B0811	Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	-4.8	-15.7	-9.3
B0812	Operation of gravel and sand pits; mining of clays and kaolin	32.2	28.5	78.5
H5020	Sea and coastal freight water transport	-135.6	515.4	399.9
H5229	Other transportation support activities	-28.0	37.8	-16.7
N7734	Rental and leasing services of water transport equipment	-171.6	-110.9	-18.7
H5210	Warehousing and storage services	-11.0	-5.0	52.0
H5222	Service activities incidental to water transportation	-51.9	356.3	338.4
I55	Tourism, Accommodation	30	-16	-206
I56	Tourism, Food and beverage service activities	-28	-46	-108
N79	Tourism, Travel agency, tour operator reservation service and related activities	235	347	263
D3511	Production of electricity: Wind Energy	136.6	168.1	197.7
F4291	Construction of water projects	-93.9	678.9	288.0
	TOTAL	**-88.3**	**1,941.7**	**1,259.8**

To actually estimate the economic impact of the implementation of MSP, a combination of input-output analysis and cost-benefit analysis was applied to the above data. Both analyses were done on data for the indicators Production value, Gross added value, and Employment. Input-output analysis aims to evaluate the socioeconomic outcomes derived from changes in final demand, changes that may be linked to the implementation of MSP. For this type of analysis, the most recent information from the Symmetric Input-Output Table at basic prices is necessary. For Belgium, this table was available for 2015. Cost-benefit analysis assesses the suitability of MSP through the enumeration and subsequent valuation, in monetary terms, of all its costs and benefits.

The classifications of the activity sectors in the input-output tables do not necessarily coincide with the NACE Rev.2 activity groups shown in the above tables. In many cases, several of the marine activities are grouped under a single sector of activity. In order to be able to make direct, indirect and total impact estimates through the input-output analysis methodology, it is necessary to operate with the sectoral groupings of the corresponding input-output frameworks. Since these Input-Output tables do not contain employment data, we in addition used Eurostat's National accounts employment data by industry (up to NACE A*64), containing information on sectoral Total employment (domestic concept) for the period 2008-2016.

Table 57 - Total impacts of MSP on production value in the 'medium' scenario. (Units: million constant Euros, €$_{2010}$)

I-O Sector	Activity	2014	2015	2016

I-O Sector	Activity	2014	2015	2016
A03	Fishing and aquaculture	0.08	0.02	-0.09
B	Mining and quarrying	24.74	12.80	63.01
C10-12	Manufacture of food products;,beverages and tobacco products	4.84	13.46	6.50
C28	Manufacture of machinery and equipment n.e.c.	0.09	0.80	0.63
C30	Manufacture of other transport equipment	0.08	0.27	0.29
C31-32	Manufacture of furniture, other manufacturing	0.35	1.36	1.23
C33	Repair and installation of machinery and equipment	2.42	8.38	9.57
D	Electricity, gas, steam and air conditioning supply	136.09	171.26	202.03
E36	Water collection, treatment and supply	0.33	1.02	0.92
E37-39	Sewerage, waste management, remediation activities	0.96	4.29	3.73
F	Construction	-0.82	155.67	85.20
G46	Wholesale trade, except of motor vehicles and motorcycles	5.50	23.33	16.53
H49	Land transport and transport via pipelines	4.97	10.95	13.66
H50	Water transport	-17.63	67.04	52.02
H51	Air transport	0.50	2.24	2.02
H52	Warehousing and support activities for transportation	-13.92	72.33	68.96
I	Accommodation and food service activities	8.02	11.84	-22.96
K65	Insurance. reinsurance and pension funding, except compulsory social security	2.54	7.75	8.12
M72	Scientific research and development	0.00	0.00	0.00
N77	Rental and leasing activities	-22.06	-5.77	6.08
N79	Travel agency, tour operator reservation service and related activities	31.49	48.24	37.06
O	Public administration and defence, compulsory social security	1.36	3.80	3.82
	Rest of the economy	74.50	255.23	239.17

Table 58 - Total impacts of MSP on gross value added in the 'medium' scenario. (Units: million constant Euros, €$_{2010}$)

I-O Sector	Activity	2014	2015	2016
A03	Fishing and aquaculture	0.03	0.01	-0.04
B	Mining and quarrying	8.25	4.27	21.01
C10-12	Manufacture of food products, beverages and tobacco products	0.95	2.63	1.27
C28	Manufacture of machinery and equipment n.e.c.	0.03	0.29	0.23
C30	Manufacture of other transport equipment	0.03	0.11	0.12
C31-32	Manufacture of furniture, other manufacturing	0.11	0.40	0.36
C33	Repair and installation of machinery and equipment	0.89	3.08	3.52
D	Electricity, gas, steam and air conditioning supply	63.82	80.32	94.75
E36	Water collection, treatment and supply	0.10	0.31	0.28
E37-39	Sewerage, waste management, remediation activities	0.31	1.37	1.19
F	Construction	-0.23	43.95	24.05
G46	Wholesale trade, except of motor vehicles and motorcycles	2.43	10.32	7.32
H49	Land transport and transport via pipelines	1.89	4.17	5.20
H50	Water transport	-5.21	19.82	15.38
H51	Air transport	0.07	0.32	0.29
H52	Warehousing and support activities for transportation	-5.31	27.60	26.31
I	Accommodation and food service activities	3.35	4.95	-9.61
K65	Insurance, reinsurance and pension funding, except compulsory social security	0.81	2.48	2.60
M72	Scientific research and development	0.00	0.00	0.00
N77	Rental and leasing activities	-10.44	-2.73	2.88
N79	Travel agency, tour operator reservation service and related activities	5.01	7.68	5.90
O	Public administration and defence, compulsory social security	1.05	2.93	2.95
	Rest of the economy	39.69	132.11	124.63

Table 59 - Total impacts of MSP on the Employment in the 'medium' scenario. (Unit: number persons)

I-O Sector	Activity	2014	2015	2016
A03	Fishing and aquaculture	0.26	0.09	-0.39
B	Mining and quarrying	56.13	25.82	127.10
C10-12	Manufacture of food products, beverages and tobacco products	12.43	34.66	16.80
C28	Manufacture of machinery and equipment n.e.c.	0.34	2.70	2.16
C30	Manufacture of other transport equipment	0.29	1.00	1.04
C31-32	Manufacture of furniture, other manufacturing	2.09	8.02	7.04
C33	Repair and installation of machinery and equipment	6.46	22.26	26.40
D	Electricity, gas, steam and air conditioning supply	223.05	273.39	322.51
E36	Water collection, treatment and supply	2.00	6.04	5.40
E37-39	Sewerage, waste management, remediation activities	2.36	10.47	9.14
F	Construction	-3.33	631.59	348.24
G46	Wholesale trade, except of motor vehicles and motorcycles	20.27	86.45	61.52
H49	Land transport and transport via pipelines	29.44	65.23	81.84
H50	Water transport	-22.02	77.14	58.15
H51	Air transport	0.69	3.22	2.96
H52	Warehousing and support activities for transportation	-46.79	249.24	240.57
I	Accommodation and food service activities	70.74	105.73	-206.80
K65	Insurance, reinsurance and pension funding, except compulsory social security	7.80	23.61	24.36
M72	Scientific research and development	0.00	0.00	0.00
N77	Rental and leasing activities	-19.30	-5.26	6.07
N79	Travel agency, tour operator reservation service and related activities	84.61	123.86	94.04
O	Public administration and defence, compulsory social security	17.35	48.39	48.81
	Rest of the economy	439.60	1,617.07	1,523.75

4.3.5 *Stakeholders interviewed*

The data-analysis was complemented with the gathering of new original data by way of structured interviews with stakeholders. Most interviews were oral interviews, and some were received as a written questionnaire. All interviews are available as annex to this report. In total 13 interviews were carried out.

Sector	Organisation	Type
Government	FPS environment	Authority in charge of MSP
	Ministerial Cabinet (North Sea)	Authority in charge of MSP
Aquaculture	Blue Cluster	Association
	Vlaamse visveiling	Company
Fisheries	Vlaamse visveiling	Company
	Rederscentrale	Producers' organisation
Shipping	FPS Maritime Transport	Company
Costal tourism	Westtoer	Public company
	Blue Cluster	Association
Offshore wind	Belgian offshore Platform	Business association
	Belgian offshore Cluster	Business association
Scientific research	VLIZ	Scientific institute
	RBINS	Scientific institute

4.3.6 Summary and main findings from interviews

Table 60 – Overview of MSP benefits according to stakeholders in Belgium

Sector	Positive effects	Reduction of conflicts	Cross-border relations	Access to information	Transaction costs	Investment and business expectations
Aquaculture	+2	-2	0	+1	0	+1
Fishing	-1	-2	0	+1	-2	+1
Coastal tourism	+1	+1	+1	+1	0	+1
Wind energy	+2	+1	+1	+1	+1	+2
Marine research	+2	+2	+1	+1	0	+1
Government	+2	+1	1	+1	+1	+1

Most interviewees were very much aware of the Belgian MSP; they had clearly followed the MSP design and implementation process, and they often referred to the new MSP (2020-2026) for which there was an evaluation process in 2018. The majority of the stakeholders was relatively positive about the plan, while some were neutral and judged the plan has had little to no impact on their activity (e.g. blue tourism, shipping). A minority was convinced that the plan induces overall negative impacts for their activity (e.g. fisheries). Even though it was difficult for stakeholders to provide hard figures during the interview, they provided very useful information.

The sectors that were most positive about the Belgian MSP were the ones developing new activities such as the offshore wind energy sector, which referred to the renewable energy policy objectives expressed in the plan as one of the conditions to trigger investment in offshore wind energy. The most important general perception of stakeholders was that the plan has created clarity and legal certainty for the involved stakeholders. Moreover, several interviewees mentioned it has stimulated interaction and mutual understanding. For the economic sectors, MSP has created (legal) certainty regarding the conditions and procedures that have to be adhered to. For instance, clearly defined and protected zones for nature conservation, windmill farms and shipping lanes, better safety measures for shipping around fixed constructions at sea, and risk reduction for project developers. This (legal) certainty enables coexistence without conflict (the structured approach of the MSP process allows plenty of consultation leading to reduced conflicts). MSP was perceived as having covered many uncertainties, thereby accelerating investments. This was an important precondition to facilitate large (high-risk) investments such as the construction of offshore wind farms. From an environmental point of view, according to several stakeholders, lots of issues are dealt with in a very early stage of the MSP process and dedicated MPAs have been assigned.

Nevertheless, different stakeholders mentioned several critical points and potential negative (economic) impacts from the implementation of MSP. One ascertainment is that conflict situations remain, most importantly with fishing industries. The fisheries sector itself considers that there is a net loss of space for their activity as a direct result of MSP: they argued that the overall impact of MSP and new activities coming in is negative for the fisheries sector. More conflicts are perceived as more activities are introduced. As for offshore aquaculture, MSP did offer some possibilities, e.g. aquaculture zones in the offshore wind zone, but could not act as a catalyst for upscaling the industry, which has not yet reached a sufficient level of maturity in Belgium.

Moreover, several stakeholders mentioned that the cross-border streamlining of maritime spatial plans between and among countries is sometimes insufficient. A clear example is the positioning of the offshore windfarm off Dunkirk (France) close to the Belgian coast, while Belgian windfarms are deliberately positioned further offshore to avoid visual pollution. Hence a clear demand for more MSP-integration and a transboundary cooperation that goes further than is currently the case. Furthermore, the maritime spatial plan hardly highlights the Belgian coast and land-sea interaction is, except for water sports and recreational coastal fishing.

An important remark is on the interviews of the scientific sector. Even though they are not an economic stakeholder and cannot estimate their turnover in monetary terms, they clearly perceived the impact as positive. There is an increasing success in getting European funds for marine scientific research (e.g. the installation of offshore windfarms in the MSP area). In general, the marine knowledge economy is growing. This is, however, not fully captured in the economic analysis of this study.

Another important aspect from the interview with the administration of the Marine Environment Service, which is in charge of MSP, is that the total cost of MSP is estimated extremely low (less than 2 FTE per year), while other stakeholders praise the reduction of administrative burden (legal clarity, clear framework, stakeholder involvement). It is possible that the administrative cost is underestimated by the public service. Another explanation is that the plan is not only effective but also very efficient in terms of administrative cost.

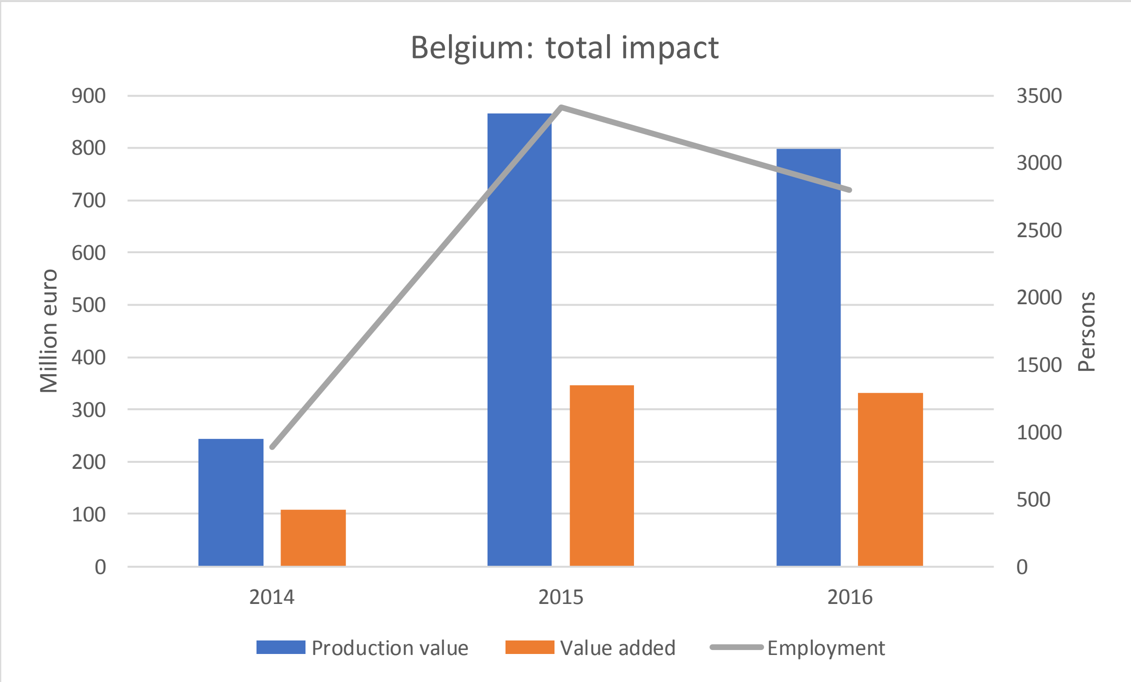
Overall, MSP brings with it the possibility to do activities at sea in a safe and sustainable way. It also stimulates and supports multiple use of space, it creates legal security that is necessary for a stable investment framework and provides information to the wider public. In economic terms, the majority of the interviewed stakeholders were convinced that there is a modest net positive (indirect) economic effect. And indirectly, this leads also to potential positive impacts (e.g. for blue tourism it was mentioned that MSP has created new possibilities for the blue economy, for scientists it increases successful fund applications).

4.3.7 Final economic effects

For each of the main industrial sectors of the maritime economy, the FDEE was estimated under different scenarios: low, medium and high. In this way, we were able to obtain a schematic vision of the Belgian blue economy sectors that benefitted from and/or experienced negative impacts by the implementation of the Belgian MSP. Likewise, the analyses also looked at the indirect and induced impact of MSP on the rest of the economy, so to measure the total combined impact (direct, indirect and induced).

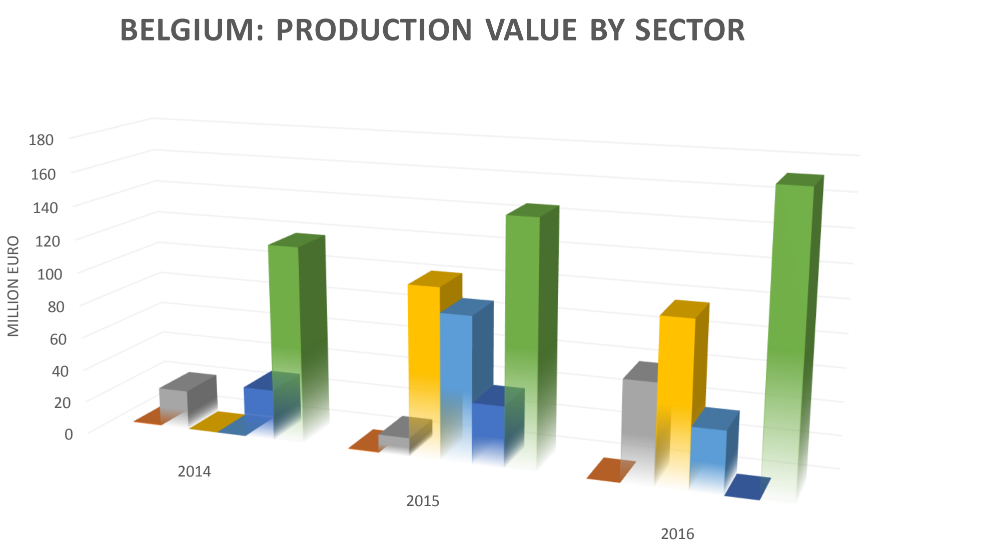
The overall impact of MSP in Belgium on the economy as a whole appears to be positive. After a rather small increase of the economic indicators Production value, Gross added value and Employment in 2014 (the year the plan was established), a more pronounced net positive impact for the year 2015 becomes apparent, and it is consolidated in the year 2016. The figures below present the results of the medium scenario.

Figure 20 - Total impact (direct, indirect and induced) of MSP in Belgium on the economy as a whole in the 'medium' scenario



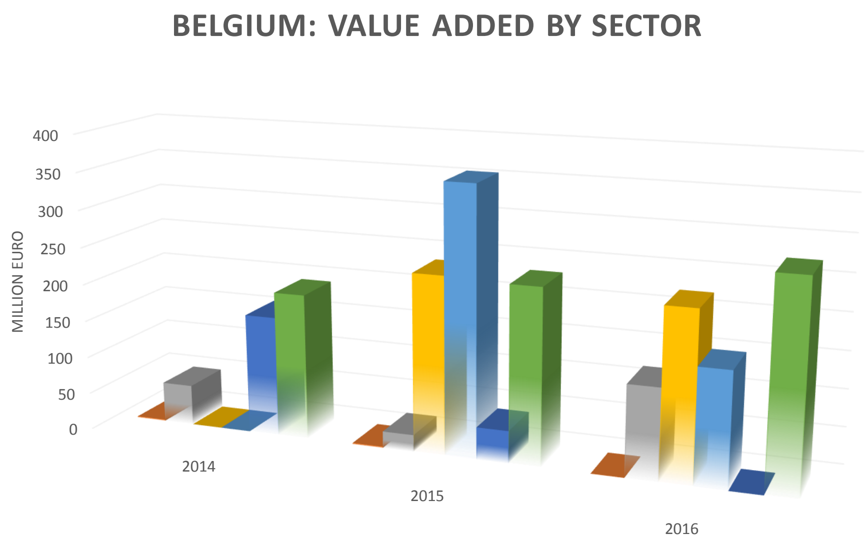
Looking at the different sectors, large differences in impact become apparent.

Figure 21 - Direct impact of MSP in Belgium on production value



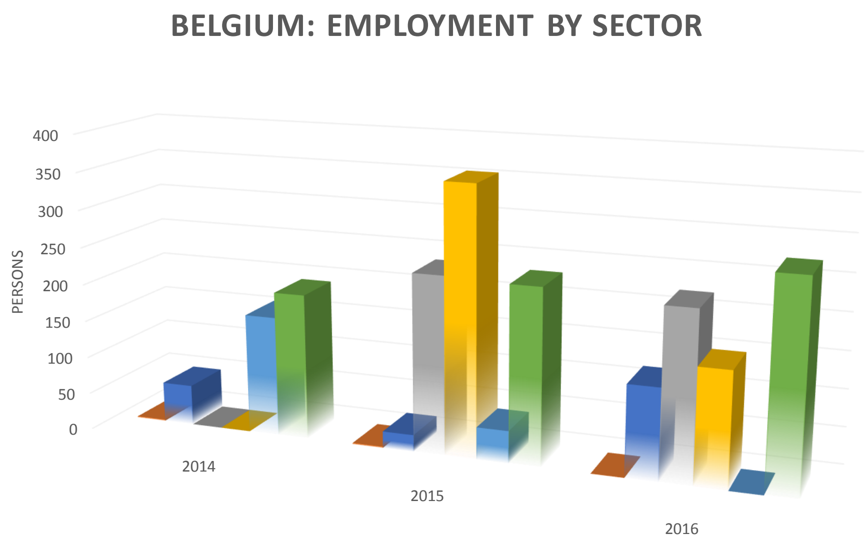
	2014	2015	2016
Fishing and aquaculture	0,38	0,41	0,11
Mineral extraction	24	11,21	60,51
Shipping	-51,75	103,18	98,15
Construction of water projects (ports)	-12,2	88,25	37,45
Coastal tourism	30,77	37,05	-6,62
Wind energy	119,55	147,11	173

Figure 22 - Direct impact of MSP in Belgium on value added



	2014	2015	2016
Fishing and aquaculture	1	2	0
Mineral extraction	54	23	122
Shipping	-62	238	225
Construction of water projects (ports)	-50	358	153
Coastal tourism	162	43	-281
Wind energy	196	235	276

Figure 23 - Direct impact of MSP in Belgium on employment



	2014	2015	2016
Fishing and aquaculture	1	2	0
Mineral extraction	54	23	122
Shipping	-62	238	225
Construction of water projects (ports)	-50	358	153
Coastal tourism	162	43	-281
Wind energy	196	235	276

The sector showing a positive overall impact of MSP (*i.e.* based on all three indicators: production value, gross added value and employment) is renewable energy production. From 2014 onwards, the impact is positive and growing each year in this sector for the three indicators. This trend is clearly reflected in the stakeholder interviews and shows a clear correlation with MSP: a steep increase in 2015 and a consolidation of this effect in 2016 (for all indicators). It should be noted, however, that the first ideas for wind parks in the Belgian part of the North Sea were established in the Masterplan of 2004, long before the current MSP. The former could be considered as an informal (draft) MSP upon which in 2005 dedicated offshore wind zones have been put in place. Nevertheless, the wind sector has acknowledged the positive impact of the formal MSP and pointed out that also for the future, the MSP process is very important (note that new offshore renewable energy zones are put in place in the next MSP for the period 2020-2026). Stakeholders' views are clearly represented in the analyses of the three economic indicators.

Besides the new sector of renewable energy production, also more traditional uses such as the construction business seem to profit considerably from MSP. Other sectors experiencing a positive impact are mining and shipping, even though for both sectors the respective stakeholders did not expect MSP to have large impacts. For mining, the positive impact on Production value, Gross added value and Employment accounts from the first year onwards and its impact is most pronounced in 2016. For shipping, there seems to be a negative impact (for all three economic indicators) in 2014 when the plan came into force, followed by marked positive impacts the following two years, with a slightly higher impact in 2015. Employment figures follow roughly the same trend as gross value added. Finally, the clear positive impact on the mining sector is probably related to the impact in the construction sector, which is in turn likely related to the installation of wind farms. This impact is expected to last as long as new windfarms are being developed and will probably decrease when all farms are operational.

On the contrary, the fishery sector experiences a very small impact from MSP. Since only 4 to 10% of the revenues are actually related to fishing in the Belgian part of the North Sea, according to stakeholders, the impact is negative yet very small (indicators show a slightly positive impact in 2014 and 2015 and a slightly negative impact in 2016). This was also indicated by the fisheries stakeholders who were not in favour of MSP, as MSP tends to allocate space to new activities, thereby implying less space for fishery activities.

The sectors experiencing the most negative impacts from MSP are those involved in coastal tourism Accommodation and food service activities at first seem to experience a positive impact in all economic indicators as a result of MSP, before a considerable drop occurs in 2016, with overall negative economic impacts of MSP for all three indicators. On the contrary, travel agencies and tour operators seem to experience positive impacts from 2015 onwards.

For blue tourism, the correlations are difficult to explain as direct causal links: it is unclear why accommodation and food service activities would experience negative economic impacts from MSP, which are opposite to the trend experienced by tour operators. During stakeholder interviews, it was mentioned that hotels renting rooms to offshore contractors are expecting to do good business when major works are happening, although some contractors are looking for their own accommodation now, for example on ships. In more general terms, it was indicated that MSP is unlikely to have an economic impact on the accommodation sector.

Over the whole period (2014 to 2016) it is estimated that overall MSP might have generated additional value added for about 785 million euro and nearly 7,000 more employees.

4.3.8 Conclusions

- MSP has a net positive economic impact from year 1 onwards;

- The positive impact is most pronounced in year 2 of the implementation of the Belgian MSP (i.e. 2015), after which this impact is consolidated in year 3 (i.e. 2016);
- The positive impact is perceived most in the sectors of renewable energy and shipping;
- The increase in renewable energy production might have had spillover effects for other sectors such as mining and construction;
- MSP does not seem to be having a dramatic impact on fisheries, despite stakeholders expecting a strong negative impact;
- Blue tourism seems to suffer a negative impact from MSP, especially in year 3 (2016), although stakeholders believe there has been no significant impact;
- The science sector is not an economic sector as such but there is an increasing success in getting European funds for marine scientific research (e.g. the installation of offshore windfarms in the MSP area);
- Stronger transboundary collaboration between different MSPs is needed according to most stakeholders;
- Administrative costs are relatively low for the Public Service, while the administrative gains are perceived as rather high by the stakeholders.

Overall, the Belgian MSP seems to be having a positive economic impact, which becomes more evident from year 2 (2015) of the implementation of the plan onwards. In year 3 (2016) this positive impact remains but the impact does not seem to continue growing. It will be very interesting to apply the same methodology to years 4 and later. It is expected that the positive impact will reach a plateau. The next push in positive impact is to be expected in year 2 of the new plan (*i.e.* in 2021), as some important new areas have been designated in the new plan (large areas for renewable energy and zones for commercial and industrial activities). However, the positive impact spread equally to all sectors: there is a very small impact on fisheries, while a substantially negative impact on accommodation, especially two years after the plan, is noted.

Only a few sectors experiencing a large impact explain the order of magnitude of the net positive impact: renewable energy, mining, construction and shipping. In addition, also non-economic sectors such as the science sector, indicate that they experience positive effects of the plan (such as increasing international funding opportunities).

With about 785 million euro of value added and nearly 8,000 more employees, overall, the impact of the plan seems to be bigger than experienced by the stakeholders. It seems that the Belgian MSP is sorting out a satisfactory effect as a policy framework: it stimulates economic (blue) growth. At the same time, stakeholders – who are generally positive about the plan – do not always perceive it as a driver for economic growth. It seems that stakeholders might not fully realise the strength of the tool, even though their sectors are seemingly profiting from it.

4.4 Germany (Baltic Sea)

4.4.1 Introduction

The German Baltic Sea Plan (GBSP) came into effect in December 2009[31] to provide an integrated and sustainable approach to the development of Germany's Economic Exclusive Zone (EEZ). Driven by increased competition for marine space since the early 2000, the plan sets the general principles for spatial development, including targets and principles for functions and uses.

The plan covers the EEZ waters beyond the 12 nm, with an estimated size of 4.500 km^2. The German federal structure allocates marine planning authority over territorial waters (12 nm from the baseline) to the states (Länder). In fact, three regional plans for the territorial sea have been already developed[32].

The Federal Spatial Planning Act (Raumordnungsgesetz, 1997) was amended in 2004 to include planning objectives and principles for the marine Economic Exclusive Zone[33]. The Raumordnung Verordnung Ostsee (AWZ Baltic SEA-ROV) is the German Baltic Sea Plan legal act, integrated by principles and sector-based regulations and supported by an environmental report.

Coordination of different uses is the GBSP overarching goal, while emphasising shipping, offshore wind farms and environmental protection. The launching of the process started in 2005 through an initial scoping report, followed by a consultation after the releasing of the Plan draft in 2008. The Plan review started in 2017 and is expected to be completed by 2021. The review process includes scoping exercises, national and international consultations.

The Federal Ministry of Interior, Building and Community (Bundesministerium des Innern, für Bau und Heimat) is responsible for the GBSP. The Federal Shipping and Hydrographic Agency (Bundesamt für Seeschifffahrt und Hydrographie, BSH) was given the mandate for maritime spatial planning of the EEZ of the North Sea and the Baltic Sea. The agency is part of the Federal Ministry of Transport, Building and Urban Development. BSH supports maritime shipping and the maritime economy, consolidates safety and the protection of the environment, promotes sustainable uses of the sea, ensures continuity in the measurements and provides current information about the conditions of the North and Baltic Sea.

Key elements of the German Baltic Sea Plan are:

- Environmental protection as a core dimension of the plan, including long-term safeguarding and reversibility of uses.
- Targeted effort to maintain the competitiveness of the shipping industry.
- Alignment with the Sustainability strategy for the development of offshore wind energy.
- Participatory process had an international dimension.

[31] Bundesministerium für Verkehr, Bau und Stadtentwicklung (BMVBS). 2009. Raumordnung Verordnung Ostsee Directive on Spatial Planning in the German Exclusive Economic Zone of the Baltic Sea, Berlin: BMVBS).
https://www.bsh.de/EN/TOPICS/Offshore/Maritime_spatial_planning/National_spatial_planning/_Anlagen/Downloads/Raumordnung_Verordnung_Ostsee.html
[32] The Sechlewig Hostein and the Mecklenburg Vorpommenrn Plans in the Baltic, the Lower Saxony in the North Sea.
[33] Germany's EEZ includes two areas in the North Sea and Baltic Sea, separated by the Schleswig-Holstein state.

- Coordination of the plan with neighbouring countries

4.4.2 Background and context

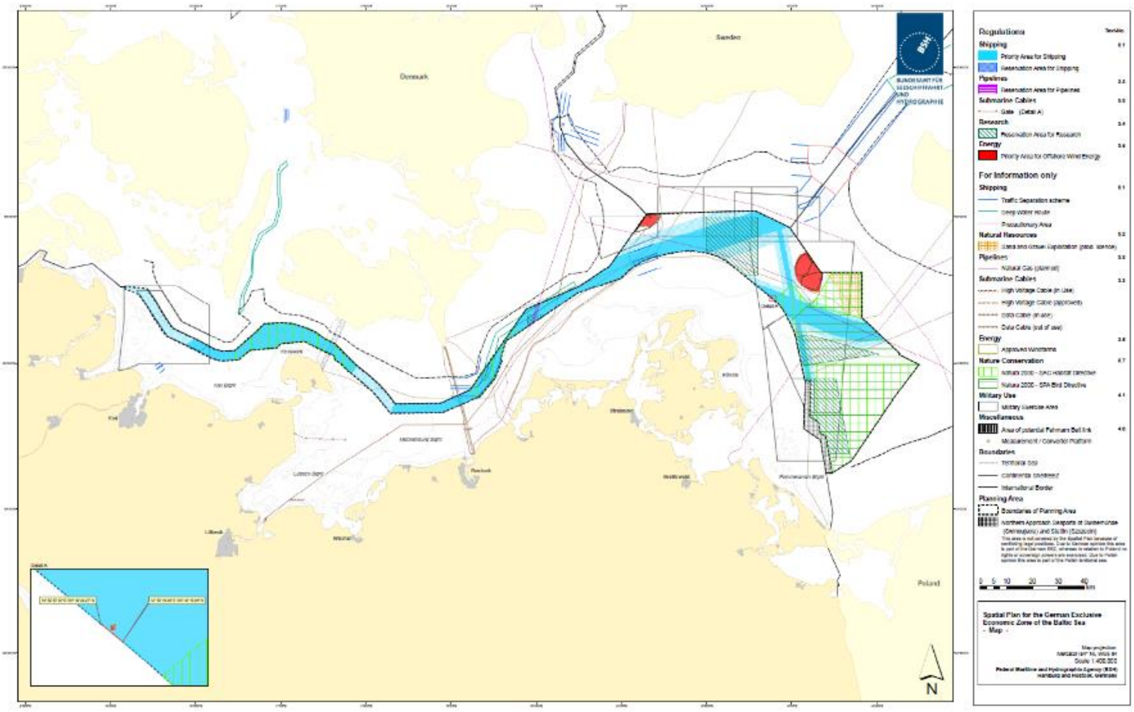
The overall goal of the German Baltic Sea Plan is "to coordinate the growing conflict of maritime uses, in particular between developing and space intensive offshore wind farms and marine environmental protection goals as well as traditional maritime uses such as shipping and fisheries" (AWZ Baltic SEA-ROV).

The German Baltic Sea Plan regulates the following sectors:

- Shipping
- Exploitation of non-living resources
- Pipelines and submarine cables
- Marine scientific research
- Energy production, wind energy in particular
- Fisheries and mariculture
- Marine environment

In addition, considerations are provided regarding military use, leisure and tourism, the Fehrman Belt crossing[34], ammunition dump sites and sediment deposition.

Figure 24 - Overview of Germany's Baltic Sea Plan



The Plan is structured in five chapters. The general introduction is followed by the guidelines for spatial development: securing and strengthening maritime traffic, economic capacity, promoting offshore wind energy, long-term sustainable use and securing natural resources by avoiding disruptions to and pollution of the marine environment. The spatial plan builds on the results of the Strategic Environmental assessment, which also include a description of measures to be taken in the course of

[34] Provision for the construction of a bridge between Puttgarden (Germany) and Rödbyhavn (Denmark), which has been replaced by a tunnel which is currently under construction.

monitoring the impact on the environment. Finally, the plan details the coordinates related to the regulation as well maps with transnational pipelines and cables in the Baltic Sea region.

The area-based approach combines priority and reservation areas. In the priority areas – designated for shipping and wind energy development – other uses are prohibited, unless they are compatible with the priority uses. Reservation areas have been designated for shipping, pipeline, and research uses that are considered particularly important when balancing with spatially significant competing uses 3 (AWZ Baltic SEA-ROV).

It should be noted that specific geographical areas have been excluded due to a legal controversy over sovereignty between Germany and Poland. Namely, the northern approaches to the harbours of Świnoujście (Swinemünde) and Szczecin (Stettin) and anchorage no. 3 (AWZ Baltic SEA-ROV).

The plan contributes to the implementation of two policy instruments:

- The Federal Government’s sustainability strategy and namely the “Strategy of the Federal Government for the Use of Wind Energy at Sea” (2002), creating framework conditions allowing the offshore wind energy potential to be exploited.
- The Federal Government's national marine strategy for sustainable use and protection of the seas (national strategy for the seas).

The plan considered two coastal states spatial planning designations:

- Schleswig Holstein MSP (2009)[35], which includes the sectors of aquaculture, ports, offshore renewable energy, offshore oil and gas, recreation and tourism, military, marine conservation and coastal lands and uses.
- Mecklenburg-Vorpommern MSP (2005), which included provisions concerning wind turbines, nature conservation, pipeline routing and use of resources. A new plan came into force in 2015[36].

[35] Initial provisions were included in the spatial report coast and sea of Schleswig-Holstein in 2006. The plan came into force in 2010 and was amended in 2015. Revisions are scheduled for more than every five years.
[36] The first plan came into force in 2005. The new plan (2016) covers more human uses and some ecosystem services.

4.4.3 SWOT Analysis

Table 61 - SWOT Analysis of MSP in Germany (Baltic Sea)

Germany

Strengths

- The sectors prioritised in the plan had a successful development
- First-hand confilcts among transport and renewable energy were overcome by exploiting synergies in the frame of the plan
- The new arenas to interact among the users enable to develop new communication flows
- The international integration of the plan with surrounding countries, international agreements (eg. IMO) and regional/local plans

Weaknesses

- The plan is limited to the offshore waters (EEZ)
- Lack of relevance and opportunities to develop the aquaculture sector
-- The administrative processes (eg. licenses) are similar than without the plan despite the management authority is the same

Opportunities

- Some sectors included in the plan (eg.research, tourism) are not still benefited with their inclusion in the plan
- Inclusion of emerging sectors in forthcoming loops (e.g. aquaculture)
- Improved integration across h Government's marine departments.

Threats

- Key sectors are conditioned to international agreements (eg. IMO) or national/international policies (eg. decarbonization)
- Complexities to engage different plans of different regional scopes (local, regional, national, international)
- Perception that certain sectors (fisheries) repeatedly and cumulatively lose access due to marine developments (including renewables).

4.4.4 Quantitative data

The data on the economic indicators were collected from a number of sources, such as Eurostat (sbs, tourism, transport, energy and PRODCOM databases), EUMOFA for fisheries, the UEPG (Union Européenne des Producteurs de Granulats), OSPAR and HELCOM for aggregates and Deutsche WindGuard GmbH for renewable energy. Therefore, a time series of economic data was created for the economic activities that are most closely linked to the Blue Economy and that may directly be concerned or affected by the Germany MSP.

The series would ideally cover a period 5 years before and 5 years after the entry into force of the plan. Since the plan is in force since 2010, our time series ranges from 2006 until 2016 inclusive. The longer the plan has been in force, the more reliable the conclusions will be.

Since not all activities considered in the classification are completely maritime, approximations were used to determine the maritime share of the total activity based on the value of the production attributable to marine activities. In particular, extraction of aggregates was estimated combining the data from the annual reports of the European Union of producers and OSPAR and HELCOM for the maritime share. The calculated percentage was then applied to production value.

Regarding the regional scope of the plan, other suppositions were applied to estimate the Baltic share of the MSP sectors. For fisheries, the landings the comparison among the ports of Sassnitz, Heiligenhafen, Neu Mukran, Kappeln with the rest of landings in Germany allow to estimate this proportion. The main ports identified by EUROSTAT were also used for shipping. For wind energy, the data available from the national wind energy association make it possible to estimate the number of MW installed and connected to the grid in the German Baltic sea. For extraction of aggregates, the information provided by HELCOM covers this part of the German waters. In the case of tourism, the number of nights in the Baltic coastal municipalities of EUROSTAT were used to estimate the maritime proportion of the sector.

Table 62 overleaf shows the production values (maritime and regional share applied) for the maritime activities for which information was available.

Table 62 - Germany: evolution of production value (million euro)

Sectors	Activity	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Fisheries and Aquaculture	Marine fishing[37] (1)	63.5	62.7	63.0	46.8	53.5	72.8	80.6	119.4	110.3	113.3	115.3
Extraction of aggregates	Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate (2)			11.9	1.4	7.8	3.1	1.2	0.8	0.7	3.4	3.5
	Operation of gravel and sand pits; mining of clays and kaolin (3)			21.2	1.7	12.1	4.8	1.9	1.2	1.0	4.6	4.2
	Other mining and quarrying (4)			1.4	0.2	1.1	0.5	0.2	0.1	0.1	0.4	0.3
Shipping	Sea and coastal passenger water transport (5)			82.9	378.4	223.0	696.3	876.4	876.1	1,620.7	1,691.5	2,045.5
	Sea and coastal freight water transport (6)			4,274.5	2,618.9	3,784.9	3,348.9	3,959.7	4,802.4	3,510.3	3,113.3	2,232.0
	Other transportation support activities (7)			8,668.2	5,278.2	6,842.4	6,678.3	7,487.6	9,824.8	8,552.9	5,902.8	6,853.9
Coastal tourism	Land transport (8)	2,911.3	3,003.1	3,123.1	2,835.8	2,959.7	3,140.6	3,170.7	3,273.3	3,390.9	3,565.8	3,615.8
	Air transport (9)	567.4	585.2	835.7	836.5	942.4	932.5	953.7	953.8	1,086.7	997.1	1,123.4
	Acommodation (10)	794.9	821.7	909.3	994.7	1,036.8	1,138.6	1,205.6	1,144.1	1,269.4	1,404.8	1,502.2
	Food and beverage service activities (11)	1,245.8	1,301.4	1,471.6	1,941.7	1,996.2	2,172.1	2,175.0	2,127.2	2,446.3	2,707.3	2,948.0
	Travel agency, tour operator reservation service and related activities (12)	0.0	0.0	430.8	426.3	484.2	525.5	529.0	591.0	558.0	610.9	562.9
Wind Energy	Production of electricity (13)								3.9	2.8	33.4	36.0

[37] Nace rev. 2 codes: 1: A0311; 2: B0811; 3: B0812; 4: B0899; 5: H5010; 6: H5020; 7: H5229; 8: H49; 9: H51; 10: I55; 11: I56; 12: N79; 13: D3511

4.4.4.1 Shipping

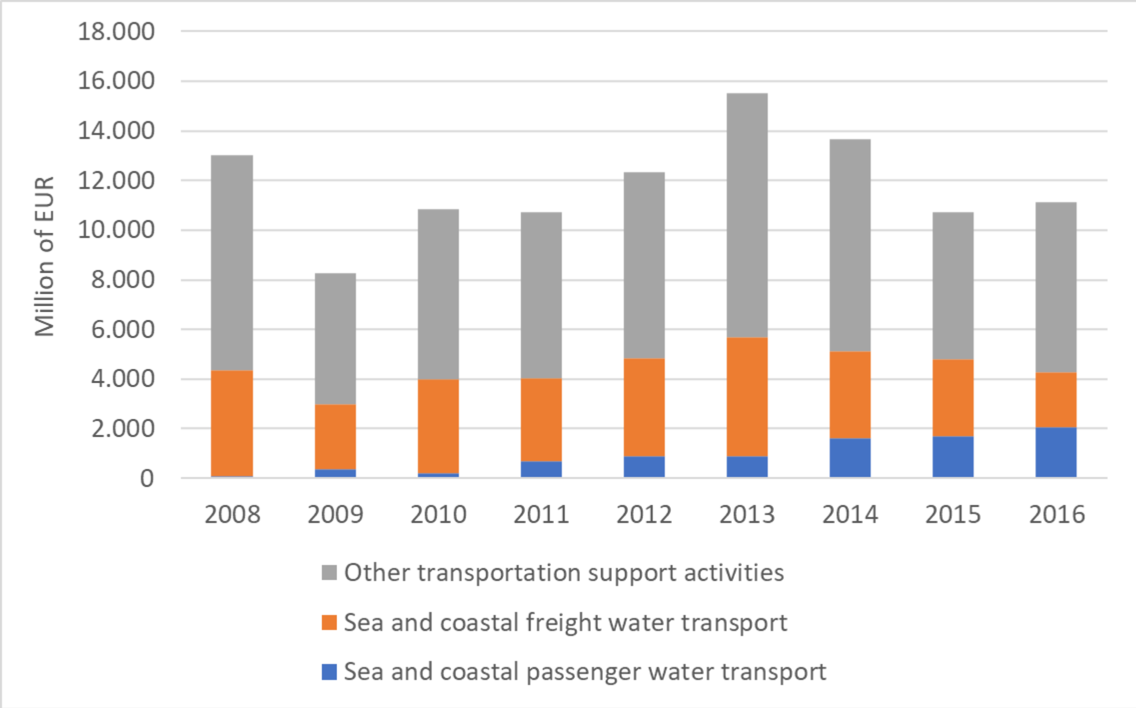
The German EEZ in the Baltic Sea constitutes a heavily trafficked area. Reinforcing the competitiveness of marine traffic is one of the Plan guidelines, in line with the relevance of the sector for the economy and its development prospective[38]. Furthermore, shipping is a highly regulated activity under international and national regulations, which shape the alternatives for spatial development.

The plan sets designated areas for shipping:

- 5 priority areas due to the intensity of traffic, the international shipping routes and the safety criteria for securing navigation.
- 4 reservation areas with moderate traffic or adjacent to the priority areas.

Quantitative and qualitative data show positive direct impacts of the implementation of MSP on the shipping sector (see figure below).

Figure 25 - Economic performance of shipping sector in the Baltic sea basin of Germany



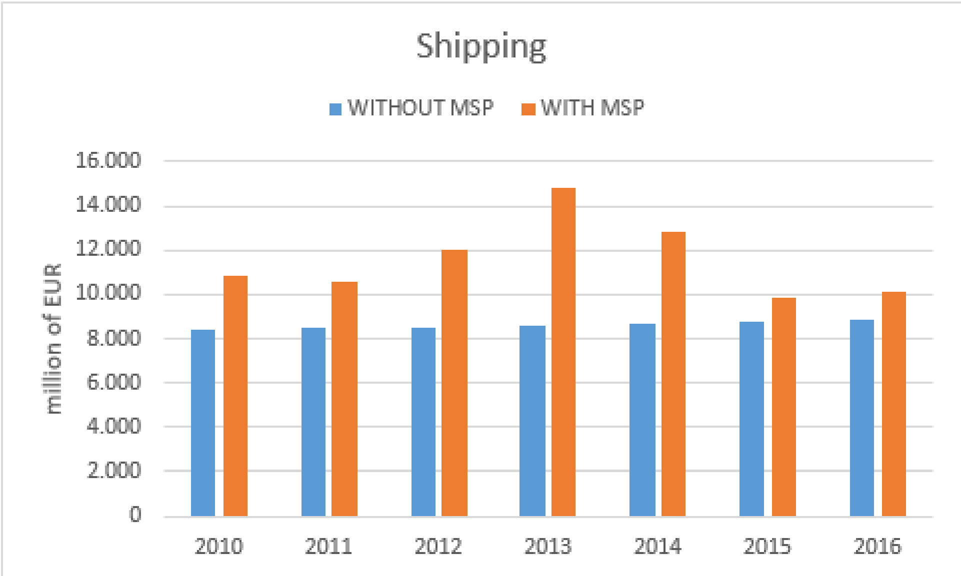
On the one hand, the evolution trends indicate that the sector is performing better than under the non-MSP scenario (see Figure 26). On the other, the interviews confirm a significant uncertainty reduction that provided stability to the sector. In the process, the planning authority first approached the shipping industry to deal with the routing plans and existing IMO routes. The priority was to ensure the routes already approved in the international context, agreed by the neighbouring countries (i.e. IMO countries). The next round of consultations focused on other uses, such as MPAs, navy uses, offshore wind, etc. and their coherence with the routes, without any relevant conflict identified. Two examples may illustrate this direct impact. For instance, such actions provide an opportunity for shipping and offshore wind representatives to discuss safety issues, and business opportunities, when it comes to logistics and construction as well as service and maintenance of new offshore wind farms. Likewise,

[38] "Already now, the shipping routes off the German coasts – in particular in the Baltic Sea – are among the most heavily travelled routes in the world, with more growth predicted. A dynamic development has been predicted for the German seaports as well. According to the Maritime Transport Forecast 2025, commissioned by the Federal Ministry of Transport, Building and Urban Affairs, the volume of cargo handled in German seaports will more than double by 2025" (AWZ Baltic SEA-ROV, 2009: 3).

the developed maps and the availability of clear shipping routes allow to discuss clearly between different stakeholders (sector, NGOs, Managing Authority) environmental protection measures.

Although stakeholders do acknowledge an enhancement in terms of sector stability, they indicated that the transaction costs (e.g. administrative) have not been reduced and remain similar with or without MSP.

Figure 26 - Evolution trends of the shipping sector in Germany, with and without MSP.



4.4.4.2 Exploitation of non-living resources

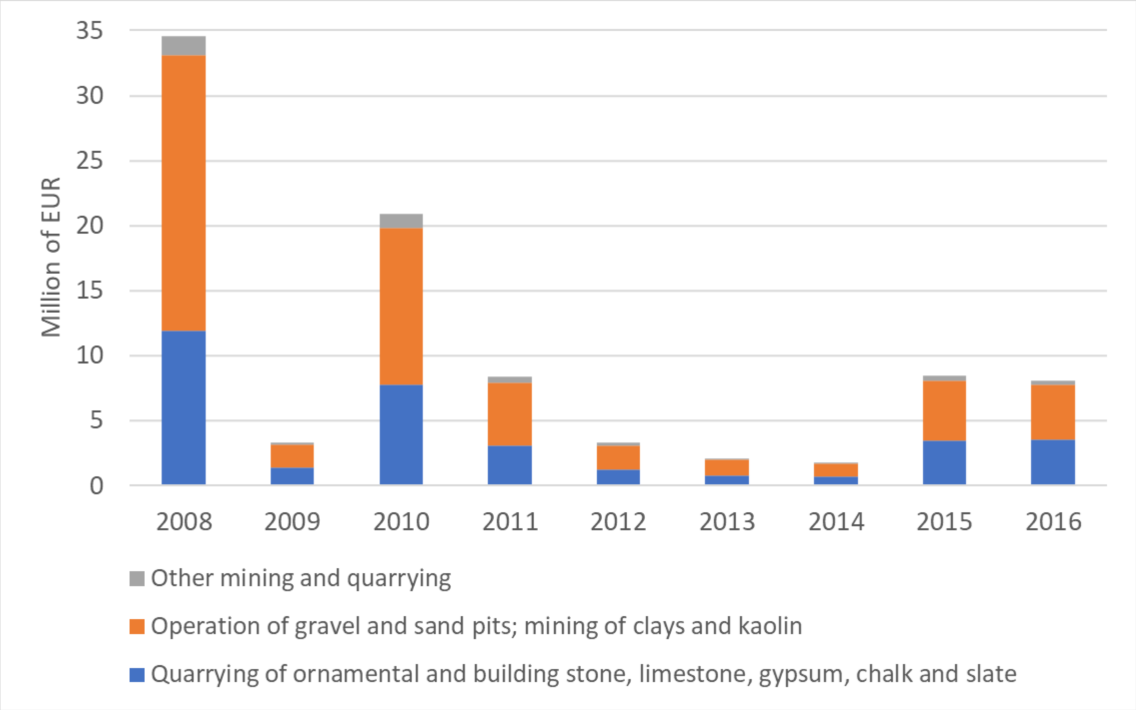
MSP considers safeguarding and exploiting non-living resources (marine aggregates, mining, hydrocarbons) as an important basis for Germany's future economic development. Therefore, the planning principle is that the exploration for and exploitation of non-living resources should be allowed and developed on a large scale under the guidance of the sectoral law (mining and environmental regulation).

However, sector development is constrained by the overarching MSP guiding concept for the protection of the marine environment, the groundswell of societal concerns about its potentially significant environmental impact, and the inability to re-allocate the activities.

The legal framework distinguishes between exploitation and production licences. The first grant the exclusive right to explore for mineral resources in a particular field whereas the second is limited to exploit minerals. The issuing of mining licences is a coastal state (Länder competence).

The analysis of the trends before MSP (2008-2009) and the scenarios with and without MSP show a positive direct impact for the exploitation of the non-living resources. At the same time, the trend also reflects the general decline of the sector in the EU, due to decreasing production (depletion of resources) and rising costs (offshore oil and gas is more expensive that onshore oil and gas; when global prices are relatively low, offshore activity may become unprofitable). The extraction of sand and gravel is the main activity developed in the Baltic sea basin of Germany, which is represented in the Figure 27.

Figure 27 - Evolution trends of the extraction of aggregates sector in Germany.

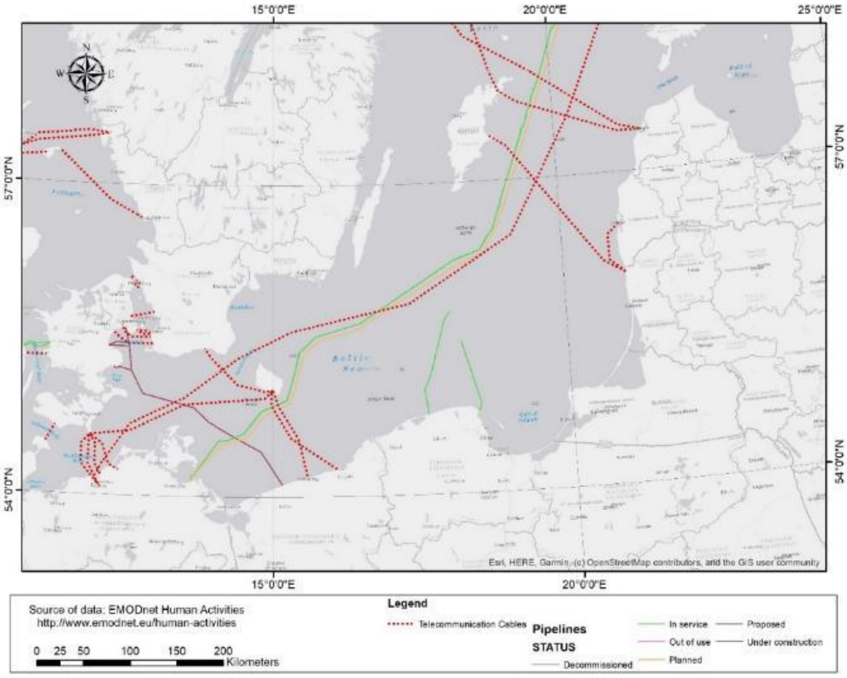


4.4.4.3 Pipelines and submarine cables

Telecommunication services and power transmission through subsea cables and pipelines have experienced a growing demand that is expected to continue in the near future. In Germany, the concerns related to conflicts of use and environmental impacts of the activity led the Federal Agency of Nature Conservation (FfN) to commission a report in 2006 on potential effects of installation, operation and decommissioning of cables in the marine environment[39].

[39] Meißner et al. (2006), Impacts of submarine cables on themarine environment— A literature review. Institute of Applied Ecology. Available at: https://www.bfn.de/fileadmin/BfN/meeresundkuestenschutz/Dokumente/BfN_Literaturstudie_Effekte_marine_Kabel_2007-02_01.pdf

Figure 28 - Cables and pipelines status in the Baltic Germany waters in 2017



The cross-sectoral interactions are explicitly addressed in the plan, setting precedence for the priority sectors and areas. For instance, cables and pipelines shall cross priority areas for shipping by the shortest route possible if they cannot be run parallel to existing structures and should not impair the safety and efficiency of navigation. Likewise, other activities are constrained to keep the appropriate distance for cables and pipelines (e.g. exploitation of non-living resources) to avoid any risk of damage or limiting the feasibility of repair.

Currently, not enough information is available to quantitatively estimate the economic maritime share[40]. The qualitative data (interviews) point out several benefits derived from MSP. Namely, a better regulation for cables and pipelines and a more efficient routing. Benefits extend to cross-borders relations, as many cases neighbouring countries have followed the cables and pipelines as indicated in the German MSP. Others, as the initial improvement in the access to information has not remained as data are not automatically updated. For instance, the information regarding cables between islands or islands and mainland are not updated.

Secondary sources[41] indicate that the German MSP has included spatial solutions to avoid potential conflicts in this specific sector. For instance, cable developers are required to use the corridors designated in the plan. By bundling cables and pipelines in corridors, the plan reduces the possibility of hitting them by fishing activities, helps foster cross-boundary grid connections and interconnections between offshore wind farms.

4.4.4.4 Marine scientific research

MSP provisions for marine scientific research are related to the nature of the activity. Setting priority areas is not envisaged because, in general, only some activities require installing facilities of a temporary nature. The reservation areas for research

[40] For instance, there is no option to disaggregate data for marine cables from the construction sector (NACE codes F4222, F4291, F4312). This limitation affects the analysis of the sector in other reference reports, e.g. the Blue Growth (2019) published by the European Commission.
[41] See MSP Platform Conflict Fiche 2: Cables and pipelines and fisheries available at https://www.msp-platform.eu/sites/default/files/2_cables_fisheries-revised_0.pdf

designated correspond to those in which large-scale, long-term research data series are collected.

The plan also considers marine scientific research as an instrument for its own monitoring and implementation, calling for the general accessibility of their results.

4.4.4.5 Energy production, wind energy in particular

The development of offshore wind energy has been a major driver of the plan. As a result, priority areas have been designed to favour this sector over other conflicting uses. Specific requirements are envisaged in relation to power cables, due to their likely increase. MSP priorities ranking is well illustrated in this case: although offshore wind farms are a priority, their power transporting cables are required to be removed in the event that they constitute a hindrance to shipping or other prevailing public interest.

The development of this emerging sector in Germany has taken place within the period covered by MSP. Therefore, comparison of alternative scenarios (with and without MSP) following the methodological approach selected is not feasible.

The offshore wind sector can be considered a new player. Qualitative data show a reduction of potential conflicts with other maritime sectors, this being an educated guess based on the previous status because the wind farms were developed within the plan time-frame[42]. Stakeholders emphasise the relevance of both MSP and sectoral plans for the offshore wind sector. The legal framework gives very good predictability of what is going to happen (how many GW will be installed and when) and the planning authority is tasked to look for the most suitable areas where wind farms may be installed.

Forthcoming developments are likely to increase the direct impact in terms of information costs for the companies. In spite of the available information through the Geosea portal[43], the pre-construction work and ground surveys require more in detail data that are still being conducted by operators. However, for the next tender 2021-2022 (for projects for 2016) the federal planning authority (BSH) will collect that information and provide it to the market[44].

The benefits in terms of reliability and predictability do not prevent the sector from trying to influence and improve the MSP process. Overall, MSP kick-started the sector and it has accelerated investment and investors interest. It has been pointed out that some ports closer to the offshore wind farms may reap benefits in terms of investment outlooks.

Table 63 - Trends of MW installed with grid connection in the Baltic and North Sea German EEZ.

	2012	2013	2014	2015	2016	2017	2018
Baltic	50.8	50.8	50.8	338.8	338.8	692.3	1,076.3
North Sea	229.5	469.5	998.4	2,956.1	3,769.5	4,695.1	5,306
TOTAL	**280.3**	**520.3**	**1,049.2**	**3,294.9**	**4,108.3**	**5,387.4**	**6,382.3**

4.4.4.6 Fisheries and aquaculture

Fisheries are defined in the plan as a traditional, socially deep-seated, use of the sea, whereas aquaculture is expected to be a meaningful commercial sector in the future.

[42] Verbatim: "We can just imagine what conflicts could have occurred in case we did not have and MSP".
[43] https://www.geoseaportal.de/mapapps/?lang=en
[44] The details of how this will finally unfold (i.e. will developers still have to do the site survey after they win the tender) are unclear at the moment of writing the report.

The rationale for the lack of restrictive areas for fisheries in MSP rests on the European Union's exclusive competence over the conservation of marine biological resources (art. 3 TFEU). However, specific provisions are included: fisheries interest shall be taken into account in the exploitation of non-living resources, pipelines and cables and generation of power.

The potential for aquaculture prompted the planning authority to consider a framework for possible future developments. This includes synergies with existing installations and combination of uses (i.e. with offshore wind turbines).

The guiding concept of marine environmental protection sets extensive consideration for the potential negative impacts of fisheries and aquaculture, as well as the sustainable exploitation of the marine resources in line with international and European regulation.

Qualitative data provide significant insights for both sectors. In the case of fisheries, the perception is that other sectors do have more tailored-made solutions (e.g. offshore energy or cable infrastructure), whereas defining special areas for fishing (e.g. for a given fishing gear) would contribute to facilitating catching fish. Despite acknowledging the difficulties of spatial planning (mobility of stocks, etc.) the sector considers that setting priority zones for fisheries should be prioritised over other incompatible uses, such as mining areas.

As for aquaculture, the companies consider that setting suitable spaces for aquaculture is critical to the development of the sector. Due to the lack of such definition, companies have to go through an extensive permitting process avoiding shipping routes, fishing areas, environmental protection areas, etc. As the GBSP do not allocate areas, investors are looking to nearby countries (e.g. Denmark or Sweden) which have designated areas. The average time for getting a aquaculture permit in Germany is 5 years vs. 6 months in those countries. It should be noted that aquaculture is mainly affected by the regional plans (see introduction). Of the two regional plans in the Baltic, only Mecklenburg-Vorpommern do include aquaculture areas. The Schleswig-Holstein does not design them, despite having ongoing aquaculture activities in the territorial waters under its competence.

4.4.5 Stakeholders interviewed

Table 64 – Stakeholders interviewed for the German case study

Sector	Organisation	Type
Government	Bundesamt für Seeschifffahrt und Hydrographie (BSH)	Authority in charge of MSP
	Ministry of Energy. Infrastructure and State Development Mecklenburg-Vorpommern	Authority in charge of MSP
	Ministry for Economic Affairs, Transport, Employment, Technology and Tourism	Authority in charge of MSP
Aquaculture	Aquakulturgesellschaft Ostseeforelle	Company
	Kieler Meeresfarm	Company
Fisheries	Landesamt für Landwirtschaft, Lebensmittelsicherheit und Fischerei Mecklenburg-Vorpommern	Public body
Shipping	Port of Hamburg	Port authority
	German Shipowners' Association	Industry association
	Strategische Hafenentwicklung	Port authority
Costal tourism	Ministerium für Wirtschaft, Arbeit und Gesundheit, Mecklenburg-Vorpommern	Public body
Offshore wind	Wind-Energy Network	Industry association

4.4.6 Summary and main findings

The sectoral-based insights and findings from the interviews have been already included in the analysis of the specific sectors. In addition, the general remarks could be summarised as follows:

- In general, the GBSP is seen as a positive tool to provide information, to frame the debate on the space available for maritime activities and to address the strategical goals of the national government.
- Most of the sectors benefit from the GBSP, with the notable exception of aquaculture. Additionally, the prioritisation of shipping routes over offshore wind farms and, and of offshore energy installations over fisheries were the main conflicts identified. However, evidence of synergies exploitation among them was remarked during the interviews and more collaboration has emerged between the energy and transport sector.
- Administrative processes and protocols have not been altered due to GBSP. Therefore, there has been no reduction of transaction costs or access to specific information and therefore the plan has not positively affected the operative costs.
- For those sectors with precedence over other conflicting activities (shipping and energy) the business expectations are positive. On the contrary, the trade-off of defining this priority has affected other sectors, like aquaculture, causing a reduction of interest in the investment.
- The information generated through the process is welcomed by all the players, while more data is needed for specific activities (e.g. related to the licenses of offshore wind farms) or the up-to-date data on sand and gravel extraction areas. Other relevant information for the plan is managed and updated by the planning authority (BSH).
- Overall, MSP provides a general framework to develop economic activities but the development of a given sector is enormously influenced by many other factors outside the sphere of plan.

A summary of the key qualitative benefits of the plan at sectorial level is presented in the following table. The range of positive or negative effects is among +2 and -2, where +2 is the most positive effects identified by the stakeholders, +1 represents some positive effects and 0 represents a null effect of the GBSP on this aspect.

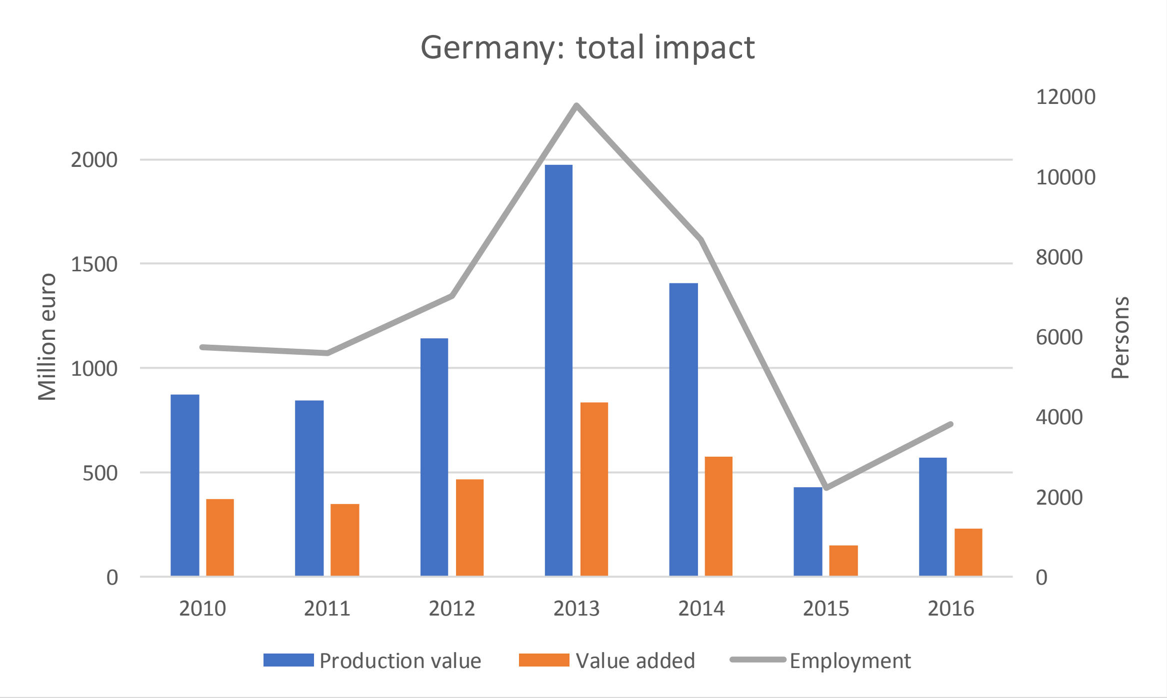
Table 65 – Summary of MSP benefits, according to German stakeholders

Sector	Positive effects	Reduction of conflicts	Cross-border relations	Access of information	Transaction costs	Investment and business expectations
Shipping	+2	+2	+2	+1	0	+1
Offshore energy	+1	+1	+1	0 (expected +1)	0	+1
Fisheries	0	-1	0	+1	0	0
Aquaculture	-2	0	0	0	0	-2
Tourism	0	+1	+1	0	0	0
Non-living resources	0	0	0	-1	0	0
Cables and pipelines	+1	+1	0	0	0	0
Marine research	0	0	0	0	0	0

4.4.7 Final economic effects

The overall impact of the German Baltic MSP on the whole economy appears to be positive. The performance of the economic indicators Production value, Gross added value and Employment are high in 2013 and 2014, three years after the implementation of the plan. For the other years the effect is less intense. All the interviewed stakeholders remark the difficulties of teasing out the impact of MSP on economic performance, due to other influencing factors. Therefore, the intensity of MSP effects may vary but the positive effects on the German economy are beyond doubt.

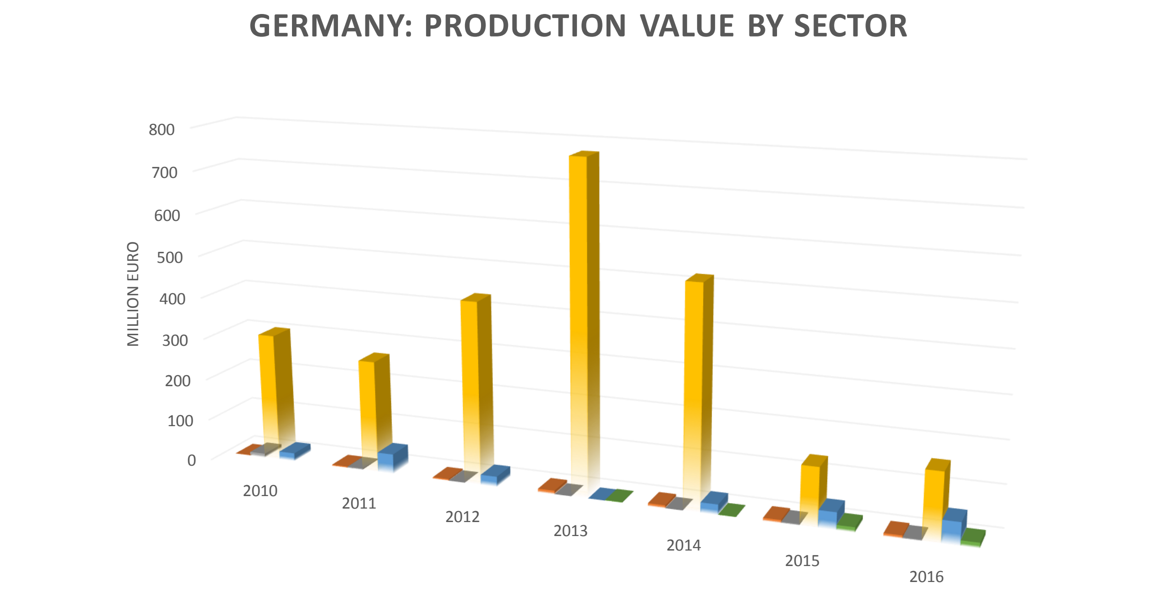
Figure 29 - Total impact (direct, indirect and induced) of MSP in Germany (Baltic Sea)



For the sectors regulated by the plan, the positive effects caused by comparing the value of production in the analysed period reached slightly more than 7 billion euro (considering direct, indirect and induced effects). Similarly, positive effects are detected on value added, which accounts for an additional 3 billion euro from 2010 to 2016. In terms of employment, the number of workers (in full-time equivalent) influenced direct or indirectly by MSP is around 45,000 people. Direct effects are responsible for 40% of the total impacts in the case of the production and 26% in the case of the employment.

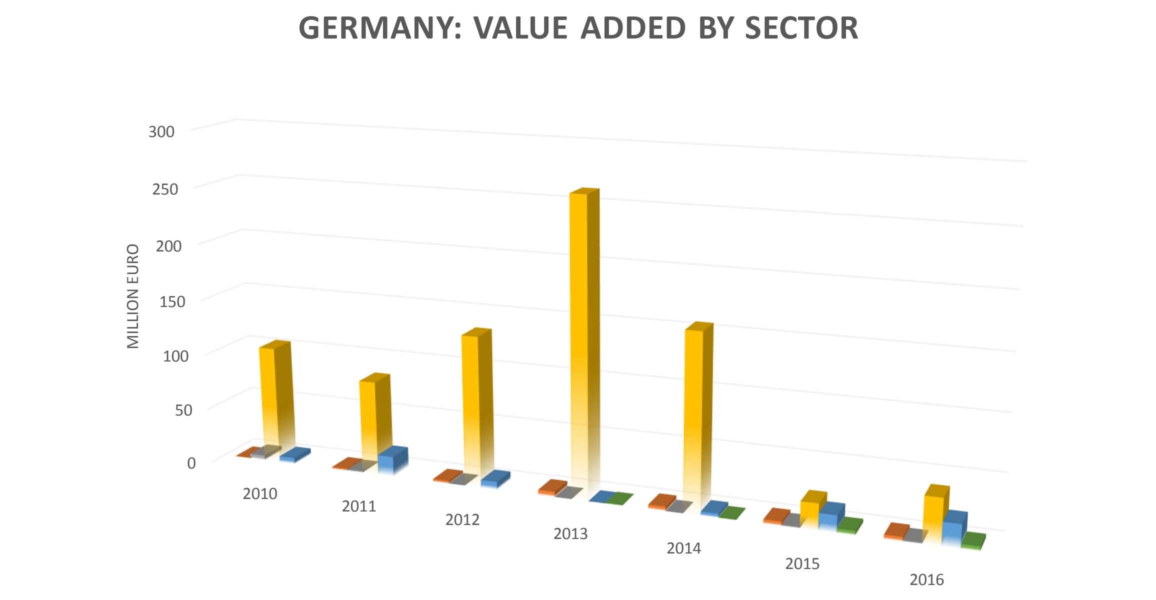
Looking at each sector individually, it is possible to notice considerable differences in impact. The sector with a positive overall impact (*i.e.* based on all three indicators: production value, gross added value and employment) is **shipping** and its related activities. From 2010 onwards, the impact is positive, growing each year with the exception of 2015. This trend is confirmed by stakeholders and is aligned with the MSP guiding principle of "securing and strengthening maritime traffic". The second most benefitted sector is the coastal tourism. Although it is not specifically managed by the plan (only considerations are included), its economic dimension tends to magnify impacts even if the actual changes caused by MSP are negligible. The third sector is energy, driven by wind farm development. This is another example of the addressing of the guiding principles of the plan "promotion of offshore wind energy use in accordance with the Federal Government's sustainability strategy". Similar trends can be observed for value added.

Figure 30 - Direct impact of MSP in Germany (Baltic Sea) on production value



	2010	2011	2012	2013	2014	2015	2016
Fisheries and aquaculture	0,7	2,94	3,66	8,02	6,61	6,62	6,58
Extraction of aggregates	8,87	2,59	0,1	-0,45	-0,57	2,54	2,36
Shipping	306,07	267,7	433,96	776,09	521,24	137,86	159,64
Coastal tourism	19,24	47,27	24,22	-12,09	24,17	40,35	52,74
Wind energy				1,41	0,98	11,53	12,25

Figure 31 - Direct impact of MSP in Germany (Baltic Sea) on value added

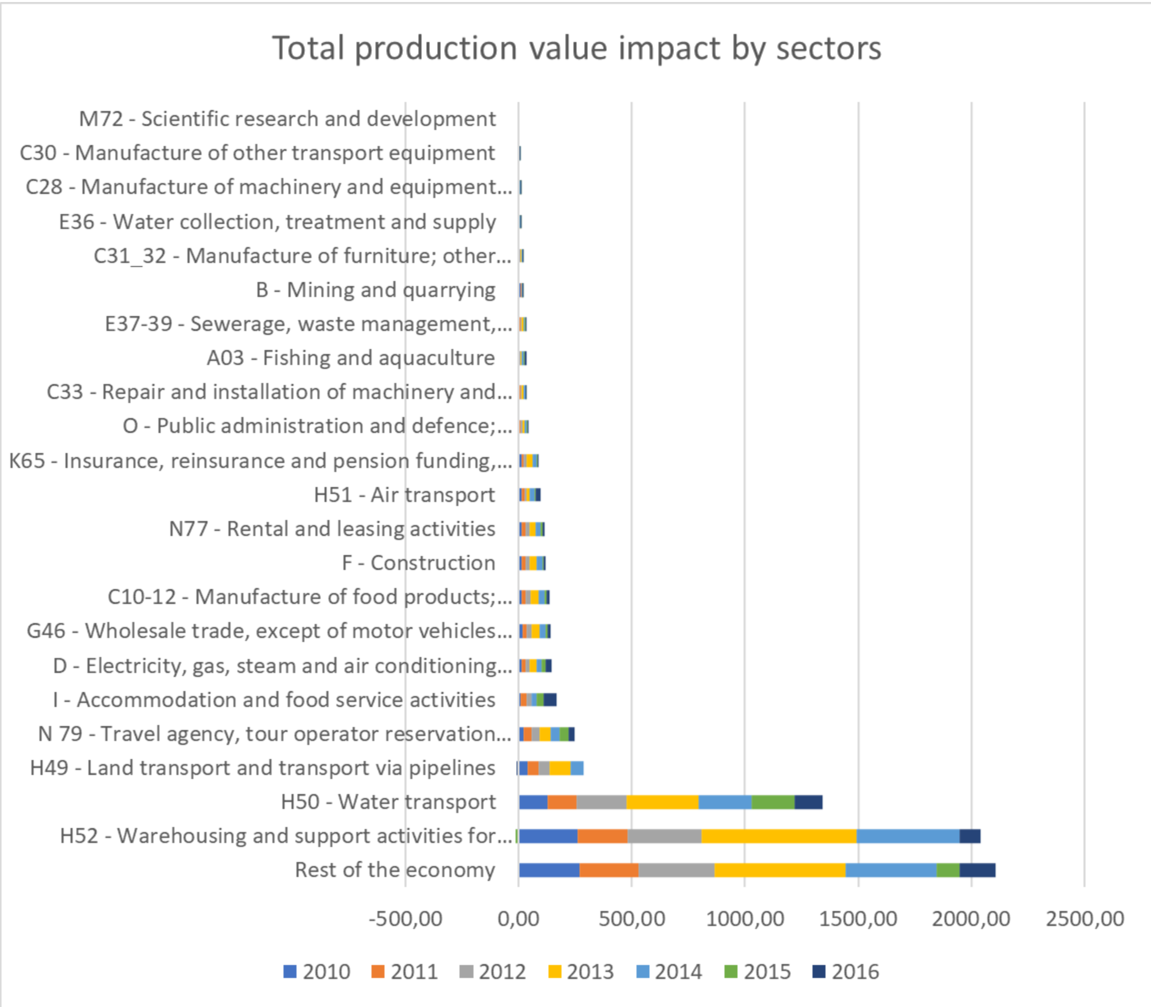


	2010	2011	2012	2013	2014	2015	2016
Fisheries and aquaculture	0,39	1,6	2,2	4,6	3,77	3,66	3,64
Extraction of aggregates	4,16	1,08	0,05	-0,19	-0,23	0,99	0,92
Shipping	105,26	84,31	134,51	262,32	157,19	23,12	40,44
Coastal tourism	5,36	17,92	6,87	-10,53	3,56	14,99	20,5
Wind energy				0,49	0,33	3,64	3,87

As most of the interviewed stakeholders stated (including the planning authorities), it is extremely complicated to isolate the effects of MSP from other economic drivers at macroeconomic or at sector level. Nevertheless, it is clear that MSP did generate positive effects. Stakeholders from the shipping and wind energy sectors acknowledged the positive impact of MSP and pointed out that also for the future, the MSP participatory cycle will be quite relevant. This participatory approach is also recognised by almost all other stakeholders as a positive key element of MSP.

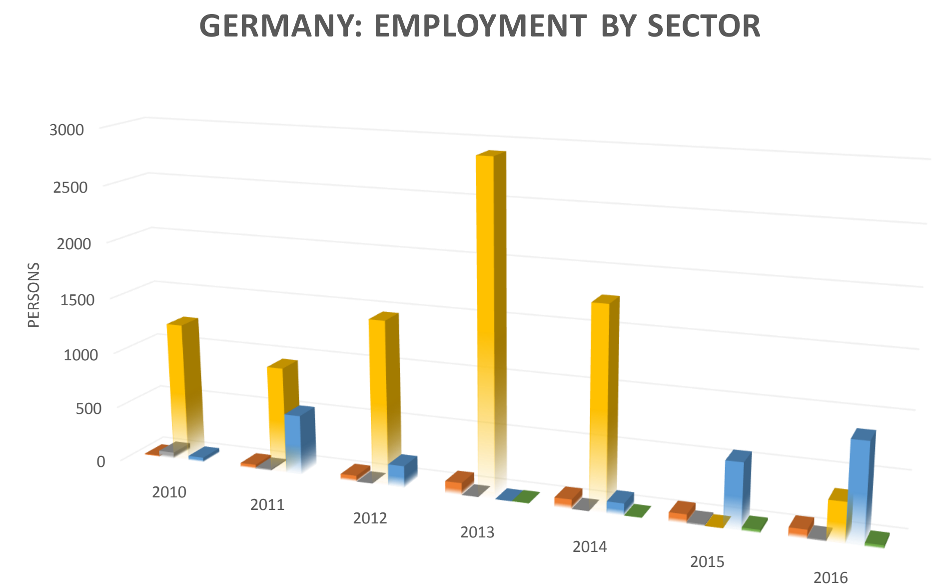
Besides transport, renewable energy and coastal tourism sectors, other traditional uses such as marine aggregates extraction, fisheries or the construction business seem to receive some benefits from MSP. These effects are multiplied by their connections with other economic sectors of the economy (e.g. insurance, equipment, manufacture of food products, repairing, etc.). Due to the selected methodological approach, these economic inter-relations are also counted in the economic impact of MSP. So, indirect and induced economic effects are shown in the rest of the sectors of the Germany economy as a result of MSP implementation.

Figure 32 - Total impact (direct, indirect and induced) of MSP in Germany on production value (million EUR)



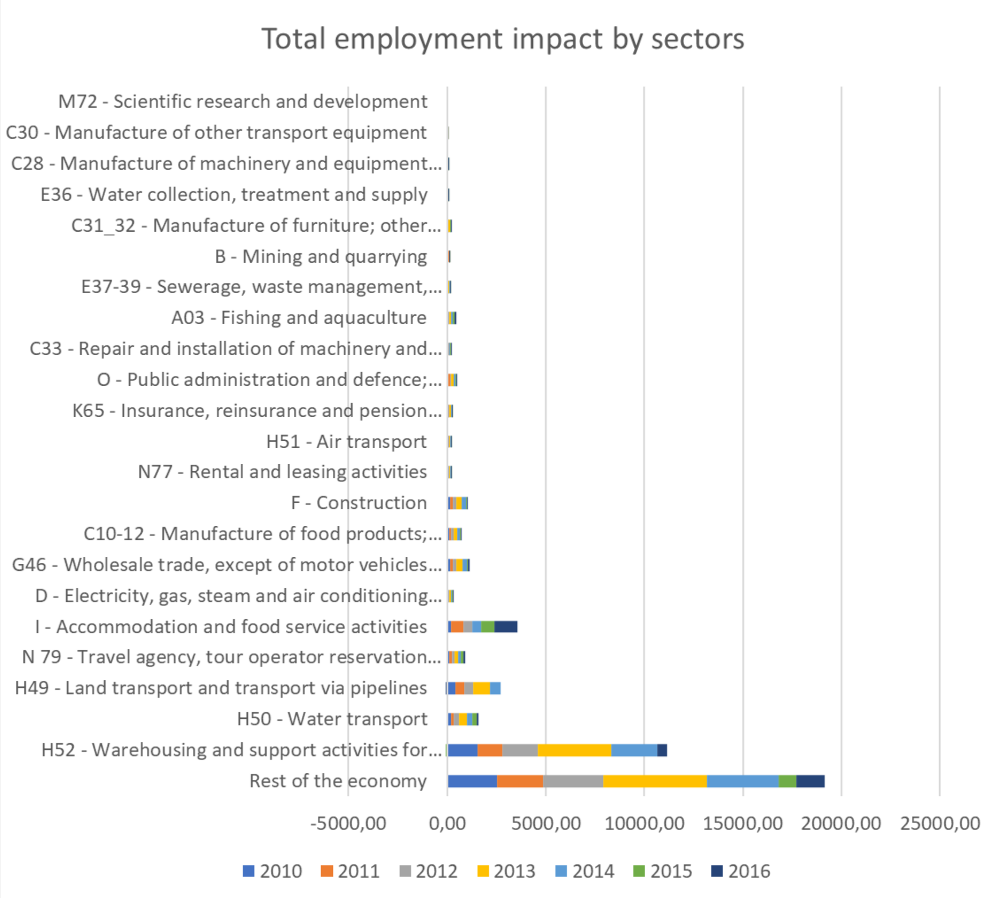
In terms of employment, warehousing and support activities related to maritime transport are the sectors which contribute to most to job creation. This is due to the fact that these sectors are labour intensive, when compared to other sectors of the economy.

Figure 33 - Direct impact of MSP in Germany (Baltic Sea) on employment



	2010	2011	2012	2013	2014	2015	2016
Fisheries and aquaculture	9	36	52	106	83	80	79
Extraction of aggregates	54	15	1	-3	-3	14	12
Shipping	1252	953	1469	2915	1781	-54	351
Coastal tourism	40	538	194	-571	106	579	870
Wind energy				3	2	27	29

Figure 34 - Total impact (direct, indirect and induced) of MSP in Germany (Baltic Sea) on employment



4.4.8 Conclusions

The German Baltic MSP has positive direct, indirect and induced effects on the economy. The findings are in line with previous anecdotal evidence suggesting that MSP might already be having a positive impact on investments in a number of maritime sectors in Germany (European Commission, 2019: 7).

- Shipping and renewable energy are the sectors with clear positive direct effects of the plan, while coastal tourism is the one with more indirect benefits. Not surprisingly, according to the plan, shipping and renewable activities are prioritised in case of conflict with other sectors.
- The connections and inter-connections between maritime and inland sectors amplify the positive effects in socioeconomic terms (value of production, GVA and employment).
- Only traditional sectors such as fisheries and aquaculture show slightly negative effects (more evident when it comes to aquaculture).
- Transaction costs are not influenced by the existence of the plan.
- Reduction of conflicts and management of cross-border issues are considered as the main strengths of the plan.
- Business expectations and the investment environment have improved in the renewable energy sector. On the contrary, the lack of specific measures aimed at supporting aquaculture seems to have reduced the economic opportunities for the sector.

4.5 Scotland

4.5.1 Introduction

Scotland's National Marine Plan (NMP) was published by the Scottish Government in 2015 to provide a single framework for managing the seas around Scotland. As a statutory document it defines clear objectives and provides a range of policies to ensure that Scotland's marine resources are used sustainably. The Plan applies to all decisions taken by public authorities, which affect the marine area.

The plan covers inshore waters (Figure 35), defined in the NMP as waters out to 12 nautical miles (nm), and offshore waters (12 to 200 nm). Under devolution, the Scottish Parliament legislates for inshore Scottish waters while the UK Parliament legislates for offshore Scottish waters with certain areas executively devolved. This is based on two separate acts governing Scottish marine planning matters.

- Marine (Scotland) Act 2010 an Act of Scottish Parliament which governs inshore waters (out to 12 nm);
- Marine and Coastal Access Act (2009), an Act of the UK Parliament, which governs offshore waters (12-200 nm).

The Scottish NMP brings together a plan for inshore waters and a plan for offshore waters into one document, i.e. two plans under two pieces of legislation, collectively referred to as the National Marine Plan, with the majority of policies applicable to both inshore and offshore waters. The Scottish NMP was prepared in accordance with the EU Directive 2014/89/EU.

The Marine Acts set out a tiered approach to developing marine planning in the UK and Scotland. The Marine (Scotland) Act requires an adaptive management approach to climate change, including through the designation and protection of Marine Protected Areas (MPAs). The UK Marine Policy Statement (MPS) is shared across UK Administrations and covers all UK waters. The Scottish NMP is compatible with the UK MPS and sets out strategic policies for sustainable development in Scotland. Regional Marine Plans will implement marine planning at a local level, within Scottish inshore waters (out to 12 nm). Regional plans are being developed via Marine Planning Partnerships, the first of which have been established in two regions, the Shetland Islands and the Clyde. In addition, a range of sectoral marine plans exist, with sector specific planning processes designed to be more spatially explicit, such as leasing rounds for offshore wind energy.

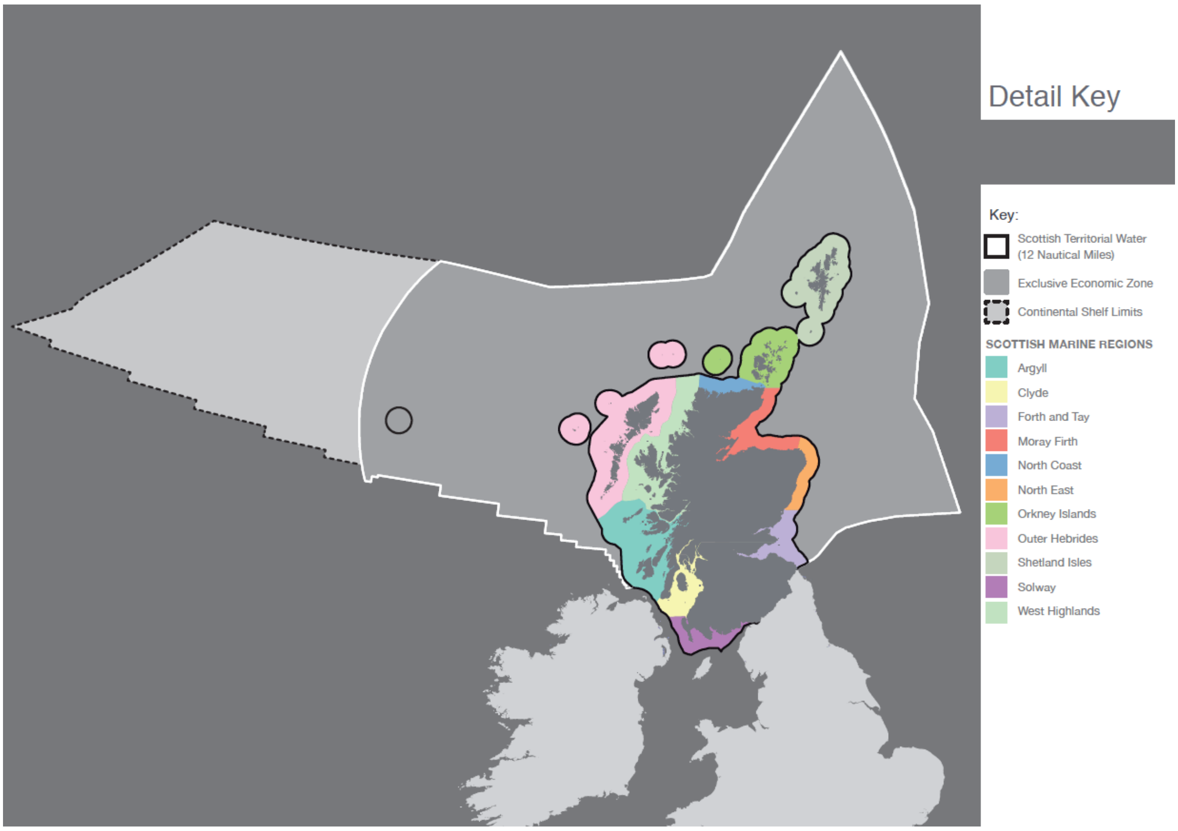
This case study is specific to Scotland, covering waters out to 200 nm and including Scotland's NMP and where possible the regional marine plans. The plan has been developed for all users of the sea, including the renewable energy sector, fishing, leisure and recreational users, ports and harbours, aquaculture and transport. It also contains marine ecosystem and marine historic environment objectives.

The NMP is supported by an evidence base provided through an online portal (National Marine Plan interactive, NMPi) which is regularly updated with new datasets. together with Scotland,s Marine Atlas, which provides an assessment of the condition of the Scottish marine area and a summary of significant pressures.

Scotland's NMP was adopted and published in March 2015. The first three-year review of its implementation was undertaken and published in March 2018. This review identified new plans and policies due to be introduced with implications for marine planning (e.g. a Climate Change Plan), together with new emerging areas of development or priority focus within Scottish waters (e.g. seaweed harvesting, invasive and non-native species and marine litter). However, overall it was considered that given the large uncertainties around the UK leaving the EU. it is not an appropriate time to amend or replace the NMP.

The Scottish marine regions, for which regional plans will be developed, are shown geographically in the figure below.

Figure 35 - Scotland's National Marine Plan area and regions, both inshore and offshore waters (Scottish Government. 2015)



4.5.2 Background and context

The NMP provides policy guidance on the following sectors.

- Sea Fisheries;
- Aquaculture;
- Wild Salmon and Diadromous Fish;
- Oil and Gas;
- Carbon Capture and Storage (CCS);
- Offshore Wind and Marine Renewable Energy;
- Recreation and Tourism;
- Shipping, Ports, Harbours and Ferries;
- Submarine Cables;
- Defence, and
- Aggregates.

4.5.2.1 Marine Scotland

Marine Scotland is a civil service directorate within the Scottish Government, responsible for leading the protection of Scotland's coastal waters and seas, to both build sustainable economic growth from Scotland's marine assets, and to safeguard its valuable marine ecosystems. On behalf of the Scottish Ministers, Marine Scotland is responsible for implementing the Marine (Scotland) Act 2010 and as such they led on preparation of the NMP and the creation of Scottish Marine Regions.

More widely, Marine Scotland is responsible for

- Marine renewable, fishing vessel, freshwater fisheries and seal licensing;
- Ensuring compliance with fisheries regulations;
- Promoting sustainable, profitable and well-managed fisheries and aquaculture industries;
- Ensuring a sound scientific evidence base exists to inform our marine policies;
- The sustainable management of freshwater fish and fisheries resources; and
- Promoting sustainable economic growth from the marine renewables industry.

Marine Scotland is divided into five main operational units covering science, compliance, planning and policy, sea fisheries, and aquaculture and recreational fisheries. All functions of Marine Scotland have a role to play in the NMP. For example, the licensing team plays a significant role in ensuring that the policies of the Plan are reflected in authorisation decisions which affect the marine environment, namely the consideration and determination of marine licences and consents on behalf of Scottish Ministers.

The NMP is relevant to other organisations. The Marine Acts require that public authorities (e.g. Councils) must take authorisation or enforcement decisions in accordance with the Plan, unless relevant considerations indicate otherwise.

4.5.2.2 The National Marine Plan

General and sector specific policies

The Plan stipulates a core set of General Policies which apply across all existing and future development and use of the marine environment. These General Policies are intended to represent the characteristics against which the sustainability of development and use is considered. They are presented under the five guiding principles of sustainable development to represent the balance required between social, economic and environmental imperatives. The General Policies apply to all plan making and decision making in the marine environment. These policies provide a clear overarching framework.

Generally, the NMP is not spatially explicit, and does not define zoning schemes or specific areas for development. Sectoral policies (for each sector listed above) have been developed where issues beyond those set out in the General Policies require to be addressed in order to ensure sustainability of the activity. These sectoral policies and plans provide more spatial information These policies were derived by considering issues specific to a sector which require varying degrees of management to support economically productive activity; manage interaction with other users; respect environmental limits; and to consider climate change. These policies address issues relevant to a particular sector and need only to be considered when there will be a direct or indirect implication for that sector. All decision making is subject to the General Policies as well as sector policies where these are relevant.

Regional Plans

Marine planning will be implemented at a local level within eleven Scottish Marine Regions (see Figure 35), extending out to 12 nautical miles. Within these regions, regional marine plans will be developed by Marine Planning Partnerships to take account of local circumstances (e.g. will cover only sectors relevant to that region) and smaller ecosystem units; regional policies will be identified, which are required to be in accordance with the NMP. Once Regional Marine Plans are in place, decisions made by public bodies – such as granting licences or planning permission, or managing other activities – must reflect plan policies. Marine Planning Partnerships will become statutory consultees, to be consulted as part of any licence determination process.

The Clyde and Shetland Isles are the first regions to take forward regional marine planning and Orkney Islands will follow. The other eight Marine Planning Partnerships are in the process of being established and will develop their respective Regional Marine Plans over the coming years, having gained insight to the successes of existing planning partnerships.

Shetland Isles Regional Marine Plan

In Shetland the process of developing a regional marine plan was formally initiated in March 2016, when Scottish Ministers gave Direction to the Shetland Islands Regional Marine Planning Partnership and its Public Authority members to prepare a regional marine plan for the Shetland Islands.

The Shetland Islands Council has adopted the fourth edition of the Shetland Islands' Marine Spatial Plan (SIMSP) as 'Supplementary Guidance' to the Shetland Local Development Plan. The Shetland Local Development Plan together with any Supplementary Guidance sets out the policies and criteria against which planning applications and works licences submitted in Shetland will be considered.

The SIMSP provides an overarching policy framework to guide marine development and activity out to 12 nautical miles. It incorporates spatial data on the marine environment, its various uses and assets.

The policies and maps in the SIMSP are material considerations in decision-making on individual marine planning applications and works licences within Shetland's coastal and marine waters out to 12 nautical miles.

Consultation on the Shetland Islands Draft Regional Marine Plan 2019 is currently ongoing.

It may be perceived that establishment of the regional marine plan for the Shetland Isles has been aided by the pre-existence of region-specific legislation and guidance, which the plan has sought to bolster, and the presence of a relatively smaller group of stakeholders already familiar with collaborating with one another. Such unique circumstances are unlikely to be encountered in other marine regions.

Firth of Clyde Marine Spatial Plan

Scottish Ministers have given the task of developing a Regional Marine Plan for the Clyde to the Clyde Marine Planning Partnership (CMPP) and its Public Authority members. The CMPP issued a pre-consultation draft of the Clyde Regional Marine Plan earlier in 2019 and the Plan is currently being finalised. The sector policies within the draft Plan are more regionally explicit but conform with the NMP. In the development of this Plan, it has been recognised that numerous stakeholders and complex stakeholder groupings can make reaching meaningful consensus in policy-setting challenging.

4.5.2.3 Sectors in the National Marine Plan

This section provides an overview of the sector policies presented in the NMP. The policies are strategic and set out broadly how marine industries and activities are expected to develop in the immediate future and in the longer term and the issues to be addressed to ensure they grow sustainably.

The sector descriptions below are supported by a series of figures in Annex, which show the spatial distribution of sector interests. It is worth noting that many of the spatial management measures referred to in the text below, whilst supported by the NMP, were in place prior to the creation of the NMP.

Sea fisheries

Management of Scotland's fisheries industry is species specific, and implemented primarily through the EU Common Fisheries Policy, as well as UK national and Scottish specific legislation. With a range of legislative drivers including the NMP, as well as the UK's forthcoming exit from the EU, a range of tensions exist between the current management arrangements and potential future management of UK and Scottish fisheries. This includes ever increasing competition for space between existing fishing grounds and other developments such as environmental designations and offshore renewable energy.

The Plan states that fishing will continue to be a commercial activity in Scottish waters to meet the ongoing and increasing demand for safe, sustainable food from the sea. The Scottish Government aspires to support the fishing industry to optimise fish quota opportunities year on year and to increase value both in landings and the processed product through improved marketing and supply chain efficiency.

It is observed that the fishing industry will have increasing interactions with other marine users in the future and that the challenge will be to maintain fish stocks for future generations and provide an environment which enables harmonious co-existence between fishing and other users and activities. Changes in spatial fishing patterns are expected.

Spatial management in future years will become part of regional marine planning, for which Inshore Fisheries Groups will provide fisheries management input. There will be increased focus on interactions within fisheries (between mobile and static fishing sectors, wild fisheries and farmed fisheries) and between fisheries and other activities (such as spatial conservation initiatives, recreation and renewables).

In terms of interactions between fisheries and conservation areas, a number of sea areas are already closed to fishing to protect vulnerable marine ecosystems, such as cold-water corals on the Rockall Bank and Darwin Mounds. In addition, fisheries in some areas are limited or prevented altogether in order to protect breeding seabird populations. In addition, local spatial measures have been applied in Shetland's inshore waters through the Regulating Order operated by the Shetland Shellfish Management Organisation (SSMO). Such measures pre-date the NMP but are supported by it.

In terms of interactions between fisheries and offshore energy developments, the licensing regime requires energy developers to explore various measures to promote co-existence with fisheries and mitigate any effects upon them.

Aquaculture

Aquaculture in Scotland is an increasingly important industry and the Scottish Government supports industry plans to grow the sector sustainably. An NMP policy is 'to grow marine finfish (including farmed Atlantic salmon) production sustainably to 210,000 tonnes; and shellfish, particularly mussels, to 13,000 tonnes sustainably by 2020'.

In supporting development, the Plan emphasises the importance of locating farms so that they do not negatively affect the carrying capacity of the environment. The Plan supports existing Locational Guidelines, and there is a presumption against further marine finfish farm developments on the north and east coasts of Scotland to protect wild salmonids.

The NMP encourages planners and the industry to identify opportunities for expansion in the number of larger, further off-shore sites which will represent a significant increase in the value of the Scottish industry and reduce potential environmental impacts at more sensitive inshore locations. The Plan also supports the sustainable growth of the seaweed sector.

Wild salmon and diadromous fish

Salmon and trout fisheries are recognised as an important and significant sector of the Scottish economy. The Plan aim is to maintain and improve the environment within which the sustainable exploitation of salmon and trout can continue to provide economic, social and recreational benefits.

Coastal net fisheries were the only source of wild salmon and sea trout for the commercial market, but are currently closed and are likely to remain so for the foreseeable future to allow stocks to recover. Anglers in rivers cannot sell their catch and on many rivers anglers are not permitted to retain their catch with all fish being returned to the river to protect stocks. Recreational salmon and sea trout angling is estimated to contribute £ 87 million per annum in expenditure to the Scottish economy.

The NMP identifies offshore renewable energy developments and aquaculture as those activities that will most significantly impact wild salmon and diadromous fish, but highlights that the effects of these activities are poorly understood.

The Plan states that a better understanding of factors that may influence stocks in both freshwater and marine environments is needed if interactions between wild stocks and other marine users, particularly important growth industries such as aquaculture and renewables, are to be fully understood and managed. The NMP is supportive of the National Research and Monitoring Strategy for Diadromous Fish, which seeks to identify knowledge gaps and direct research in relation to the potential effects of offshore and marine renewable energy generation on migratory fish.

Oil and gas

The Scottish Government supports a low carbon economy which involves the move away from fossil fuel based energy consumption towards investment in renewable energy and increased energy efficiency. However, oil and gas are set to remain a vital source of energy during the move towards a future based upon renewable energy.

The NMP suggests that the focus should be on maximising remaining extraction, re-using infrastructure and expertise (e.g. transfer of skills to developing sectors such as offshore renewables and carbon capture and storage), and decommissioning of existing infrastructure.

To date there has been minimal spatial conflict between oil and gas and other marine sectors.

At the same time, it should be noted that the management and regulation of the oil and gas industries has not been devolved to the Scottish Government, but has been retained by Westminster. Scottish Ministers therefore have very little control over oil and gas development – the most valuable sector of the marine economy.

Carbon capture and storage

Carbon Capture and Storage (CCS) is a set of technologies that has the potential to reduce CO_2 emissions from new and existing coal and gas-fired power plants and large industrial sources. CCS is a three-step process that includes, capture of CO_2 from power plants or industrial processes; transport of the captured and compressed CO_2 (usually via pipelines); and, underground injection and permanent geologic sequestration of the CO_2.

The Scottish Government believes that CCS is a critical component in the decarbonisation of Scotland's energy supplies and that Scotland has a competitive advantage in the development of this technology. The NMP clearly supports projects that are looking at the commercialisation of CCS.

CO_2 can only be safely stored where geology is suitable. As such, CCS infrastructure is likely to have similar spatial characteristics to the offshore oil and gas industry. The NMP envisages positive interactions between oil and gas and CCS, with shared use of infrastructure as well as the transfer of skills.

Despite long-term policy support for CCS development in Scotland, the sector has experienced a series of 'false dawns', though several projects continue to investigate its commercialisation (e.g. the Acorn project, which aims to deliver a low-cost CCS system in north east Scotland by 2023).

Offshore wind and marine and renewable energy

The NMP states that Scotland's marine area has an estimated 25% of Europe's offshore wind and tidal resource and 10% of the wave resource. The Scottish Government is committed to building a globally competitive offshore wind and marine renewables industry based in Scotland.

Supported by and allied to the NMP, the Scottish Government has created sectoral marine plans specifically focused on the future development offshore wind, wave and tidal energy. Sectoral Marine Plans contain Scottish Government policies, including their spatial strategy, to steer commercial scale offshore renewable energy development. The plans, which have been developed over a number of years since 2012, identify preferred strategic locations for the sustainable development of offshore wind and marine renewables, thus theoretically supporting offshore renewables developers in the finding of suitable development locations. The NMP confirms that this preference should be taken into account by marine planners and decision makers if alternative development or use of these areas is being considered. Proposals for offshore wind and marine renewable developments within Plan Options are subject to licensing and consenting processes, whilst decision makers must take account of provisions within Plan Options and other material considerations, each application is considered in its own merits.

Within the Scottish marine area, there are a number of planned development sites for offshore wind and marine renewable energy, within both Scottish Territorial Waters and beyond 12 nautical miles offshore. Of note are the previously identified 'Round 3' offshore wind development zones and Scottish Territorial Waters Offshore Wind Sites, where projects are currently nearing operation, in or approaching construction, or consented and awaiting construction. Interest in further development of offshore wind continues, with proposals for a further round of offshore wind development in Scottish Waters announced in 2018 (referred to as ScotWind Leasing). Regional locational guidance has also been prepared by the Scottish Government to support the development of floating and deep-water offshore wind projects. In comparison to offshore wind, development of the wave and tidal sector, whilst supported by the Scottish Government, has been far slower with few projects transitioning from prototype to commercial scale to date.

The NMP recognises that development of the offshore renewables sector is dependent upon further development of supporting infrastructure, such as ports and harbours, and opportunities for connection to the National Grid to allow the export of electricity from projects. The NMP supports strategic development of the offshore renewables supply chain/supporting infrastructure.

The NMP predicts significant positive interactions between offshore renewables and submarine cables, manufacturing, construction, maintenance and ports and harbours sectors. The Plan also identifies key marine sectors that may be affected by marine renewable energy development. Despite sectoral/regional guidance that seeks to identify the most appropriate areas for the development of offshore renewables, the issue of physical competition for marine space remains. Navigational restrictions and the impact of physical structures in the sea may affect sectors such as fisheries and aquaculture, marine recreation and tourism, shipping and defence, especially where planned development spatially interacts with existing uses. The NMP suggests that impacts can be avoided or minimised through an inclusive approach which identifies affected sectors, improves communication between offshore renewables developers and these sectors, identifies the impacts and seeks to address these through effective communication and mitigation strategies. Offshore renewables projects also interact with the natural environment, and concerns have been raised regarding inappropriate siting of developments with resulting significant adverse effects on, for example, seabird populations (e.g. it 2017, the Royal Society for the Protection of Birds lodged a legal challenge against decisions by the Scottish Ministers to grant consents for the construction of four offshore wind farms off the east coast of Scotland, though the offshore wind farm projects ultimately retained their consents).

Recreation and tourism

Scotland's marine and coastal areas support a range of recreational, sporting and visitor activities, ranging from coastal walking to international sporting events. Marine recreation and tourism activity are widely distributed around the coast and ranges from individual, social and club participation to competitive events and commercial ventures. Much of this activity takes advantage of some of the most attractive coastal scenery and most varied and demanding marine conditions in the world, offering conditions for a range of activities and abilities, and the NMP states that it is important to ensure these qualities are maintained and enhanced.

The VisitScotland National Tourism Development Framework for Scotland, which is wholly aligned to the industry-led strategy 'Tourism Scotland 2020', has been prepared to assist and promote growth in Scotland's visitor economy to 2020. The Framework sets out actions and provides guidance to help co-ordinate future development in the visitor economy and the NMP states that this should be followed by marine planners and decision makers. The NMP suggests that marine planning can support sustainable development of marine recreation and tourism by ensuring facilities and access to coastal and intertidal areas are protected or improved, whilst ensuring any development or activity is sensitive to the marine environment

Most of the waterborne recreation takes place near the shore and within approximately three nautical miles. In particular areas of the marine environment there can be competition for space (e.g. with fisheries, shipping, coastal development projects, submarine cables coming ashore) although studies suggest there are relatively few real-life examples of direct conflict. The NMP suggests that in supporting sustainable growth of the marine recreation and tourism sector, marine planning can help to ensure that it co-exists with existing marine users and reduce conflict.

In terms of future growth of the sector, the NMP identifies focus areas, such as the development of improved berthing facilities to support sailing tourism.

Shipping, ports, harbours and ferries

The NMP states that trade is essential to Scotland's economic prosperity, especially in today's global economy. Shipping is an important element of trade. Ports safeguard navigational safety of shipping as well as facilitating trade through the movement of freight and therefore are vital to the Scottish economy and its growth.

Ports and harbours provide infrastructure for other sectors of both regional and national importance. including vital support to industries such as fishing, oil and gas, aggregates, aquaculture and the developing marine renewable energy industry. The National Marine Infrastructure Plan which assessed the opportunities and suitability of ports to service the offshore renewables industries.

While a few ports specialise in specific cargos, like Glensanda for crushed stone and Sullom Voe for oil, the majority are multi-purpose and undertake a variety of functions even if they are known for one particular commodity, such as Peterhead for fish or Grangemouth for containers. Ports and harbours also support the tourism industry by providing landing points for passenger ferries, cruise ships and other marine tourism operators, as well as offering facilities for recreational users. Lifeline ferry routes support Scotland's more fragile and remote communities, including the islands.

The NMP anticipates that ports will have an increasingly significant role in supporting future growth of the offshore renewables industry thereby further extending their economic importance. The Plan also expects a trend for larger ships which require larger ports and wider/deeper navigational channels is expected, and the opening up of new trade routes.

In Scotland the majority of port and harbour operations are administered by statutory Harbour Authorities, who have a range of statutory powers or duties for the purpose of improving, maintaining or managing a harbour and for ensuring safety of navigation. Harbour Authorities have considerable autonomy over their area of jurisdiction, which may include permitted development rights. Marine planners and decision makers are required to have regard for the statutory duties and responsibilities of a Harbour Authority and will consult with them where a proposal for consented development or activity will impact on their operations or property. Where Harbour Authorities are required to apply for licences or other permissions, their applications will be considered in accordance with the objectives and policies of the NMP.

Submarine cables

The NMP notes that submarine power and telecommunications cables are of national and international economic importance and support the growth of other sectors covered by the Plan. Over 95% of international telecommunication is by submarine cable and approximately 40% of all the UK's active international cables are on the Scottish seabed. An international cable network passes north and south of Shetland connecting North America to Europe. These cables do not make a land-fall in Scotland. Other cables connect mainland Scotland to Shetland, Orkney, Northern Ireland, the Faroe Islands and oil and gas fields, and connect offshore renewables projects to the onshore National Grid.

Submarine cables are subject to licensing controls (noting emergency cable repair is exempt), and as such proposed new cables or cable repair works must take account of the policies set out in the NMP. Cables laid on the seabed are routinely buried to avoid interaction with other marine users.

Defence

Scotland's seas and coasts are used for military training exercises, test and evaluation facilities and are critical for operational reasons. The Ministry of Defence (MOD) coastal establishments and the adjacent seas are used for maritime training activities and surveillance of potential threats to the country's offshore interests. Defence activities that use the marine environment, directly or indirectly, in support of operational capability are diverse and include naval vessels, aircraft, naval bases, navigational interests, underwater acoustic ranges, maritime exercise areas, amphibious exercises, coastal training ranges and coastal test and evaluation ranges.

Whilst defence is a reserved issue the NMP suggests there is a benefit in identifying the implications of defence marine use for other marine users and to minimise potential impacts. It is recognised that marine activities such as fishing can be displaced by MOD activities (e.g. by temporary restrictions to areas or the presence of munitions dumps) but agreed codes of conduct are in place to resolve any conflicts arising from respective activities.

Aggregates

Marine aggregate extraction removes sand and gravel from the seabed for use as construction aggregate or for land reclamation or beach replenishment. Although Scotland has considerable marine sand and gravel resource, historically the marine aggregate industry has been very small due to more readily accessible land supplies. There are no current licences for marine aggregate extraction and no clear driver for a change in this in the immediate future.

4.5.2.4 Review of the National Marine Plan

The Marine Acts require the Scottish Ministers to review and report on the implementation of the NMP; this exercise was most recently undertaken in 2018 (Scottish Government, 2018). At this time no regional marine plan had been formally adopted.

The review process was led by external consultants and consisted of two main work areas. Firstly, existing data monitoring programmes and other data sources were assessed to inform review of the effectiveness of policies and progress towards NMP objectives. Secondly, a questionnaire was used to engage with relevant sectors, public authorities and marine interests on their views of the effectiveness of the NMP. In total, 27 responses to the questionnaire were received. In addition, a multi-stakeholder workshop hosted by the Scottish Coastal Forum also sought feedback to inform the review.

The review identified that further work is ongoing to produce a marine economic statistics report that will bring together official statistical evidence to inform indicators for monitoring progress across the economic sectors covered in the NMP. Such evidence was not available for inclusion in the 2018 review, which was therefore a predominantly qualitative exercise.

In summary, the review concluded that the NMP is perceived as being a valuable document with comprehensive and relevant policies. It was acknowledged that there are gaps, including new and emerging activities, which the next iteration of the Plan will be expected to address. There was general awareness that taking account of the Plan is a statutory requirement for public bodies and there is clear evidence of planning authorities using policies or objectives in the Plan to support the decision-making process for licence applications, but implementation of its policies is perceived to vary widely across, and within, different regulatory, planning and advisory bodies. Within the stakeholder workshop it was commented that some policies and objectives in the NMP, when taken together for decision making purposes, can be challenging or perceived as contradictory, e.g. when looking to balance some General Planning policies with sectorial policies or economic with environmental policies/objectives. It was also commented that integration of the Plan with terrestrial planning needs to be further supported and strengthened. Looking ahead, it was noted that the next iteration of the NMP should be expanded to better cover additional marine sectors/activities, such as the decommissioning of oil and gas and renewables infrastructure, floating offshore wind energy, large scale and offshore aquaculture, seaweed harvesting and marine and wildlife tourism.

Furthermore, in addition to the review process described here, the NMP has also been reviewed in detail from the perspective of ecosystem goods and services.

4.5.3 SWOT Analysis

Table 66 - SWOT Analysis of MSP in Scotland

Scotland

Strengths

- The geographic scale provides complete coverage of Scottish inshore (to 12 nmiles) and offshore waters (EEZ).
- Includes all main Scottish marine sectors.
- Comprehensive evidence base through the NMP interactive online database with extensive mapped datasets across all sectors; providing a consistent, verifiable and up-to-date data resource to all.
- Provides framework to enable and encourage dialogue between marine sectors.
- Review & evaluation process in place (every 3 years).
- Delivered on a national and regional basis.

Weaknesses

- No spatial element to the plan in terms of identifying key areas for specific sectors.
- Lack of defined time frame for delivery of all 11 regional plans (currently two are completed and one is in development).
- Challenges in quantitatively measuring effectiveness of the plan.
- Lack of clear reasoning for specific planning decisions correlated to NMP objectives.
- Complexities in decision making related to sectors not devolved to Scottish Government (oil & gas).

Opportunities

- Frequent review process promotes opportunity for adaptation and learning.
- Inclusion of identified emerging areas of development or priority focus e.g. seaweed harvesting, non-native species and marine litter.
- Improved integration across Scottish Government's marine departments.

Threats

- Uncertainty around UK leaving the EU has delayed any amendments to the NMP after the 2018 review.
- Frustration related to lack of delivery of eight regional plans.
- Perception that certain sectors (fisheries) repeatedly and cumulatively lose access due to marine developments (including renewables).

4.5.4 Quantitative data

4.5.4.1 Data sources

Scotland's marine economic statistics were published for the first time by the Scottish Government in October 2018, covering data for 2008 to 2016. Data beyond 2016 is not yet available. These statistics, considered 'experimental' as it is the first time such statistics have been published for Scotland, have been based on economic values for the Scottish Annual Business Survey (SABS), and supplemented by other datasets, such as Marine Scotland fisheries and aquaculture statistics. Unless otherwise referenced, the information within Section 3 is drawn from the Scottish Government 2018 statistics.

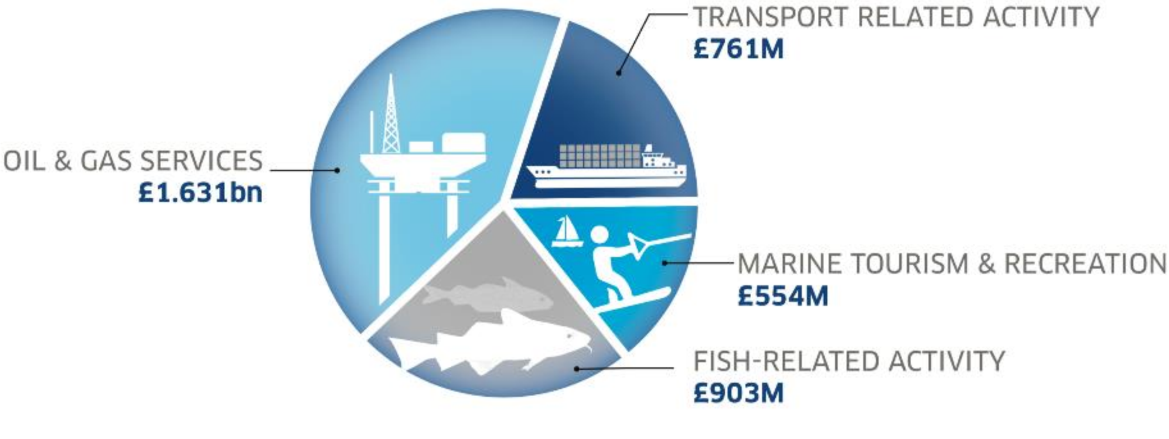
It is noted that Marine Scotland is developing specific indicators for monitoring the socio-economic impact of the NMP. These indicators will include the following:

- Economic contribution and profitability for the key marine economy sectors;
- Infrastructure development for the marine economy;
- Patterns of employment in marine economic sectors;
- Diversity of Scotland's marine economy; and
- Performance of key sectors against relevant environmental limits and trends for key economic activities.

4.5.4.2 Overview

In 2016, Scotland's marine economy (excluding oil and gas extraction) generated £3,8bn in GVA and employed 75,300 people, accounting for 2,9% of total Scottish GVA and 2,9% of total Scottish employment (Scottish Government, 2018). Scotland's oil and gas services generated £ 1,631 billion in GVA in 2016. The four key marine sectors covered within the statistical dataset from 2008 to 2016 includes oil & gas, fisheries and aquaculture, transport and tourism (Figure 36), Other, relatively emerging sectors, including marine renewables, research and development, and netting of sea salmon and trout, are noted to contribute, but comprehensive data that is comparable to the other sectors is somewhat limited.

Figure 36 - GVA of Scotland's key four marine sectors (Marine Scotland, 2018)

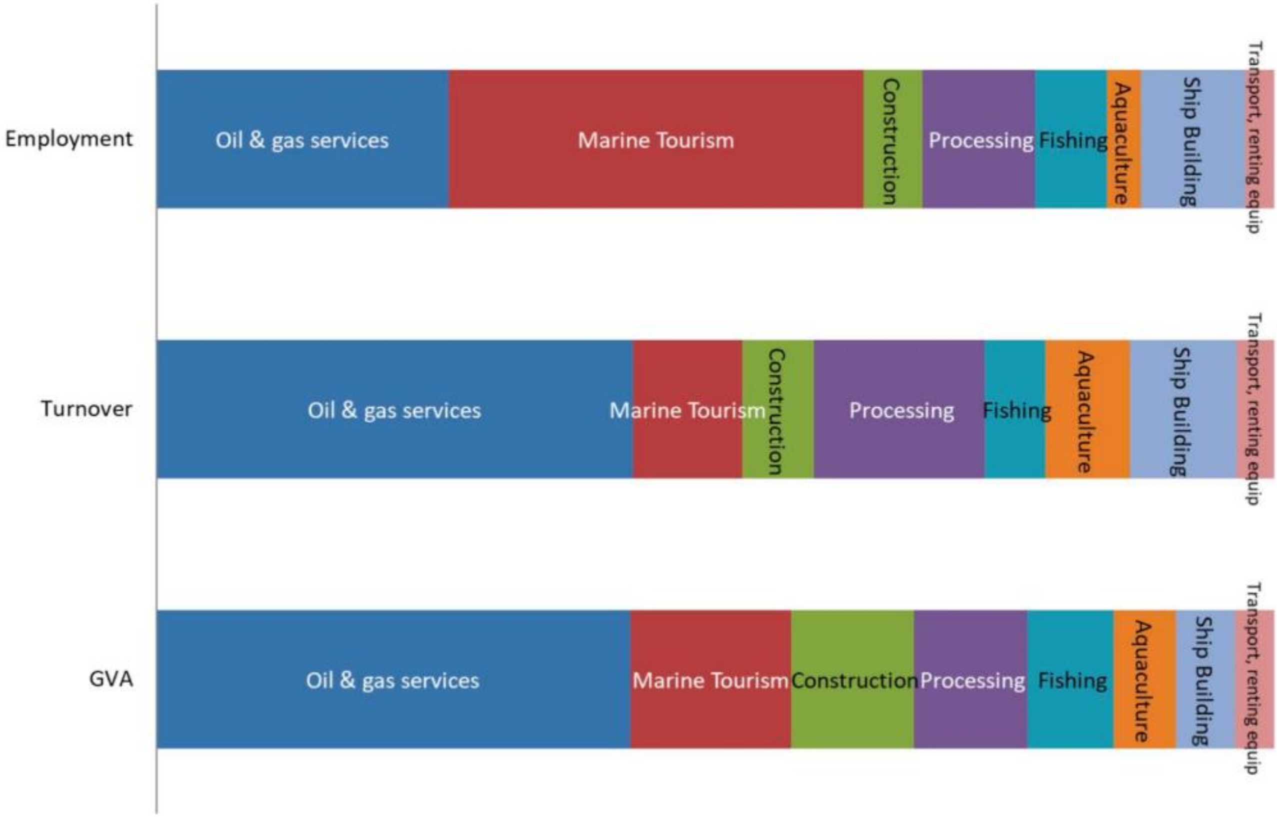


The distribution of GVA, turnover and employment across the different marine sectors are illustrated in Figure 37 and explored for each sector individually in this Section.

Regionally, the North East of Scotland is particularly important, with Aberdeen City accounting for 43% of the total marine economy GVA (including oil and gas), and

Aberdeenshire with 25%. This highlights a strong concentration of marine sectors in the North East region, benefitting from oil and gas services, fishing and fish processing industries (Scottish Government, 2018).

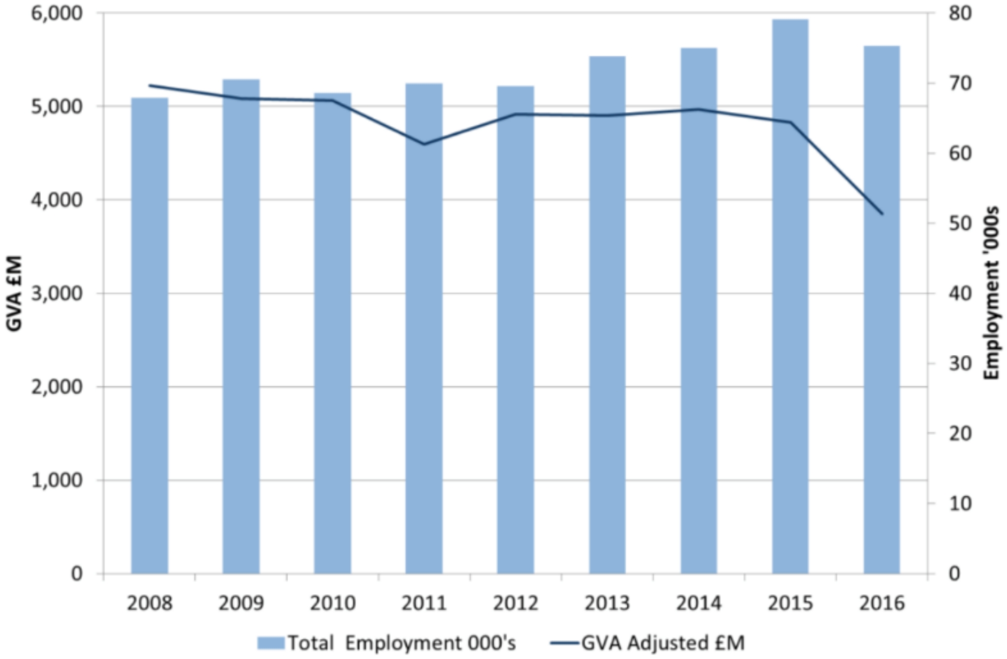
Figure 37 - Distribution of GVA, turnover and employment across sectors in 2016 (Scottish Government, 2018)



Monitoring change as a result of the NMP is challenging based on the timeseries available (2008 to 2016) and the adoption of the NMP (in 2015) and subsequent implementation, from 2015 onwards.

Total marine sector statistics indicate that GVA fell by 20% from 2015 (£4,83 billion) to 2016 (£3,85 billion), and employment across the same period fell by 5%. The longer-term trend from 2008 to 2016 indicates an overall decrease in GVA by 26% and overall increase in employment by 11% (Figure 38).

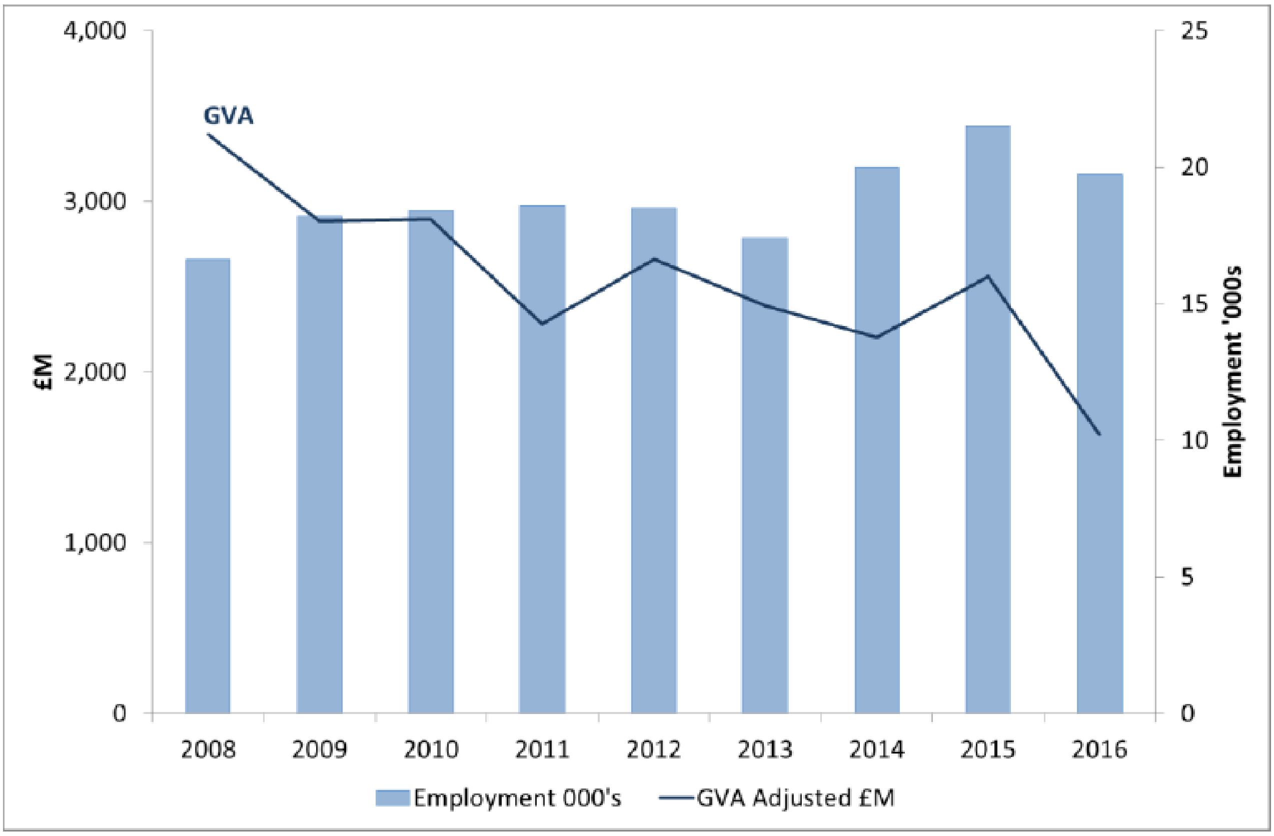
Figure 38 - Marine sector GVA and employment, 2008 to 2016 (adjusted to 2016 prices) (Scottish Government, 2018)



4.5.4.3 Oil and gas support activities

Oil and gas support activities are the largest contributors of turnover and GVA to the Scottish marine economy. In 2016 oil and gas services generated £1.6 billion GVA accounting for 1.24 % of the overall Scottish economy, and 42 % of the marine economy. In terms of employment, oil and gas services provided employment for a headcount of 19,700 people, contributing 0.8 % to total Scottish employment, and 26 % of the marine economy employment. Between 2008 and 2016 oil and gas services GVA (adjusted to 2016 prices) halved while employment increased by almost 20%. Between 2015 and 2016 turnover and GVA dropped by a third.

Figure 39 - Oil and gas services – GVA and employment, Scotland, 2008 to 2016 (2016 prices) (Scottish Government, 2018)

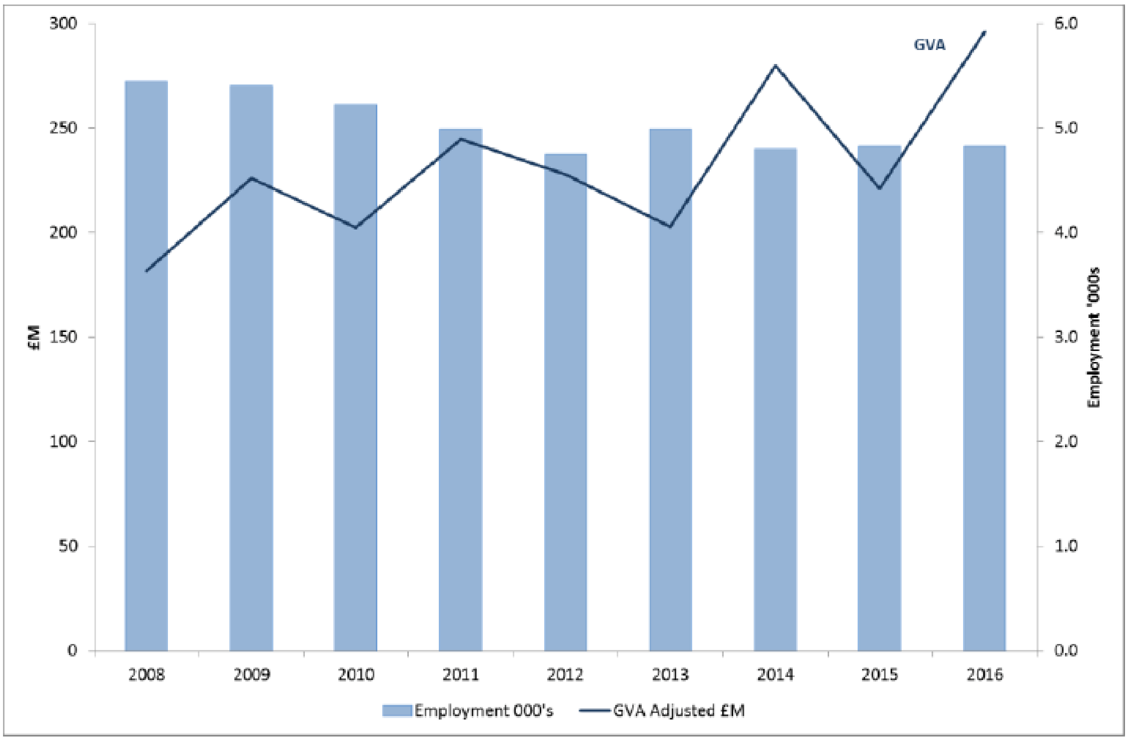


4.5.4.4 Commercial fisheries

The economic contribution of the fishing sector has been estimated using Marine Scotland Sea Fisheries Statistics and Seafish Industry Authority Fleet Economic Survey published statistics for 2016.

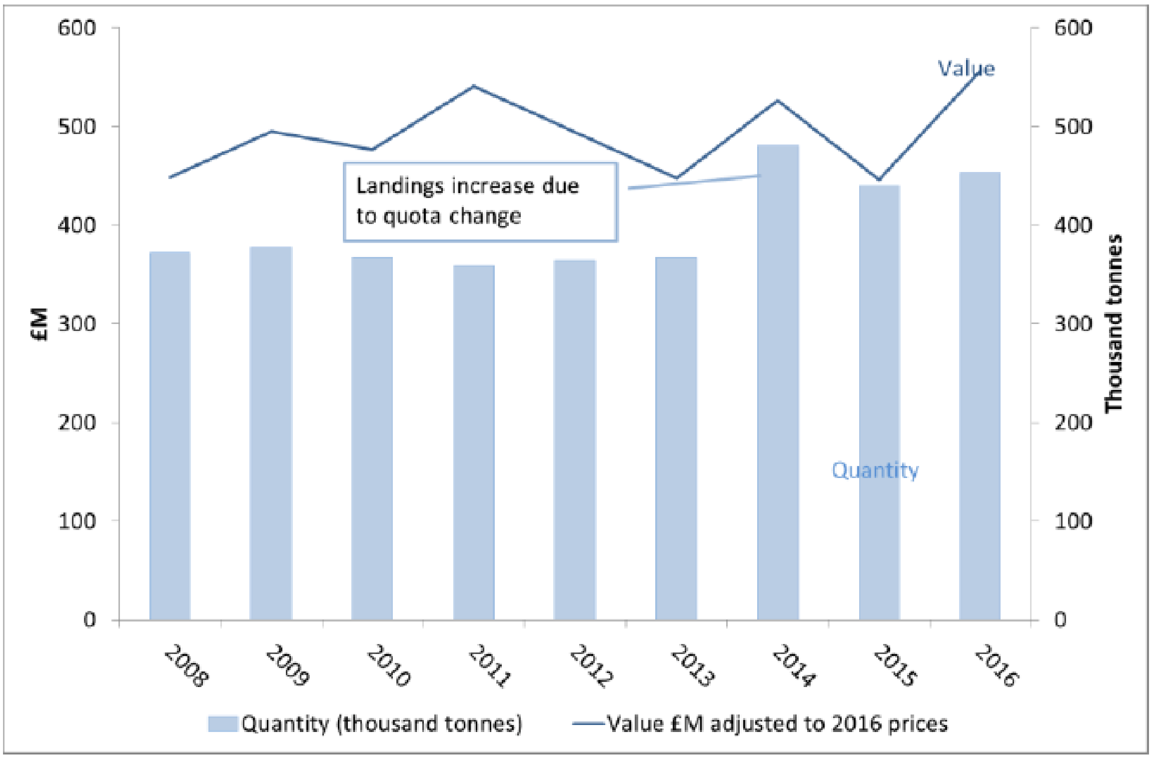
In 2016, fishing generated £296 million GVA, accounting for 0.2 % of the overall Scottish economy, and eight per cent of the marine economy. In terms of employment, fishing provided employment for a headcount of 4,800 people, contributing 0.2 % to total Scottish employment, and 6 % of the marine economy employment. From 2015 to 2016 the GVA from fishing (adjusted to 2016 prices) increased by 34%, while the longer-term trend from 2008 to 2016 showed that fishing GVA increased by 63%. Over the same period, employment fell by 11%, though it has been stable in recent years. The GVA per worker (adjusted to 2016 prices) has increased from £33,000 in 2008 to £61,000 in 2016. Most recent figures show an increase of 34% in GVA per worker between 2015 and 2016.

Figure 40 - Fishing - GVA and employment, Scotland, 2008 to 2016 (Scottish Government, 2018)



The economic performance of the fishing sector is dependent on the amount of fish landed and the value of the landings.

Figure 41 - Fishing - quantity and value of all landings by Scottish vessels, 2008-2016 (Scottish Government, 2018)



Local authorities with the highest fishing GVA in 2016 were Aberdeenshire, Shetland Islands and Highland. Employment on Scottish registered vessels is regularly reported in the Marine Scotland Scottish Sea Fisheries Statistics. The employment figures are currently reported by regions, which are broadly local authority areas, with the island local authorities combined. With 1,207 fishers, Aberdeenshire has the largest number of people employed in sea fishing in Scotland and accounted for 25 % of the total number of fishers on Scottish vessels in 2016. The Islands group accounted for 22% of the employment.

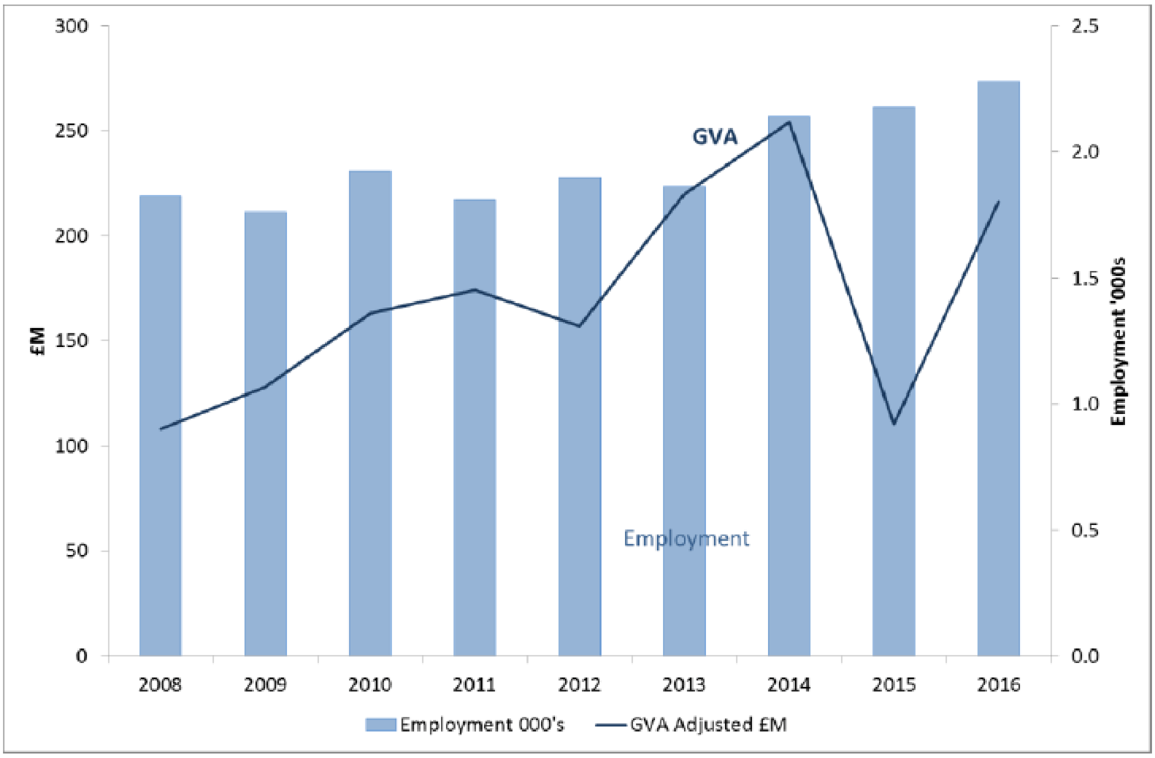
4.5.4.5 Aquaculture

The economic contribution of aquaculture has been estimated using two main data sources, Marine Scotland Aquaculture survey statistics for 2016 and economic data collected to meet EU Data Collection Framework requirements. The aquaculture survey statistics provide production and employment data, while data collected for DCF provides financial data from a sample survey.

In 2016 aquaculture generated £216 million in GVA, accounting for 0.16% of the overall Scottish economy, and 6 % of the marine economy. In terms of employment, aquaculture provided employment for a headcount of 2,300 people, contributing 0.09 % to total Scottish employment, and 3% of the marine economy employment.

Between 2008 and 2016 aquaculture GVA (adjusted to 2016 prices) doubled while employment increased by 25%. In 2015 GVA was at its lowest since 2008, which was due to a combination of lower turnover and higher costs as a result of disease challenges. Between 2015 and 2016, although production volume decreased, farmed fish prices rose with the result that GVA for 2016 almost doubled from £110 million in 2015 to £216 million in 2016.

Figure 42 - Aquaculture - GVA and employment, Scotland, 2012 to 2016 (Scottish Government, 2018)



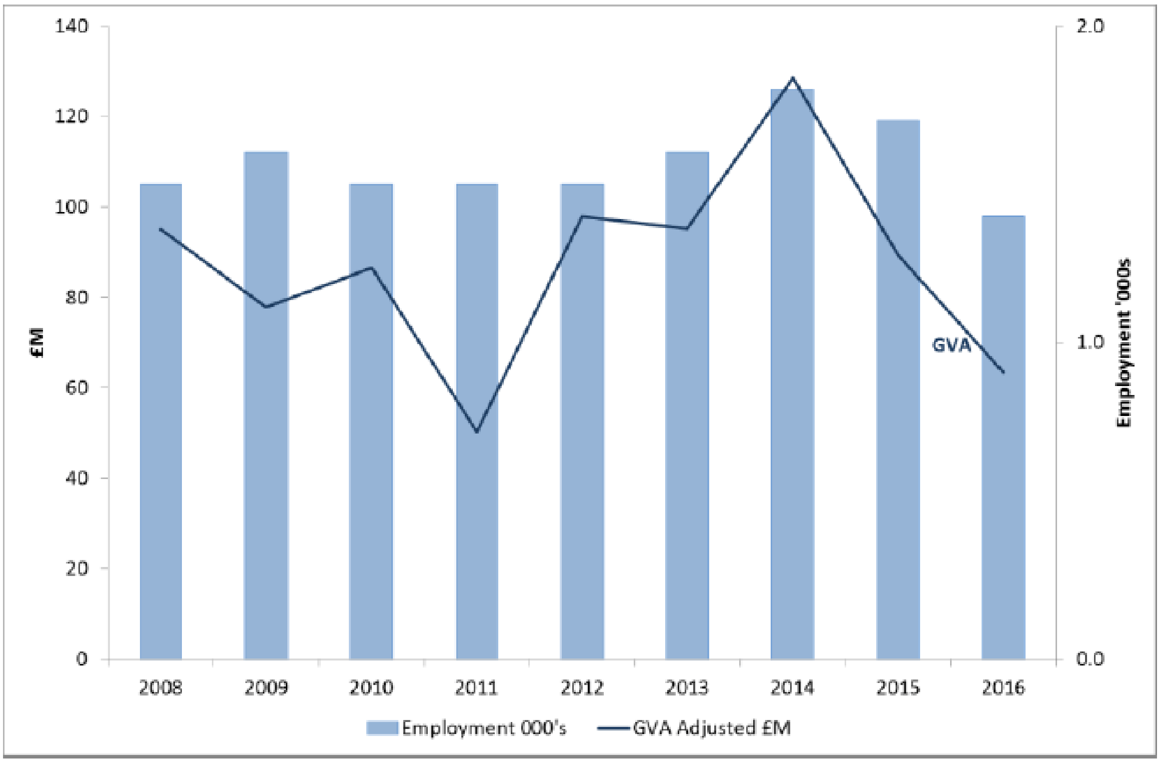
Atlantic salmon production accounts for 95% of all aquaculture. Around 28% of salmon production occurs on the North coast (Marine regions, West Highlands, Moray Firth & North Coast), one fifth occurs in both the Outer Hebrides and Argyll and Clyde with a little under 10% produced in the Orkney Isles. Mussels are mostly grown in the Shetland Isles, which accounts for three quarters of all production. Oyster production accounts for around 1% of all aquaculture value and is largely split between the North Coast group and Argyll and Clyde (around a third of total production in each).

4.5.4.6 Ships, Ports, Harbours and Ferries

This sector includes passenger and freight transport. Sea and coastal water transport is an essential part of Scotland's transport network. It is key for connectivity and supporting both island and mainland communities. One quarter of Scotland's total freight tonnage, including exports, was carried by water transport in 2016.

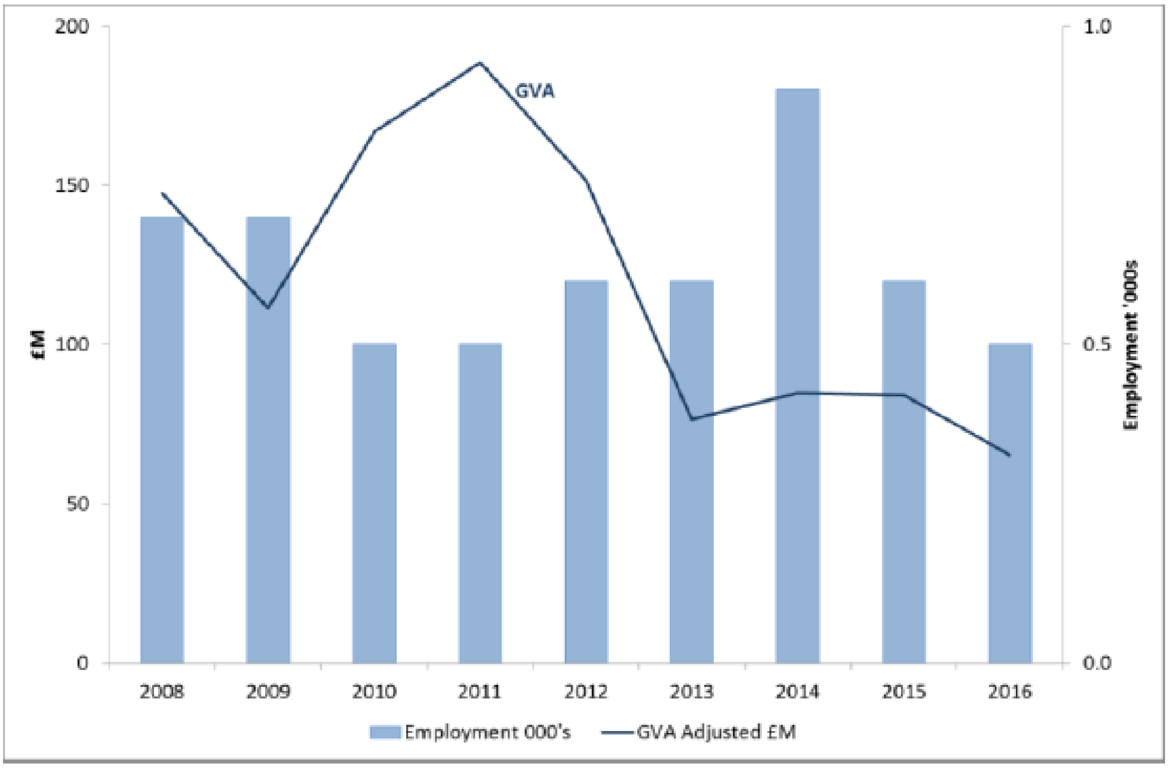
In 2016, water passenger transport generated £63 million GVA, accounting for 0.05% of the overall Scottish economy, and 1.6% of the marine economy GVA. In terms of employment, water passenger transport provided employment for 1,400 workers, again contributing 0.05% to total Scottish employment, and 3% of the marine economy employment. Between 2015 and 2016 passenger transport GVA fell by 29% and employment fell by 18%. In the longer-term trend, passenger transport GVA (adjusted to 2016 prices) fluctuated between 2008 and 2016, with 2016 values being the second lowest in the series. GVA is down by one third and employment by 7%. Transport Scotland statistics show that, the number of passengers in 2008 was very similar to 2016, while the number of vehicles increased by 10%.

Figure 43 - Passenger water transport – GVA and employment (headcount), 2008 to 2016 (2016 prices) (Scottish Government, 2018)



In 2016 freight water transport generated £65 million GVA, accounting for 0.05 % of the overall Scottish economy, and 1.7 % of the marine economy. In terms of employment, water freight transport provided employment for 500 workers, contributing 0.02 % to total Scottish employment, and 0.7 % of the marine economy employment. From 2015 to 2016 water freight transport GVA (adjusted to 2016 prices) fell by almost a quarter (23%) and employment fell by 17%. GVA reached a peak of £189 million in 2011, but between 2008 and 2016 GVA fell by over a half (56%) and employment fell by 29%.

Figure 44 - Freight water transport - GVA and employment (headcount), 2008 to 2016 (2016 prices) (Scottish Government, 2018)



Transport Scotland's statistics indicate that there were 67 million tonnes of freight handled by ports in Scotland in 2016. However, between 2008 and 2016 the total tonnage of freight traffic through Scottish ports reduced by 31%.

The highest freight traffic in 2016 was through Forth ports (27 million tonnes), Clyde ports (9 million tonnes) and Sullom Voe (Shetland Isles) ports (6 million tonnes).

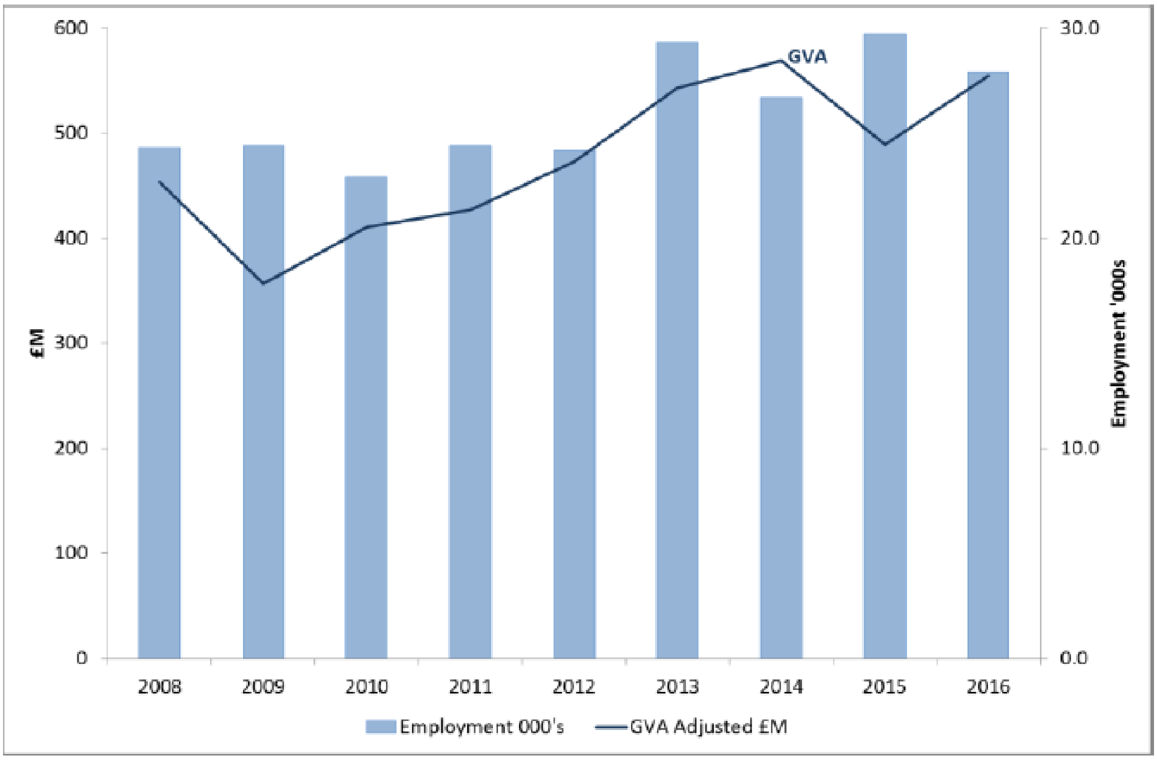
4.5.4.7 Recreation and Tourism

In 2017, Marine Scotland developed the methodology for estimating marine tourism and recreation, as distinct from all tourism. All tourism businesses located in postcodes within 100 metres of the coastline were assumed to be engaging in marine tourism and recreation or dependent on the marine environment. While this may include some businesses that are not marine-related, and not include some that are marine-related, it provides a reasonable and replicable method of estimating marine tourism and recreation businesses with existing data.

In 2016 marine tourism generated £554 million GVA, accounting for 0.4 % of the overall Scottish economy, and 14 % of the marine economy. In terms of employment, marine tourism provided employment for 27,900 workers, contributing 1.1 % to total Scottish employment, the biggest marine economy employer accounting for 37 % of the marine economy employment. Scottish tourism as a whole was estimated as producing £3.9 billion GVA in 2016. Thus, marine tourism is estimated to account for around 14% of all Scottish tourism.

While the marine tourism methodology was developed in 2017, figures have been estimated retrospectively, showing that, between 2008 and 2016 marine tourism GVA (adjusted to 2016 prices) increased by 22% and employment increased by 15%. The latest figures show a 13% increase in marine tourism GVA between 2015 and 2016, though employment dropped by 6% in that time.

Figure 45 - Marine tourism - GVA and employment (headcount), 2008 to 2016 (2016 prices) (Scottish Government, 2018)



Employment in Marine tourism and recreation contributes strongly to employment in the marine economy in Scotland, though GVA is a smaller proportion of Scotland's marine economy GVA, possibly reflecting the seasonal nature of tourism and recreation and the part time nature of employment.

The Forth and Tay region contributed the largest marine tourism GVA in 2016, while the Clyde region contributed higher turnover and employment.

4.5.4.8 Other sectors

The Scottish Government 2018 Marine Economic Statistics report does not report on the contribution of other sectors identified in the NMP to the marine economy because figures were not readily available. The estimates presented below within this case study may therefore provide a lower bound of the economic value of Scotland's marine sector. Where available, additional data sources have been analysed to provide an indication of the economic activity associated with these other sectors and the outcome of this is described under the sub-headings below.

Seafood processing

Whilst the NMP does not explicitly capture seafood processing, the Scottish Government 2018 Marine Economic Statistics report does provide information on this sector. While fish processing is predominantly a terrestrial activity, the bulk of processing in Scotland is highly dependent on fish landed/farmed in Scottish waters. Therefore, in terms of economic statistics, fish processing can be considered part of the marine economy. In 2016 seafood processing generated £391 million GVA, accounting for 0.3% of the overall Scottish economy, and 10 % of the marine economy. In terms of employment, fish processing provided employment for 7,600 workers, again contributing 0.3% to total Scottish employment, and 10% of the marine economy employment. With some variation from year to year, employment in seafood processing in Scotland has changed little over the period from 2008 to 2015. GVA reached a record value in 2014, but fell to a second lowest value in 2015 before recovering in 2016. As of September 2018, there were 284 registered fish processing plants in Scotland. The three local authorities with the highest number of plants were Aberdeenshire (52), Highland (43) and Aberdeen City (38).

Wild salmon and diadromous fish

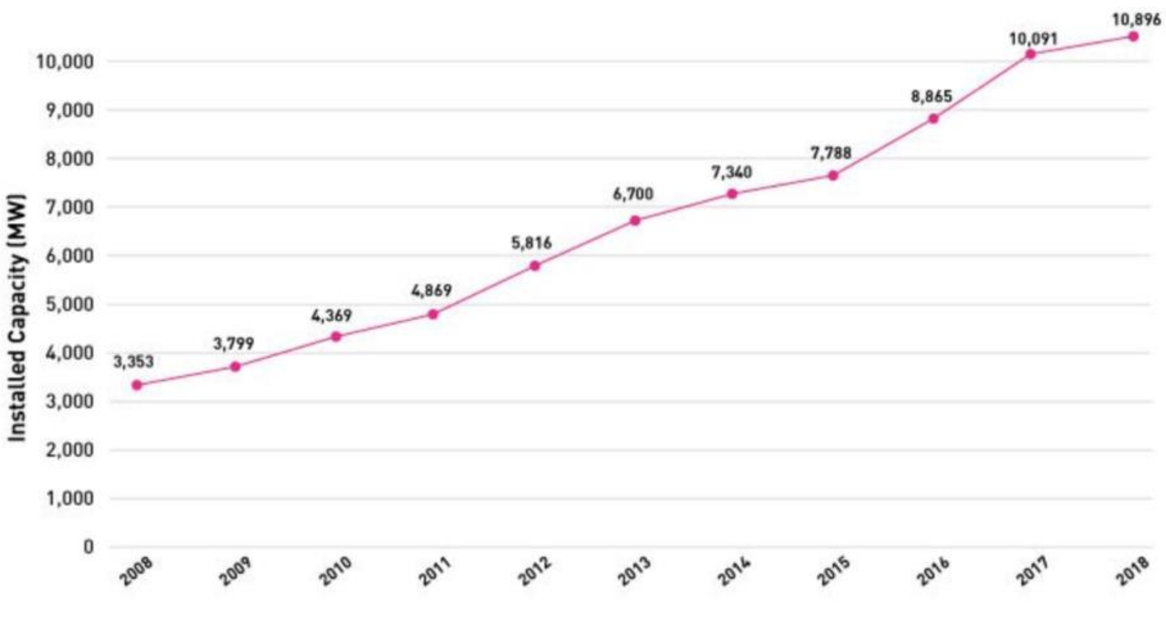
Coastal netting of sea salmon and trout are not currently included within the Marine Economic Statistics report, but it notes that direct GVA from angling and netting was estimated to be £25.9m in 2014. Only netting would be relevant to these economic statistics. However, costal net fisheries of salmon and trout are currently closed and are likely to remain so for the foreseeable future to allow stocks to recover.

Offshore Wind and Marine Renewable Energy

The UK currently leads with the largest amount of installed offshore wind capacity in Europe, representing just over 40% of all installations (Kafas, 2017). The Scottish Government's proposed key energy target is that half of Scotland's heat, transport and electricity energy needs are met by renewables by 2030.

Scotland's renewable electricity capacity has shown steady growth over the last few years with the average annual capacity increase over 750MW since the end of 2008, although this includes all renewable energy sources, where onshore and hydro dominate in Scotland.

Figure 46 - Total Installed Capacity of Renewable Electricity in Scotland 2008-2018 (Scottish Renewables, 2019)



N.B.: The figure includes all onshore and offshore renewable energy sources, which are dominated by hydro-power and onshore wind.

In 2018, Scottish offshore wind energy had an installed capacity of 623 MW. There is significant additional capacity in development across Scotland, with projects either in planning or already consented; offshore wind has 3.9GW already consented and 1.2GW in planning (as of 2018 figures). When operational, the 3.9GW offshore wind projects will represent a growth of 726% in installed capacity.

The Office of National Statistics (ONS) publish an annual survey on the low carbon and renewable energy economy in the UK, including direct and indirect activity, employees and turnover. The survey found that in 2017, there were 17,700 FTE employees in renewable energy in Scotland, 3,400 of which are within the offshore sector (Scottish Renewables, 2019).

Other

Other marine sectors included within Scotland's NMP, but for which statistical data has been unavailable include,

- Carbon Capture and Storage;
- Submarine Cables;
- Defence; and
- Aggregates.

4.5.5 Stakeholders interviewed

Sector	Organisation	Type
Government	Marine Scotland	Authority in charge of MSP
	Crown Estate Scotland	Manages seabed out to 12 nautical miles and gives occupation rights
	Shetland Council	Authority in charge of MSP
Aquaculture	Scottish Salmon Producers Organisation	Producers' organisation
Fisheries	Scottish White Fish Producers Association	Producers' organisation
	Scottish Fisherman Federation	Industry association
Shipping	British Ports	Ports' association
	Forth Ports	Port operators
	CalMac	Shipwoner
	Northlink	Shipowner
Coastal tourism	Visit Scotland	Public body
	Scottish tourism alliance	Industry association
Extraction of oil and gas	UK Oil and Gas	Industry
Renewable energy	Scottish Renewables	Industry association
	EMEC	Energy Centre
	EDF	Industrt
	Marine Scotland	Public body

In total seven interviews were completed with representation from the following sectors, fisheries, aquaculture, governance, ports, marine tourism and renewable energy.

The response rate reflects the timing of the study, with many relevant individuals on summer leave. Notably, stakeholders from the oil and gas industry and maritime transport were not available to respond.

Some respondents requested remote completion of the interview template, two of which remained outstanding at the time of writing. Marine Scotland requested additional time to complete the questionnaire to ensure appropriate input from individuals across various departments. Again, this was not received by the time of writing, however, the 2018 Scottish Government review of the NMP provides useful insight on the Marine Scotland position on progress and direction of Scotland's marine spatial plan.

4.5.6 Summary and main findings from interviews

Stakeholders' responses on the overall positive effects of Scotland's NMP is depicted in Table 67 and discussed further below.

Table 67 – Overview of MSP benefits according to stakeholders in Scotland

Sector	Positive effects	Reduction of conflicts	Cross-border relations	Access to information	Transaction costs	Investment and business expectations
Aquaculture	+1	1	0	+1	0	+1
Fisheries	-2	-2	-1	+1	-2	1
Shipping	0	0	0	+2	-2	-1
Coastal tourism	+2	0	0	+2	+2	+2
Renewable energy	+2	+1	+1	+2	+1	+2

The majority (73%) of respondents agreed that Scotland's NMP has had an overall positive effect; this was true for across all sectors except fisheries.
The respondents recognised the importance of Scotland's NMP as being the first plan to bring Scotland's marine sectors to the forefront, highlighting the diverse range of current and potential maritime industries within Scotland.

Stakeholders consider it a high level, strategic plan, providing guidance at a political level, but note that for most sectors real-time effects have not yet manifested. It is expected that the Regional Marine Plans (currently implemented for Shetland, in draft / consultation phase for Clyde and to be developed for all other regions) will provide more guidance and influence for local marine spatial planning and decision making.

While fisheries stakeholders consider the NMP a useful reference document, especially when communicating with other maritime industries, they were the only sector that considered no overall positive effect of the NMP. Fisheries stakeholders highlighted that transparency around decision making could be improved, including justification cross-referenced against specific NMP commitments and policies. For example, the NMP recognises the fishing industry as "very important", but does not commit to how access for the industry will be safeguarded. The perception from the fishing industry is that other sectors are favoured over fishing.

The Scottish marine tourism sector is fully supportive of the plan, highlighting that it upholds free and unencumbered access for recreation, leisure and tourism activity in the marine environment, including within marine protected areas (MPAs).

For emerging industries, the NMP is thought to have facilitated sector growth, specifically for marine renewables, as well as providing support to future development, such as seaweed harvesting.

Most stakeholders cited the importance of the NMP in providing a framework for discussions between sectors and acting as a good reference for management and development of Scotland's marine sector.

Stakeholders provided a range of examples to highlight the environmental, economic and social consequences brought about by the NMP.

The NMP has been most beneficial to marine renewables, an industry that has emerged and grown in parallel with marine spatial planning implementation in Scotland e.g. the Orkney renewables developments. Such sectors have been driven by the ambitions of the NMP. For marine industries that have been well-developed pre-NMP, including aquaculture, oil and gas and maritime transport, there are less examples of the direct influence of the NMP. However, it is considered that the NMP has led to more informed decision making and better quality submissions for consents/licenses/permission, especially for larger scale developments.

The tourism sector credits the effect marine planning has on encouraging integration with terrestrial planning policy, facilitating better understanding of site-specific and sector-specific development requirements on both sides of the high water mark. "*Every offshore activity has an onshore infrastructure requirement and the relationship between these and the communities they support is a fundamental tenet of the marine plan. This applies to commercial activity (shipping, passenger services, fisheries, aquaculture, mineral extraction, renewable energy) and tourism, recreation and leisure activity (boating, paddlesports, swimming, scuba, coastal walks) and makes it easier to reach a balance between conservation imperatives and economic growth.*"

For the offshore wind industry the Blue Seas, Green Energy (2010) plan has been considered fundamental to the establishment and growth of the sector. Clear principles around acceptable development have shaped the location and type of projects developed. For example, the plan stipulated how far turbines could be situated from the coast – providing a strategic view on proximity to the coast. Due to this, some projects dropped out of the leasing rounds process, including Robin Rigg and Wigtown Bay extensions, thereby avoiding the significant costs of environmental impact assessments and ground investigation surveys for projects that would not ultimately gain consent.

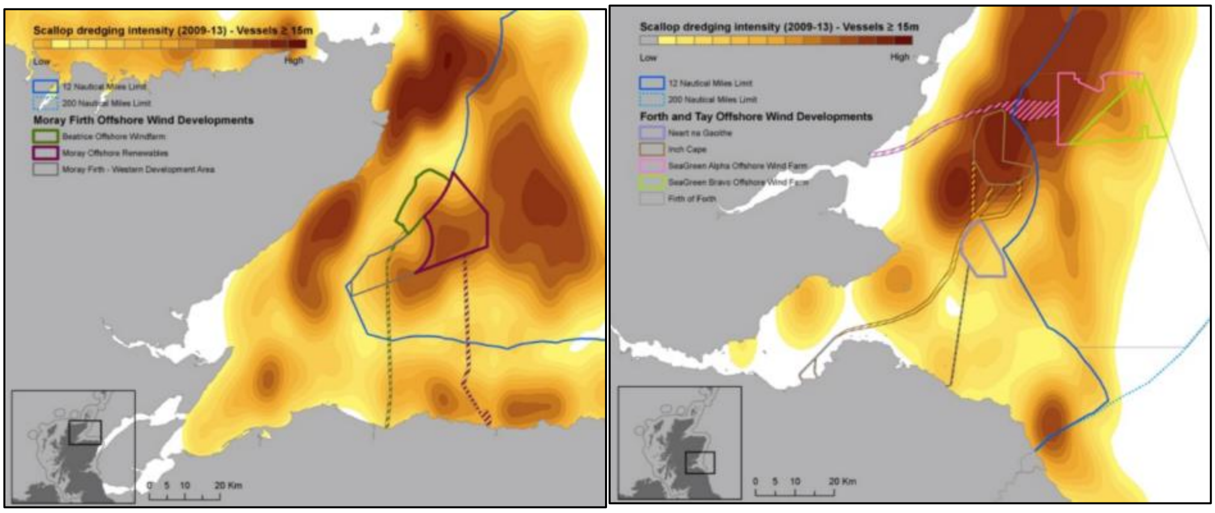
The marine plan for Scottish renewable energy sector is currently being reviewed and updated by Marine Scotland, in consultation with the renewables industry. An updated sector plan is expected in October/November 2019. Critically, this involves comprehensive assessment of the ecological headroom available for specific sensitive species based on the cumulative impact of all UK offshore wind farms.

While Scotland is recognised as one of the largest fishing nations in Europe, when it comes to marine planning the Scottish commercial fisheries sector often feels overlooked, with multiple exclusions from established grounds as new developments progress and management due to environmental designations is implemented.

For example, it was perceived by the fishing industry that for the North Arran Marine Protected Area, which is protected for maerl beds, seagrass beds and ocean quahog aggregations, NGOs lobbied Scottish Government to implement measures more stringent that those recommended by the UK and Scottish environment agencies. This ultimately led to the area's closure to mobile gear, which directly affected a number of fishermen.

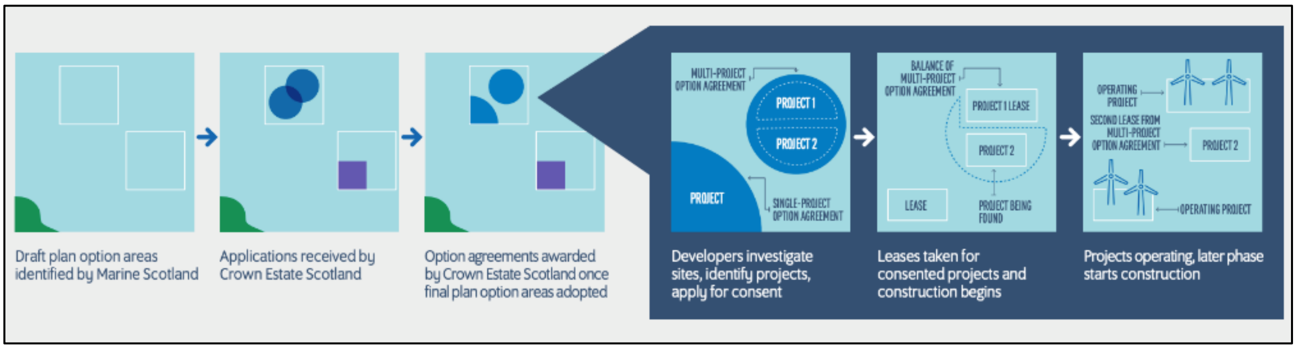
Mapping projects, including NMPi and ScotMap, have illustrated key fishing grounds targeted for a range of species throughout Scottish waters, the fishing industry consistently cite loss of grounds to other maritime sector developments. This includes infrastructure developments, such as the consented Beatrice Offshore Wind Farm, which is located across important scallop grounds in the Moray Firth; as depicted in Figure 47. The fisheries industry often feel their voice is not heard over larger industry and / or environmental NGO's. One commercial fisheries representative stated that, *"As long as the government stays with the view that fisheries do not need their own areas, fishing grounds will continue to be lost as other sectors look to expand."*

Figure 47 - East coast offshore wind developments overlaid with amalgamated fishing activity over the last five years of available data (2009-2013) for scallop dredging in the Moray Firth (left) and Forth & Tay (right) regions (Kafas, 2017)



The renewables industry are somewhat limited to explore development within specified areas defined within leasing rounds. Sites are developed within option areas identified by Marine Scotland, as annotated in Figure 48.

Figure 48 - Leasing in context of offshore wind project development process (Crown Estate Scotland, 2018)



A case study investigating Multi-Use in European Seas (MUSES) focused on commercial fisheries and offshore wind farm development on the east coast of Scotland (Kafas, 2017). It found enhanced multi-use of marine space to bring great potential for improved value for society and local economy, such as longevity of the fishing industry. Opportunity was also noted for combining offshore wind farms with other activities, such as offshore storage, enhanced oil recovery, desalination, wave energy and low-maintenance aquaculture. Specific to offshore wind and commercial fisheries, multi-use recommendations on marine planning included (Kafas, 2017).

- Consideration of multi-use opportunity mapping, as opposed to constraints mapping
- Stronger coexistence policies with explicit reference to multi-use
- Development of good practice guidance on how to construct a wind farm to make it fishing-friendly.

Under half (43%) of respondents consider the NMP to reduce conflicts across sectors. Two respondents considered that there are no conflicts based on most activities being mobile or time focused, but did consider the NMP to provide a platform for conflict resolution, should they arise.

Similarly, other respondents cited the importance of the NMP in providing a forum and framework to discuss and address conflicts on competition for space. It has made marine sectors more aware of each other, they are readier to engage, cooperate and coexist in the marine environment.

The fisheries sector strongly disagreed that the NMP has reduced conflicts, despite the commitments made for fisheries within the plan. The fisheries respondents highlighted that the Scottish Government supports aquaculture and renewable energy industry targets for growth, and that to-date very little consideration has been given to fisheries in decision making around fish farming and offshore wind farms, for example, "*For the six wind farms licensed in Scotland, two are located directly over prime scallop grounds, in the Moray Firth and Forth and Tay.*"

While other sectors consider that requirements, including conditions of consent, are becoming more stringent to ensure commercial fisheries interested are effectively mitigated, including consultation, mitigation and monitoring with an emphasis on co-existence.

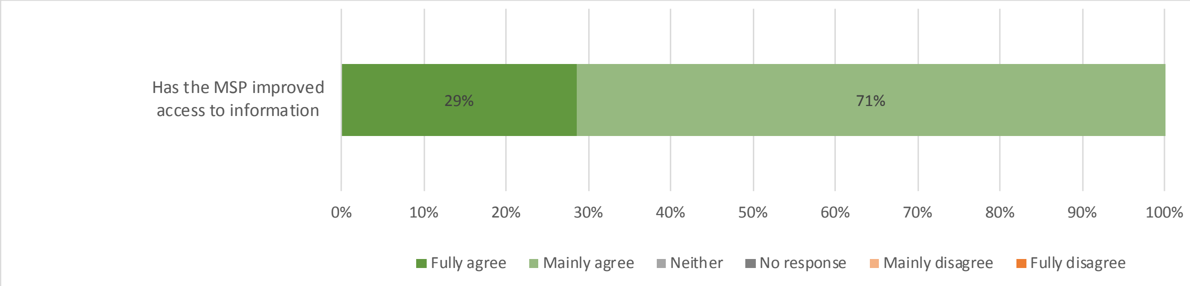
Ansong et al (2018) considered the cross-border issues of offshore renewable energy and other sectors, specifically shipping and navigation in the Celtic Seas. Ansong et al highlighted the importance of mechanisms for formal communication between MSP competent authorities and sectoral groups and also cross-sectoral engagement. MSP offers the opportunity to engage with stakeholders, whilst considering other maritime uses and interests such as shipping, fishing and offshore renewable energy in the allocation of space.

Complexity of cross-border marine spatial planning is comprehensively documented by Baruah et al (2017) for the Solway Firth. This transboundary estuary is subject to two distinct marine planning jurisdictions (Marine Scotland and MMO), with marine plans being developed on each side, but on different time scales. The Scottish National Marine Plan provides a framework for marine planning but it is unknown when the Scottish Solway Marine Region Plan will be developed; the English Solway is therefore receiving greater attention to detail through development of the North West Marine Plans (Baruah et al, 2017), which are scheduled for adoption in 2021.

Communication across cross-border regulators, planners and stakeholders is crucial to the successful development and implementation of marine spatial planning to support specific legislative requirements on each side of the border. In the Solway Firth, this is facilitated through the cross-border Solway Firth Partnership (SFP), which is a trusted point of contact on both English and Scottish sides.

Stakeholders' response on the improved access to information is depicted in Figure 49.

Figure 49 - Stakeholder response to interview questions on improved information (based on seven interviews)

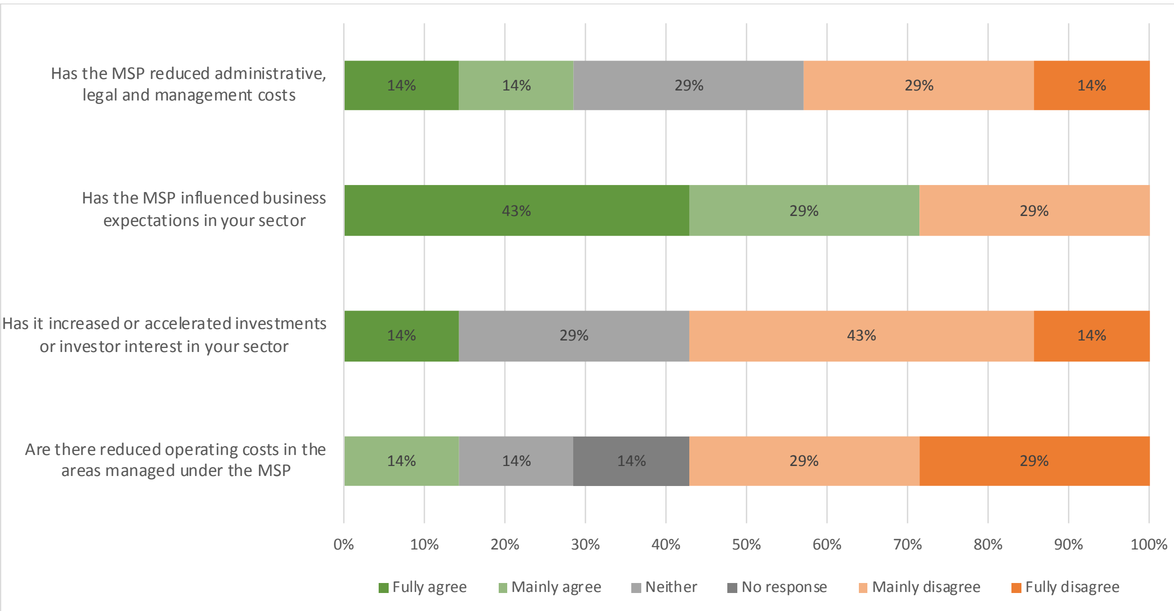


The information resource provided through the NMPi online portal has been consistently cited as a key benefit of the NMP, bringing data together in one, fully accessible resource. It is recognised that the Scottish Government has made information accessibility a priority, with regular updates to the fully accessible NMPi geographic database.

The NMPi provides a common approach to acquisition and dissemination of data in a consistent format, and facilitates regular (annual) updates when data becomes available. The NMPi has improved data provision and assisted in meeting sectoral and societal demands for knowledge and transparency, Furthermore, it has reduced duplication of effort, therefore improving overall efficiency and information exchange. It supports information sharing, exchange and examination and has driven expectations on what information should be examined, presented and shared with stakeholders and the public.

Stakeholders' response on the reduction of overall costs, business expectations and investment brought about by the NMP is depicted in Figure 50 and discussed further below.

Figure 50 - Stakeholder response to interview questions on the reduction of overall costs, business expectations and investment (based on seven interviews)



Administrative costs. Only the tourism and renewable sectors agreed that the NMP has reduced administrative, legal and management costs. For offshore wind, costs have been reduced by ensuring appropriate focus on consentable projects. The Scottish Government's strategic environmental assessment, NMP and renewables sector plan (Blue Seas, Green Energy) resulted in specific sites being identified by the Government for developers to bid for the right to develop an application for consent to build a wind farm. In comparison, in England, the onus was on the industry to undertake strategic appraisals and site selection.

Business expectations. The majority of respondents (73%) agreed that the NMP has influenced business expectations. The NMP and Marine Scotland Policy has facilitated open dialogue with industry regarding different constraints, allowing industry to tailor expectations accordingly. The NMP has provided an open forum for discussing constraints and priorities as a whole.

The NMP has driven focus to sustainable development and heightened ambitions of the different marine sectors, including becoming more profitable. It has highlighted business and community opportunities in Scotland, providing positive expectations, especially for the marine renewable and salmon farm sectors.

The fisheries sector agree that the NMP has influenced business expectations, but this influence is towards a decline, rather than growth. "*More than ever people are very negative about the future of the fishing industry*."

Furthermore, it is considered that inshore fishermen are increasingly loosing access to traditional grounds, leading to more uncertainty and limited investment in this sector.

Investments. Just over half of respondents (57%) disagreed that the NMP has led to increased investments or investor interest in marine sectors. Investor appetite is different to ambition, for example the ambition of shellfish industry is good, but investors are currently more likely to favour salmon farm investment as it is more profitable; this is not driven by the NMP, but the financial portfolio of individual businesses.

Other government policies were considered to have more influence on investments, such as the commitment to deliver 30 GW of installed capacity from offshore wind by 2030.

The only sector to fully agree that the NMP has increased investment was marine tourism, citing a number of public and private investments for the next decade, based on the appeal of the sea and the coastline, but fully respectful of the need to maintain high levels of environmental quality.

Operating costs. Just over half of respondents (58%) disagreed that the NMP has led to a reduction in operating costs, with two considering it actually increased costs due to the additional data needs to inform consenting applications and higher costs due to NMP commitments to other sectors. One respondent cited lower costs due to clusters of supply chain providers resulting in improved cost efficient.

Fees. no fees, royalties or licences are paid specifically related to the NMP for sectors to carry out their activities. Developers do pay licences and fees under existing legislation, not linked to the NMP. The NMP itself has very little impact on the daily operations of businesses, it is more linked to the policy side of marine sector development. This may change with the development of regional marine plans.

The Scottish stakeholders were asked how the NMP has effected the value of production in their sector. All sectors interviewed, except renewables, attributed either zero or less than 25% change in production value due to the NMP.

The timeline of available economic data (2009 to 2016) and introduction of the NMP in 2015 was noted, which makes attribution of change resulting from the NMP not possible. Stakeholders consider that even now, in 2019, it is too early to tell if the plans and positions within the NMP have influenced the growth in marine sectors. Currently, no direct impact can be seen to link production or growth with the NMP for most sectors.

Commercial fisheries stakeholders consider very little positive effect of the NMP on the fishing industry with other sectors expanding at rapid speed. Furthermore, it would be extremely difficult to attribute change given the range of factors that affect commercial fisheries production value year to year, including stock status, quota allocation, trading prices for quota allocations, fisheries restrictions, and product value.

For renewable energy, the NMP has had more positive effects, with this sector attributing greater than 75% of growth to marine spatial planning and the Blue Seas, Green Energy sector plan. These plans have dictated where development could occur and where not, via strategic assessment and leasing rounds.

4.5.7 Final economic effects

The Scottish stakeholders were asked how the NMP has affected the value of production in their sector. All sectors interviewed, except renewables, attributed either zero or less than 25% change in production value due to the NMP. Specifically, stakeholders representing commercial fisheries and aquaculture sectors, indicated a range of 0-25% change in production as a result of the NMP, while those representing renewables sector attributed greater than 75% growth as a result of the NMP. All other sectors either did not provide a response or considered no direct impact linking production or growth with the NMP.

The timeline of available economic data (2009 to 2016) and introduction of the NMP in 2015 was noted, which makes attribution of change resulting from the NMP challenging. Stakeholders consider that even now, in 2019, it is too early to tell if the plans and positions within the NMP have influenced the growth in marine sectors.

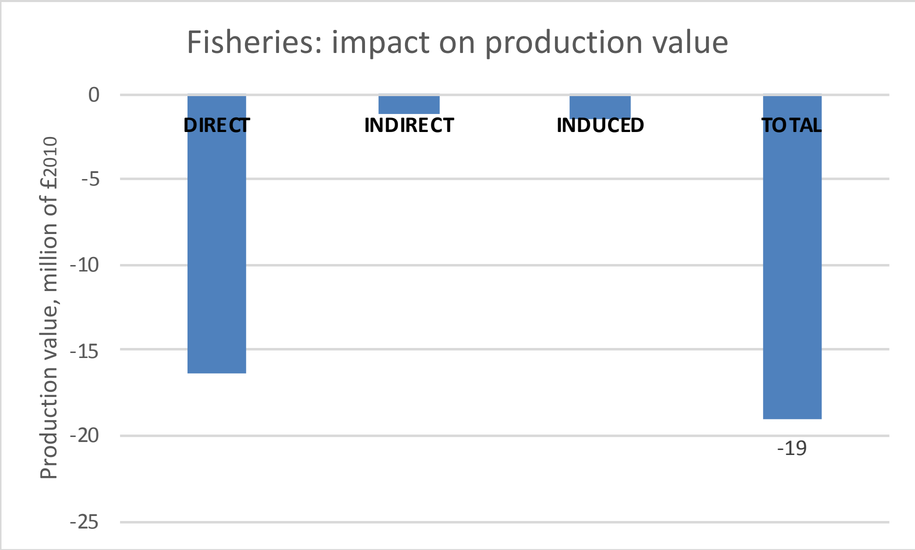
Further details of the economic assessment completed for fisheries, aquaculture and renewables is provided below.

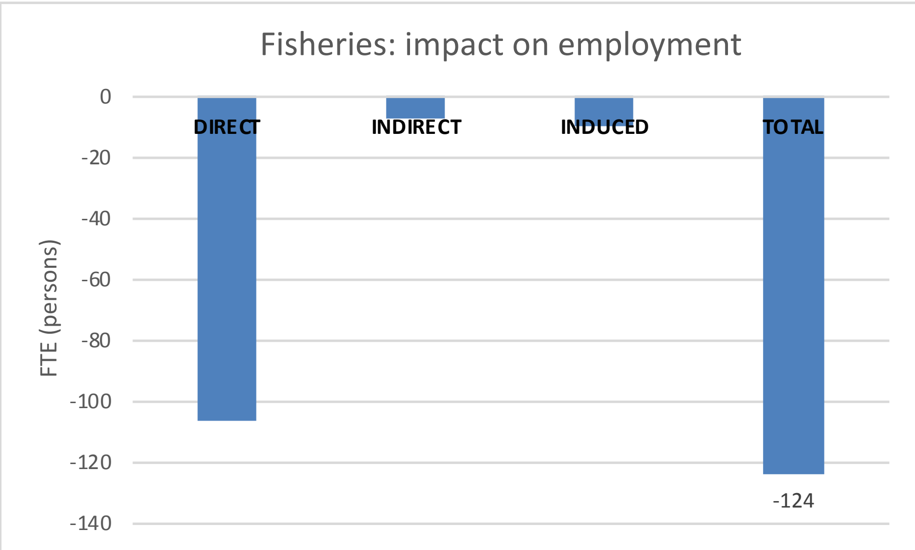
4.5.7.1 Fisheries

Commercial fisheries stakeholders consider very little positive effect of the NMP on the fishing industry how cited the rapid expansion of other sectors resulting in reduction is access to fishing grounds around Scotland. The dynamic nature of fisheries is also well understood, which makes attribution of change difficult given the range of factors that affect commercial fisheries production value year to year, including: stock status, quota allocation, trading prices for quota allocations, fisheries restrictions, and product value. In spite of this complexity, economic calculations have been made to explore the direct, indirect and induced impacts of the NMP on this industry (Figure 51).

Overall, in 2016, the impact of a medium scenario of 12.5% change resulting from the introduction of NMP, has been found to result in an overall reduction in fisheries production of -£19 million, with the majority from a direct impact (86%). In relation to employment, this has resulted in a loss of -124 FTE individuals.

Figure 51 - Fisheries: impact on production value and employment based on medium impact scenario of 12.5% change from NMP, based on 2016 values



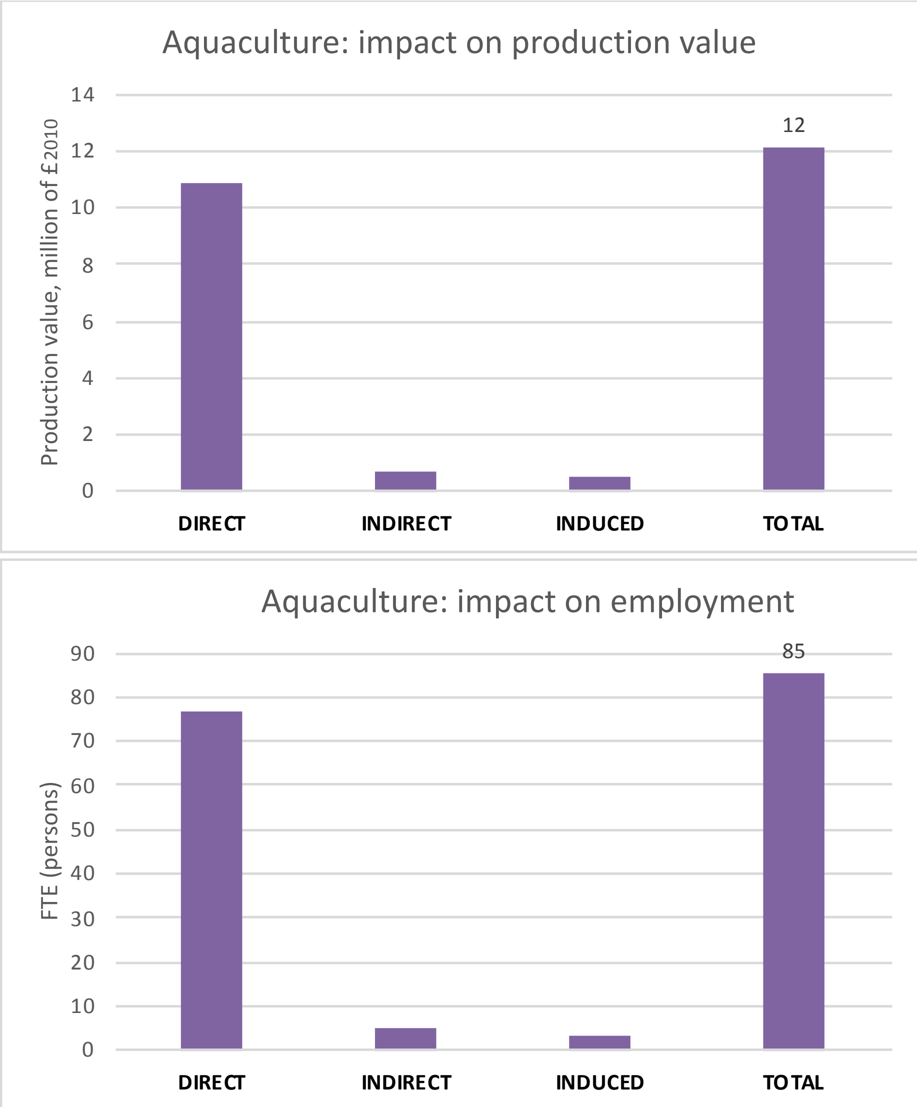


4.5.7.2 Aquaculture

Stakeholders interviewed with experience of the Scottish aquaculture sector included regulators and competent authorities in this sector, however, no consultation was undertaken directly with industry bodies. The impact of the NMP was considered to be minimal, and less than 25%, for this sector that has been well established pre-NMP. Economic calculations have been made to explore the direct, indirect and induced impacts of the NMP on this industry (Figure 52).

Overall, in 2016, the impact of a medium scenario of 12.5% change resulting from the introduction of NMP, has been found to result in an overall increase in aquaculture production of £12 million, with the majority from a direct impact (89%). In relation to employment, this has resulted in an increase of 85 FTE individuals.

Figure 52 - Aquaculture: impact on production value and employment based on medium impact scenario of 12.5% change from NMP, based on 2016 values



4.5.7.3 Renewables

For renewable energy, the NMP has had more positive effects, with this sector attributing greater than 75% of growth to marine spatial planning and the Blue Seas, Green Energy sector plan. These plans have dictated where development could occur and where not, via strategic assessment and leasing rounds.

Economic data is not yet available for the marine renewable sector, and therefore economic analysis is not yet possible.

4.5.7.4 All maritime sectors

Based on economic data available, for the sectors outlined in Figure 53, Scottish marine industries had a production value of £26,835 million in 2016. The difference based on the medium scenario of impact from the NMP (i.e. 0 to 12.5% dependant on sector), the overall impact of the NMP has resulted in reduced production for all sectors, except aquaculture (Figure 54). In total, this has resulted in a reduction in production value of -£253 million.

Figure 53 - Production value of marine sectors in 2016

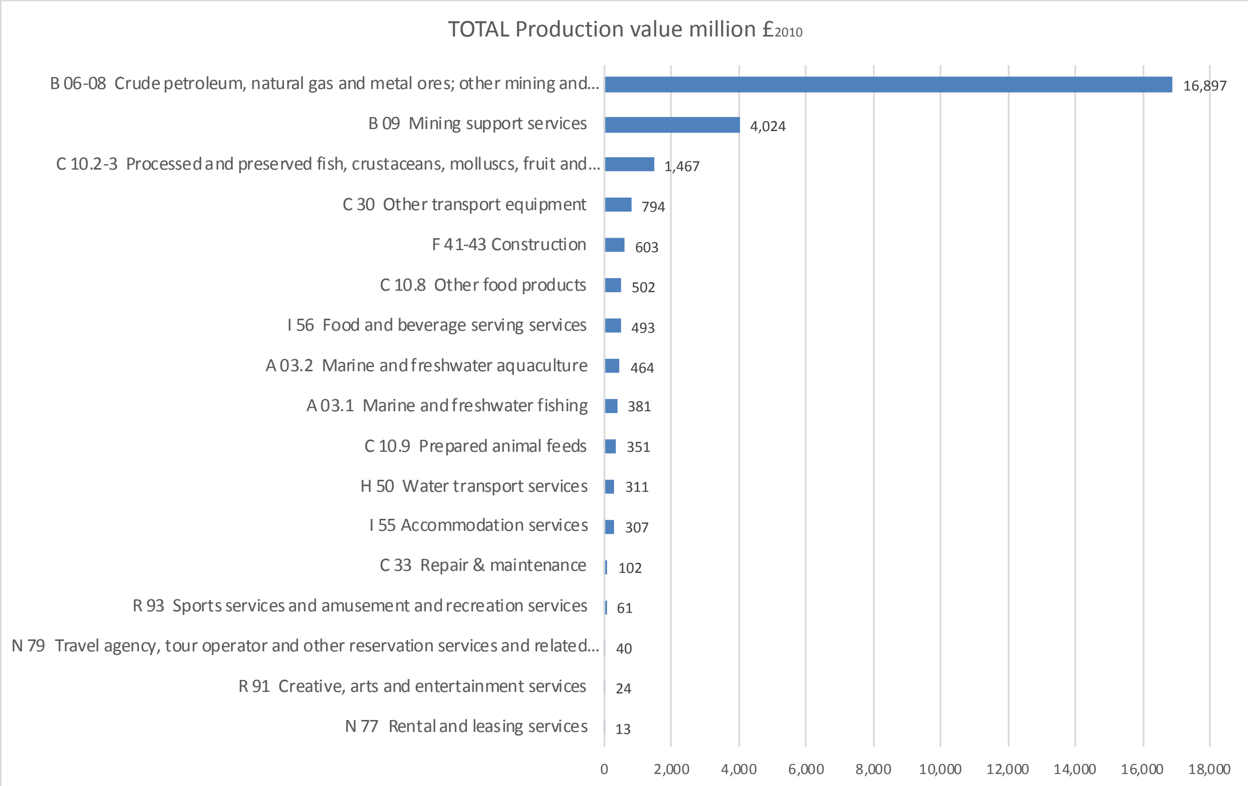
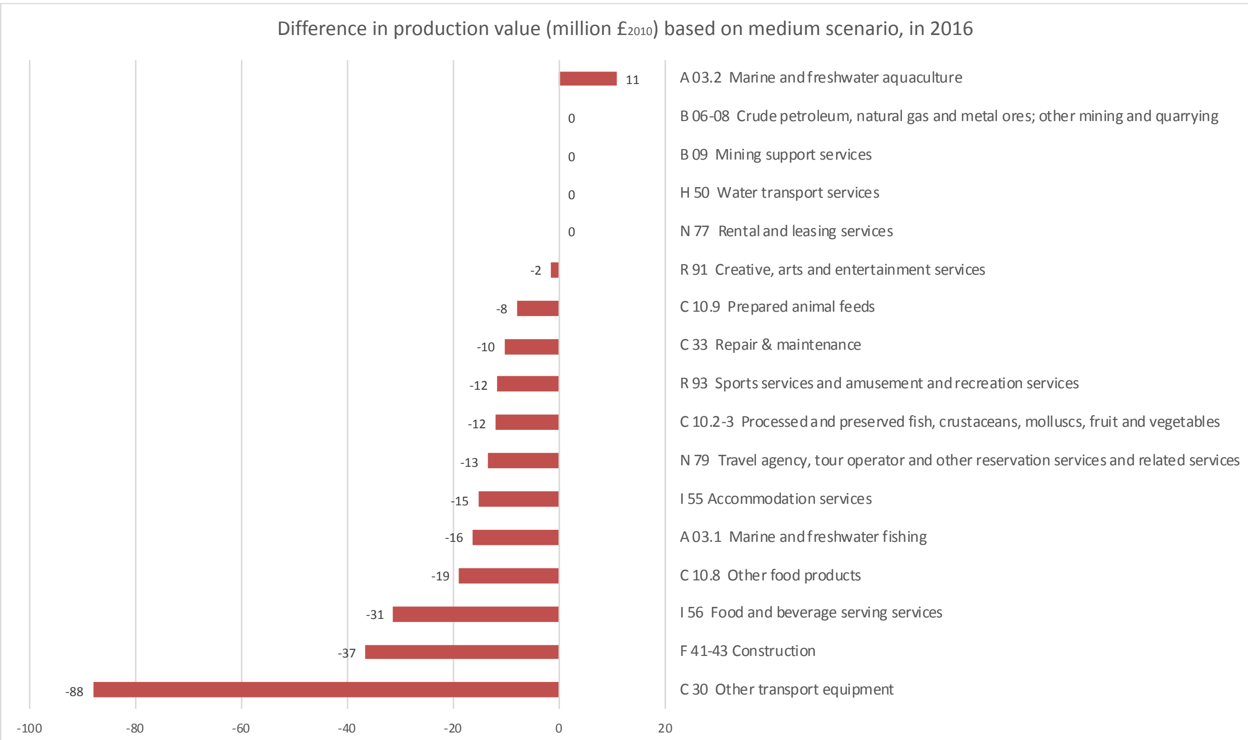


Figure 54 - Impact on production value based on medium impact scenario of 12.5% change from NMP, based on 2016 values



4.5.8 Conclusions

The Scottish case study involved interviews with seven stakeholders, including fisheries, aquaculture, governance, ports, marine tourism and renewable energy sectors. All stakeholders agreed that Scotland's NMP provided a framework to highlight the importance of marine sectors in Scotland, and a forum for undertaking consultation across these sectors.

The NMP interactive (NMPi) database was considered by all stakeholders to provide a comprehensive and accessible information resource, meeting sectoral and societal demands for knowledge and transparency.

Generally reduced administrative and operating costs were cited for the renewables offshore wind sector, where clear guidance and strategic planning has better informed appropriate site selection, thereby minimising exploration costs. Other sectors have not yet experienced reduced costs in this area.

Policy and legislation were considered more important than the NMP for generating investment in marine sectors, including the UK Government's target of 30GW installed capacity from offshore wind by 2030.

The majority of respondents considered the NMP to influence business expectations, both positively, driving sustainable development, heightened ambitions and improving profitability; and negatively, due to reduction in access to fishing grounds, particularly effecting inshore fleets with more limited operational range.

The NMP has facilitated sector growth in the offshore wind renewable energy sector, which has undergone significant growth, especially off the east coast of Scotland. This has, however, caused upset to fisheries stakeholders with the location of some wind farms devaluing their fisheries activity, with notable examples for the scallop sector.

Trends in GVA and employment have been explored based on the economic data available from 2008 to 2016 for each sector. Unfortunately, the data period available does not allow direct attribution of change due to the NMP, which was introduced in 2015, to be explored.

For the renewables sector, as of 2018 there was 623 MW installed capacity in offshore wind farms in Scotland, with a further 3.9GW already consented. When operational, this 3.9GW will represent a growth of 726% in installed offshore wind capacity in Scotland. This is likely to be across a number of years, as the pre-construction and construction process can take 3-5 years before the wind farm is operational. This will represent significant growth in Scotland's offshore wind sector in the next five years.

Economic calculations into the direct, indirect and induced impact on production have been explored using low (0%), medium (12.5%) and high (25%) scenarios. For all marine sectors with economic data available, this economic assessment estimated an overall reduction in production value in 2016 for all three scenarios: low -£63 million, medium -£253 million and high -£442 million.

4.6 Norway (North Sea and Skagerrak)

4.6.1 Introduction

Norway does not have a single plan for all of its EEZ, but rather breaks its EEZ into three regions, the Barents Sea, the Norwegian Sea, and the North Sea, that combined cover the entire Norwegian EEZ — 2,385,000 km^2. The management plans for Norway's marine areas establish the overall political and strategic framework and guidelines for management actions across economic sectors, and describe management actions to be implemented for the conservation and sustainable use of these areas. The 2009 Nature Management Act and the 2009 Marine Resources Act provide the overall legal framework (purpose, goals, and principles) for the management of marine areas and the management actions that must or may be implemented under the legislation.

The Integrated Management Plan of the Marine Environment of the North Sea and Skagerrak entered into force in April 2013. The work on the management plan was organised along the same lines as for previous management plans. It was coordinated by an interministerial Steering Committee including all the relevant ministries and headed by the Ministry of the Environment. An important feature of the management plan system is that relevant subordinate agencies and key research institutions cooperate in drawing up the scientific basis for the plans.

Strictly speaking, the management plan is not a zoning plan. Its purpose is to provide a framework for the sustainable use of natural resources and ecosystem services derived from the North Sea and Skagerrak and at the same time maintain the structure, functioning, productivity and diversity of the area’s ecosystems.

4.6.2 Background and context

The North Sea and Skagerrak area is Norway’s most intensively used sea area and one of the most heavily trafficked in the world. Norwegian society derives major assets from its use. The bulk of Norway’s oil and as production and thus value creation by the industry takes place in the North Sea. In addition, the North Sea is biologically productive. There are major fisheries in the area, which is fished by both coastal and deep-sea fishing vessels. Moreover, the Skagerrak is particularly important for small-scale fisheries, and is also the sea area of Norway that is most heavily used for outdoor recreation. The high level of activity combined with a number of potentially conflicting interests places considerable demands on the management regime.

Environmental concerns were the main driver for the plan. From the 1970s, much was done to improve the environmental status in the North Sea and Skagerrak, and particularly to reduce the pollution load. Nevertheless, the state of the environment still gave cause for concern and was unsatisfactory in many ways. Concentrations of hazardous substances were higher in the North Sea and Skagerrak than in Norway’s other sea areas, and the concentration of marine litter was higher than anywhere else in the Northeast Atlantic. Water quality was good in the coastal current, but eutrophication and sediment deposition may affect water quality in near-coastal waters and fjords. Moreover, a number of seabird populations had declined and certain fish stocks were in poor condition. Climate change and ocean acidification were creating new challenges that would require a long-term approach to management of the North Sea and Skagerrak. This means that Norway needed to take steps to improve environmental status and ecosystem resilience, and strengthen the basis for continued value creation through use and harvesting of the North Sea and Skagerrak.

The Government took initiative on the MSP process. The Government’s goal is for Norway to be a pioneer in developing an integrated, ecosystem-based management regime for marine areas. The Government will therefore continue to use the system of management plans for sea areas. With the publication of this management plan for the Norwegian part of the North Sea and Skagerrak, the Government established management plans as the basis for integrated ecosystem-based management of all Norwegian sea areas. The management plans clarify the overall framework and encourage closer coordination and clear priorities for management of Norway’s sea areas. They aim to increase predictability and facilitate coexistence between industries that are based on the use of these sea areas and their natural resources. The management plans are also intended to be instrumental in ensuring that business interests, local, regional and central authorities, environmental organisations and other interest groups all have a common understanding of the goals for the management of the area in question.

The work on the Management Plan for the North Sea and Skagerrak was organised along the same lines as for previous management plans in Norway. It was coordinated by an interministerial Steering Committee including all the relevant ministries and headed by the Ministry of the Environment. An important feature of the management plan system is that relevant subordinate agencies and key research institutions cooperate in drawing up the scientific basis for the plans. The scientific basis for the North Sea–Skagerrak management plan was prepared by an Expert Group headed by the Climate and Pollution Agency and including representatives of the Directorate for Nature Management, the Directorate of Fisheries, the Institute of Marine Research, the Coastal Administration, the National Institute of Nutrition and Seafood Research, the Norwegian Institute for Air Research, the Norwegian Institute for Nature Research, the Norwegian Institute for Water Research, the Norwegian Water Resources and Energy Directorate, the Petroleum Directorate, the Petroleum Safety Authority Norway, the Maritime Directorate and the Norwegian Radiation Protection Authority. Two advisory groups for the management plans, the Advisory Group on Monitoring (headed by the Institute of Marine Research), and the Forum on Environmental Risk Management (headed by the Norwegian Coastal Administration) were also involved. Participation by interested parties is also an important element of the management plan work, in the form of consultation on the background reports and consultative meetings during the process of developing the plan. After the Expert Group had delivered the scientific basis to the ministries, a conference was held in May 2012 to give all interested parties an opportunity to discuss the reports. The management plan is based on both existing and new knowledge about ecosystems, ecological goods and services and resources that are important as a basis for value creation in the management plan area, and about trends in environmental status, pressures and impacts on the environment, and environmental risk. Studies have also been carried out to assess commercial activities and social conditions and ecological goods and services.

The sectors directly addressed by the plan are:

1. **Fishing**: fisheries in the management plan area are conducted by Norwegian and foreign vessels, including EU vessels that have been allocated quotas in Norway's exclusive economic zone during negotiations on bilateral agreements. The share of the total catch value in Norwegian waters taken in the North Sea and Skagerrak is on average 25 %. The corresponding figure for catch quantity is on average 23 %. Norway shares most of its fish resources with other countries, so that international cooperation on their management is essential. The EU is Norway's main partner in the North Sea and Skagerrak. Under the United Nations Convention on the Law of the Sea, Norway and the EU have an obligation to cooperate on the management of shared fish stocks in this sea area. To be noted that aquaculture, one of Norway's most important industries is not directly affected by the plan.
2. **Seafood** (fish processing industry): The seafood industry is Norway's next largest export industry and the value added it generates has increased substantially in the last few years. Norwegian seafood products are continually winning new markets worldwide, and in spite of large fluctuations, there has been an overall rise in prices. Rising international prosperity is being accompanied by a growing focus on health and nutrition, providing further opportunities for the Norwegian seafood industry. However, the emphasis on quality has also increased, which makes even greater demands on catch handling, product quality and the environmental status of the nursery areas of fish and crustaceans.
3. **Shipping**: The North Sea and Skagerrak are important shipping areas. There are several important transport routes, for example for vessels in transit along the Norwegian coast to northern waters, traffic to and from the Baltic Sea, and

traffic between the major ports in Norway and other North Sea countries. The North Sea and Skagerrak are used by every vessel category and to transport all kinds of cargo. There is a larger volume of shipping in the North Sea and Skagerrak than in other Norwegian sea areas, and it is more complex. The southern part of the management plan area is very heavily trafficked, and three-quarters of maritime transport in the North Sea take place outside Norway's exclusive economic zone.

4. **Petroleum activities**: The North Sea was the starting point for Norway's petroleum industry, and much of the area was opened for exploration as early as 1965. Production started in 1971 on the Ekofisk field, The North Sea still has considerable petroleum potential and will generate substantial value added for many years to come. The petroleum industry is by far the largest of the industries in the management plan area in terms of both value added and employment.
5. **Leisure and tourism**: The sea and coast are very important areas for the travel and tourism industry and for leisure activities in Norway. The coastline bordering the management plan area is very attractive and heavily used by the local population. The coastal and marine environment is important for this sector in a variety of ways, it provides enjoyment, opportunities to engage in a variety of activities and health benefits. In addition, the coastal and marine environment is an important basis for economic activity in the tourism and travel industry at both local and national levels.
6. **Offshore renewable energy and wind power**: Offshore renewable energy production includes offshore wind power, wave power, marine current power, tidal power and osmotic power. At present, offshore wind power is a marginal sector in Norwegian waters, but it has a very large potential. However, developments in the years ahead are uncertain, as, at the time of writing, very few MW of offshore energy – be it wind or ocean – are planned or consented45.
7. **Marine bioprospecting**: Many marine organisms are likely to have properties that can be exploited and used in the manufacture of new products and processes in a number of industrial sectors. Marine bioprospecting therefore has a potential for value creation, and Norway is considered to be in a good position to make its mark internationally in this field.
8. **Mineral extraction**: At present, there is no mineral extraction from the seabed in the North Sea and Skagerrak or in other Norwegian sea areas. However, there has been little exploration of the seabed in the management plan area. Better mapping and the development of new technology may lead to value creation from seabed mineral deposits.

To be noted that aquaculture, one of Norway's most important industries is not directly affected by the plan. This is because the management plan does not cover areas within the geographical scope of the Planning and Building Act or the Water Management Regulations, with the exception of an overlap in the area from the baseline to one nautical mile outside the baseline. This means that the management plan does not determine the framework for activities in the coastal zone, such as fish farming. At the same time, it can be argued that its effects on coastal tourism and the fish processing industry are somewhat limited and possibly indirect.

[45] Source: EMODnet Human Activities: www.emodnet-humanactivities.eu.

4.6.3 SWOT Analysis

Table 68 - SWOT Analysis of MSP in Norway (North Sea and Skagerrak)

Norway

Strengths

- Effective consultation process involving several actors at government and business level
- Joint Forum for Integrated Marine Management for Norway's sea areas
-Work was organised along the lines of previous regional plans in Norway
- Cooperation in existing international forums to achieve and maintain good environmental status

Weaknesses

- Aquaculture is not included in the plan
- Weak connection to adjacent coastal management programme
- Lack of economic monitoring
- Not a zoning plan

Opportunities

- Evaluation process in place
- New and emerging uses of the marine area (e.g. offshore wind, marine energy)

Threats

- Concentration of hazardous substances and marine litter are higher in the plan area
- Oil and gas industry on a downward trend because of resource depletion

4.6.4 Quantitative data

Norway was one of the most challenging case studies when it came to statistical data. Although Norway is not an EU Member State, its statistical office provides Eurostat with data. However, the main challenge was related to the fact that the Norwegian case study is regional (North Sea and Skagerrak) and so it required data at a geographical level not available on Eurostat for Norway. To cope with issue, it was decided to use Statistics Norway as a source, which makes available several datasets at county (NUTS-3) level. The following counties were identified as being affected by the management plan.

1. Vestfold
2. Aust-Agder
3. Vest-Agder
4. Rogaland
5. Hordaland
6. Sogn og Fjordane

Eurostat and Statistics Norway classification system do not always perfect overlap. especially when it comes to data at NUTS-3 level. As a consequence, it was not possible to compare the performance of the activities addressed by the plan with Norway's neighbouring countries.

The table below reports the evolution of production value for the sectors mentioned in the plan. The values are expressed in 2010 euros.

Table 69 - Evolution of production value in Norway before and after MSP

Sector	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Fishing*	433.7	452.7	522.3	566.2	469.3	412.3	440.0	528.6	602.7	535.3
Seafood (fish processing industry)	1,038	983	1.182	1.213	1,166	1,173	1,228	1,628	2,003	1,936
Shipping	15,785	14,460	14,670	14,153	15,000	15,069	16,333	17,852	16,710	16,335
Petroleum activities	150,631	171,810	149,536	148,716	154,599	141,817	136,156	78,489	64,364	72,488
Leisure and tourism	n.a.	n.a.	n.a.	60,688	56,318	64,035	69,260	75,726	80,325	n.a.

Years with the plan in force on a light blue background
**Note that aquaculture is not in the plan

The plan was implemented in 2013. As can be noted, all sectors are on an upward trend, with the exception of petroleum activities. The table only reports production value, as this is the main variable in our method. The effects of MSP on value added and employment will be looked at in the next sections.

While positive, these figures are not sufficient to establish a cause-effect relationship between MSP and economic growth. The upward or downward trends might be due to a variety of factors, and only stakeholders or comparisons with neighbouring countries without MSP can shed light on the contribution of planning to the blue economy (see section on final economic effect)

4.6.4.1 Fishing

Given that Norway exports a significant proportion of its fish, global market conditions are particularly important to its fisheries sector. Competion from Russia, Alaska, South America and Asia led to lower prices for frozen finfish fillets which put pressure on the

Norwegian industry. European Union trade barriers have also increased in the form of customs duty on processed fish products. It reduced the profitability of the Norwegian fisheries sector and will continue to be an important determinant in the sector's performance.

High labour costs have made Norway less competitive. This has in part been compensated by increased efficiency and mechanisation.

4.6.4.2 Seafood (fish processing industry)

The seafood industry is of great importance to the Norwegian economy. As shown in the data, until not long ago, the fish processing industry was struggling, mainly for the same reason as the Norwegian fishing fleet. However, thanks to restructuring, automation, and great availability of top-quality raw material (the industry is dependent among other things on salmon production), the fish processing industry has lately recovered.

4.6.4.3 Shipping

The economic performance of maritime transport in the time series analysed is not particularly noteworthy. While pivotal in ensuring connection between Norway and the rest of the world, maritime transport has been on a steady trend, with production value on a moderate growth, albeit partly due to inflation.

4.6.4.4 Petroleum activities

Table 69 clearly shows that the oil industry has been on a downward trend for many years now. While still being Norway's most important industry, the trend is judged to be irreversible, as oil resources have been exploited for a very long time in the North Sea. They are becoming less and less available, and extraction costs are getting higher. In addition, a shift towards cleaner forms of energy also suggests that the industry will never come back to its former glory, even though it has potential to remain profitable for quite some time.

4.6.4.5 Leisure and tourism

The data clearly confirm the conventional wisdom that Norway's tourism industry has been on a boom with no signs of slowing down. Table 69 shows that tourism has now surpassed the oil and gas industry in terms of production value. Tourism is particularly vital in the region of the North Sea and Skagerrak plan. Part of the boom is due to the success of the computer-animated fantasy film Frozen, which, released in 2013, is based on the scenery and traditions of Norway. However, besides creating opportunities for economic growth, tourism is also raising concerns in Norway, as it is increasingly seen as an activity that risks damaging the environment.

4.6.4.6 Offshore energy, wind energy, marine bioprospecting, mineral extraction

Although these activities are included in the Management Plan for the North Sea and the Skagerrak, they are not yet carried out in Norway to an industrial scale. Only in the case of wind energy, there is just one operating wind farm in the plan area. As a consequence, no economic data are available through official statistics, either because there is still no industrial activity, or because there is some activity, but, due to the low number of operators involved, data are confidential (e.g. wind energy).

4.6.5 Stakeholders interviewed

Interviews with stakeholders and planning authorities play an important role in the method developed to determine whether MSP has produced benefits or costs for the blue economy. The table below lists the organisations identified as representative of the various sectors involved in the plan.

Sector	Organisation	Type
Government	Norwegian Environment Agency	Authority in charge of MSP
Fishing	Norges Fiskarlag	Business association
	Fiskebat	Business association
	Fiskeridirektorate	Public body
	Norges Råfisklag	Business association
Seafood	Sjømat Norge	Business association
	Norwegian Seafood Council	Business association
	Sjømatbedriftene	Business association
Shipping	Norges Rederiforbund	Business association
	MarHub	Business association
	Maritimt Forum	Maritime Cluster
Extraction of oil and gas	Norsk olje&gass	Business association
Leisure and tourism	Norwegian Environment Agency	Authority in charge of MSP
Offshore wind	Norwea	Business Association
Offshore renewable energy	Havenergisenteret	Research Centre
Marine Bioprospecting	Norwegian Environment Agency	Authority in charge of MSP
Mineral Extraction	Nordic Mining	Industry
	MarMine	Research project

It has proved extremely difficult to conduct interviews in Norway. The Norwegian Environment Agency has been contacted repeatedly and initially offered to cooperate with the research team. Nevertheless. despite numerous requests, a contact person was appointed by the Agency only one day before the deadline for submitting this report, thus making it impossible to include the information in it at this stage.

The only sectors for which it has been possible to interview stakeholders are fishery and oil and gas. The organisations contacted for seafood and shipping declined our request for an interview due to other engagements and priorities. The organisations contacted for coastal tourism did not answer our emails. As far as the other sectors are concerned, at present there is little to no activity, although it would have been interesting to hear the opinion of the planning authority, as these sectors might experience considerable growth in the future.

4.6.6 Summary and main findings from interviews

Even though only three interviews have been conducted so far, their viewpoints on the Management Plan for the North Sea and Skagerrak are remarkably consistent. MSP is viewed as a good opportunity to foster coordination between different industries, and is generally perceived as positive. However, according to stakeholders, the link between the plan and the economic performance of their sectors is rather weak.

There is a number of plausible explanations to account for that. An explanation might be that, in the words of stakeholders, "the plans are not legally binding, but merely guidelines, and in our opinion they don't have any real influence of the balancing of interests in the region". At the same time, it was pointed out that the plan only regulates territorial waters, and, according to the Norwegian Fishermen Association, a new tool/new rules for managing the use of space outside the 12 nautical miles should be implemented. However, this doesn't seem to be the case, as in the plan it is clearly stated that this applies to territorial waters and exclusive economic zone.

The opinion of the oil and gas industry is also very interesting, especially because it is by far the "richest" maritime economic activity in Norway. In the period analysed, oil production went down, but the Norwegian Oil and Gas Association holds that the decline could not possibly have any connection whatsoever with the Management Plan, because the outlook of the industry is chiefly influenced by the abundance of oil in the subsoil. In other words, natural resources are depleting and it has become increasingly expensive to extract them. There seems to be no possibility for a Management Plan – which the Association considers a good tool – to fix that.

The plan is believed to have increased predictability and certainty, but stakeholders have been unable to quantify these effects, mostly because they believe these are negligible. Interestingly, it has been argued that while increased certainty, predictability and data availability might have generated benefits, administrative burden might have increased as well. It has been reported that the oil and gas industry has had to invest money for additional studies and surveys in the framework of the Management Plan. It is also believed that the negligible benefits and costs overall cancel each other out, so the net effect might probably be close to zero.

Even though stakeholders do not seem to believe there is a link between the Management plan and the economic performance of their sectors, it does not necessarily follow that there is none. First of all, it should be noted that, especially if the benefits are still negligible and not immediately visible, stakeholders might just not be aware that the very existence of a plan is benefitting their industries, e.g. through the aforementioned increased stability and certainty (see next section). Secondly, it should be stressed that fishery, seafood, oil and gas, shipping and tourism are "traditional industries", and existing literature suggests that it is innovative sectors which tend to reap most benefits from MSP. It would have been extremely interesting to enquire with the planning authority about the foreseen developments in sectors such as wind energy, marine energy, bioprospecting and mineral extraction. Even though at present these activities are not yet carried out on a commercial scale, or they are carried out to a limited extent, it is possible that the plan is already facilitating their future development.

4.6.7 Final economic effects

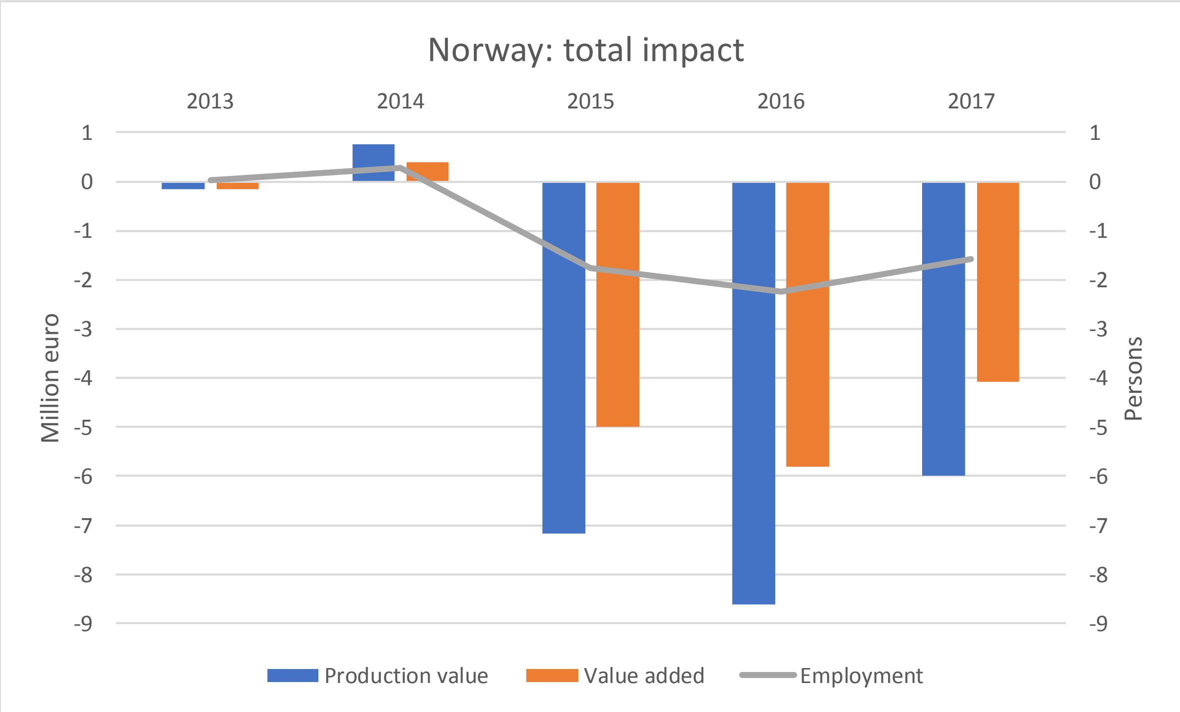
Table 69 above shows the evolution of production value in Norway before and after MSP. Apart from petroleum activities, all maritime sectors reported moderate growth after MSP was implemented in the North Sea and Skagerrak region.

However, it is not straightforward to determine whether and how much MSP contributed to the performance of the blue economy. First of all, only stakeholders from the fishery and the oil and gas sectors accepted to be interviewed by the study team. In both cases, they clearly ruled out the possibility that the Management Plan might have influenced the economic performance of their sectors.

One might be tempted to generalise these conclusions and assume that also in the case of seafood, shipping and tourism the Management Plan has not had any influence. Alternatively, it is possible to create a set of scenarios (low, medium, high) and see how the Norwegian blue economy in the North Sea and Skagerrak region performed compared with neighbouring economies without MSP. We selected Estonia, Latvia, Lithuania, Sweden, Finland, Poland, Denmark and France as countries eligible for a comparison. Not all of them have characteristics similar to Norway, but averaging the results allows a more robust comparison. In particular, one may assume that without MSP, the North Sea and Skagerrak region's blue economy would have grown at the average rate of the 8 countries combined.

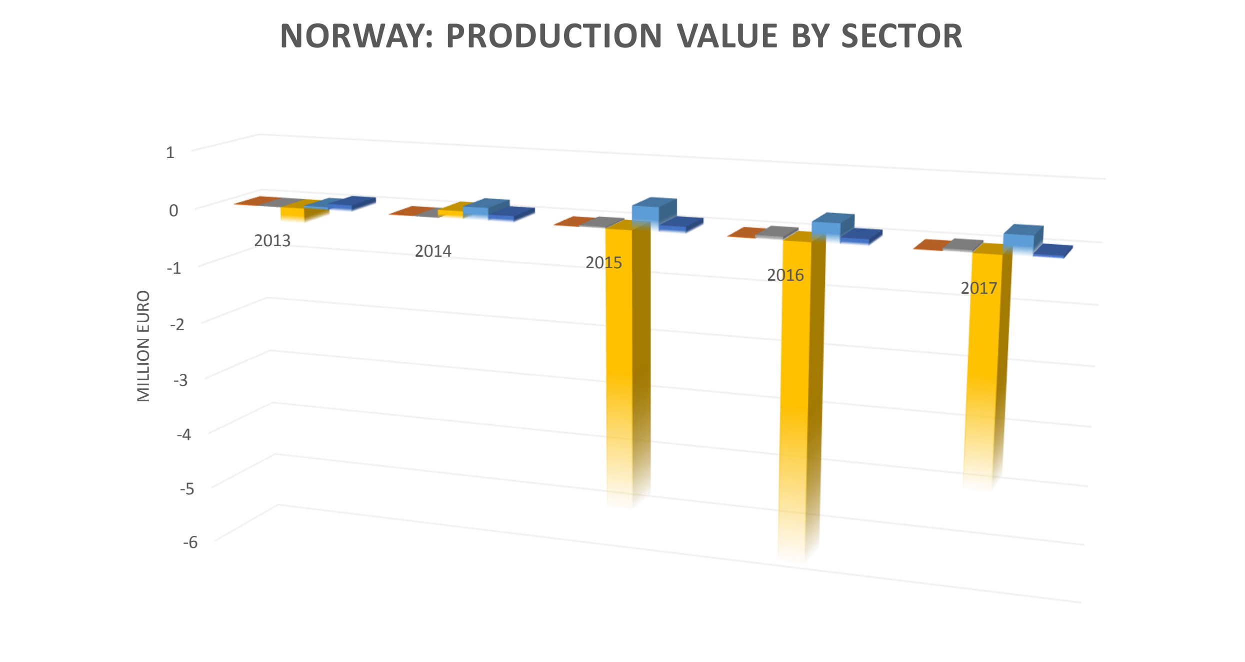
The figure below reports total impact of MSP – so direct, indirect and induced – in Norway, based on a low scenario, i.e. a scenario where the impact of MSP on the blue economy is rather limited.

Figure 55 - Total impact (direct, indirect induced) of MSP in Norway (North Sea and Skagerrak)



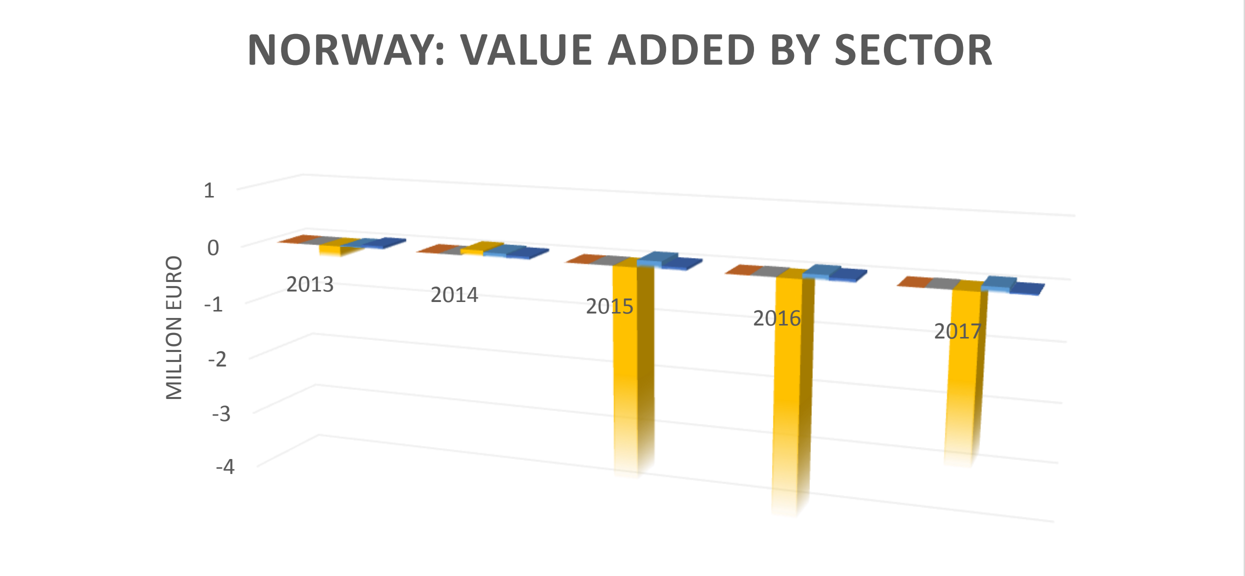
If one picked a "medium" or a "high" scenario, the results would of course still surprisingly negative, as though MSP had a negative impact on the blue economy of the North Sea and Skagerrak area, as well as on Norway in general. However, the final figures are heavily influenced by the negative performance of the oil and gas sector, which, in the words of stakeholders, went down for reasons completely unrelated with Maritime Spatial Planning.

Figure 56 - Direct impact of MSP in Norway (North Sea and Skagerrak) on production value



	2013	2014	2015	2016	2017
Fishing	-0,00716891	-0,005930878	0,001354403	0,007147863	-0,001263575
Seafood	-0,005814345	-0,00711486	0,025602813	0,055553186	0,040791394
Oil extraction	-0,253483525	0,131455978	-4,752542758	-5,346011641	-3,77362641
Shipping	0,05	0,214828272	0,405442703	0,328558463	0,327175011
Coastal tourism	0,11	0,104926024	0,11391254	0,106649152	0,048908338

Figure 57 - Direct impact of MSP in Norway (North Sea and Skagerrak) on value added



	2013	2014	2015	2016	2017
Fishing	-0,002918291	-0,002414318	0,000509549	0,003348032	0,00
Seafood	-0,001209974	-0,001480613	0,004941474	0,010251327	0,01
Oil extraction	-0,198244331	0,102809058	-3,625956036	-3,962732871	-2,80
Shipping	0,016669167	0,074969037	0,127349797	0,093728348	0,09
Coastal tourism	0,055611139	0,051566693	0,054488358	0,05871633	0,03

The direct impact on employment is completely absent, so no graph is presented.

However, if one decides to exclude the oil and gas sector from the calculations, the total impact of the management plan on the Norwegian economy becomes mildly positive:

If one does not consider the oil and gas sector, the results are positive.

Table 70 - Norway. Scenario evolution of production value. value added and employment without the oil and gas sector. Units. million EUR for production value and value added; number of persons for employment

Year	Low	High	Medium	Low	High	Medium	Low	High	Medium
	Production value	Production value	Production value	Value added	Value added	Value added	Empl.	Empl.	Empl.
2013	0.28	587.79	255.14	0.14	298.76	115.41	0	260	159
2014	0.53	1,206.92	568.55	0.23	542.49	236.43	0	499	266
2015	1.00	2,320.39	1,135.30	0.40	947.94	441.17	0	900	465
2016	0.93	2,194.00	1,076.18	0.37	888.35	410.19	0	857	444
2017	0.74	1,791.10	898.03	0.28	699.21	334.81	0	682	341
Total	3.48	8,100.2	3,933.2	1.42	3,376.75	1,538.01	0	3,198	1,675

The difference is striking, considering that the stakeholders interviewed believe that MSP has had no influence whatsoever on their sectors. Unfortunately. much of it is generated by the shipping sector, whose stakeholders declined our request for an interview.

As mentioned above, the negative performance of the oil and gas sector drags down the whole blue economy in the region. If we exclude it from our calculation, it emerges that actually the North Sea and Skagerrak's blue economy performed better than its counterparts without a plan in force.

If we take the medium scenario as a reference, overall, in the period from 2013 to 2017 the blue economy of the region generated an additional 1.5 billion euro of added value – which might have not been generated, had the blue economy grown at the same pace of the countries without MSP – and provided additional jobs for 1.6 thousand employees.

At this point, there is a striking contradiction between stakeholders' perception and the results of our estimation. It is difficult to establish who is right. Generally, the opinion of industry professionals should be hold in high regard, as they are in the best position to spot changes in their business. At the same time, it should also be noted that no stakeholders from important sectors such as shipping and coastal tourism agreed to be interviewed. Thus, while MSP might not have had a noticeable effect on fishery and the oil industry, it might well have generated benefits for shipping and coastal tourism.

In addition, it is also possible in principle that stakeholders are not fully aware of the benefits that MSP is producing for their own business. Increased stability and certainty, for instance, might be quite difficult to quantify, but they certainly do generate additional revenue by improving the investment climate and the overall economic environment. Because stability and certainty might not be immediately visible, it is not unusual, even for an experienced business professional, to underestimate their impact on the economy.

The final answer remains uncertain. The Management Plan for the North Sea and Skagerrak is not, strictly speaking, a zoning plan, so stakeholders' views cannot be dismissed altogether; at the same time there remains that after the implementation of the plan the North Sea and Skagerrak the blue economy performed better than the average of the countries without MSP, with the notable exception of the oil industry.

4.6.8 Conclusions

As of today, there seems to be a tenuous link between MSP in the North Sea and Skagerrak and the performance of the Norwegian blue economy. The statistical data collected for the period analysed do reveal some upwards and downwards trends, but in the words of the (very few) stakeholders interviewed the main drivers are not to be found in the plan. This seems true both when the trend is upward (e.g. fisheries) and when it is downward (e.g. oil and gas). The case of oil and gas is particularly interesting, in that the industry is by far the largest maritime activity in Norway; production value has been going down considerably in the last few years, but this is mainly due to resource depletion and other factors that cannot be addressed by a spatial plan.

At the same time, it should be considered that the Management Plan for the North Sea and Skagerrak entered into force in 2013, and is due to be updated next year. Furthermore, some stakeholders have noted that the plans are not legally binding; they establish a framework for consultation and location of activities and furnish useful guidelines, but the lack of zoning might suggest that they can only have a negligible effect on the performance of the economy. Moreover, it should be noted that the main purpose of the management plant seems to be environmental protection, rather than value creation.

Nevertheless, besides stakeholders' views, a simulation created for this study has compared the North Sea and Skagerrak's blue economy after MSP with the blue economy of some neighbouring countries without MSP. When the oil industry is removed from the equation, the medium scenario constructed for the simulation reveals that MSP might have generated an additional 1.5 billion euro of added value and 1.6 thousand employees.

Moreover, it is worth noting that the Management Plan for the North Sea and Skagerrak addresses several industries which are at a nascent stage in Norway, such as, offshore wind energy; offshore renewable energy, marine bioprospecting and marine mineral extraction. As of today, these industries are non-existent or too small (there is only one operating offshore wind turbine in Norway). Therefore, it has been possible to tease out the impact of spatial planning only on well-established sectors; but well-established sectors are consistently those who reap the least benefits from spatial planning. In particular, one stakeholder pointed out that the management plan could not have possibly had an impact on business expectations and investments for his sector, but he believed that it can make a difference for new industries. So, it may be wise to look again at the impact of spatial planning in the North Sea and Skagerrak region in a few years, as the emergent sectors enter into a more mature stage of activity and start generating revenue, which might have a direct link with the management plan.

In terms of transaction costs and administrative burden, the plan does not seem to have had a noticeable impact either. Stakeholders have confirmed that there is a clear, perceived benefit due to improved stability and certainty, but at the same time some have noted that the planning process itself has raised their costs, mainly due to studies and research to be carried out for compliance. While no one has been able to quantify these benefits and costs, all think they tend to be negligible and, on average, cancel each other out.

4.7 Rhode Island

4.7.1 Introduction

The Rhode Island Ocean Special Area Management Plan (Ocean SAMP) is one of the first marine spatial plans in the United States. It was developed following the Rhode

Island Governor's 2006 policy decision to encourage the development of offshore wind energy. There followed a process of extensive consultation with stakeholders to develop what became the Ocean SAMP, published in 2010.

The Ocean SAMP is managed by the Coastal Resources Management Council (CRMC), a management agency with regulatory functions for the coastal zone. Activities proposed within the coastal zone require Council approval in the form of an assent, or permit. Specific policies have been designed to protect each coastal feature and to manage development via Special Area Management Plans (SAMP).

The coastal zone is defined as two hundred feet (61 metres) inland from any coastal feature out to 3 nautical miles (5km) offshore. The Ocean SAMP is the largest SAMP developed and managed by the CRMC. It covers nearly 1,500 square miles (3,800 km^2) of marine waters, which extend beyond the 3-nmile limit of the coastal zone and so required CRMC to apply to for extend responsibilities into federal waters.

It was developed as a comprehensive plan for Rhode Island's offshore waters, particularly to address the siting of wind energy developments in the context of existing users and the natural environment. However, it is important to emphasise that the Ocean SAMP was launched, prepared and adopted as a comprehensive ecosystem-based marine spatial plan, not as a renewable energy facility siting plan (Schumann et al. 2016).

Key elements of the Ocean SAMP are[46]:

- Designation of a 13 square-mile Renewable Energy Zone (REZ) southeast of Block Island, pre-selected as a preferred area for wind energy;
- Increased protection of 54 percent of the Ocean SAMP area;
- A streamlined regulatory process to evaluate offshore renewable energy proposals;
- Mechanisms to facilitate continued stakeholder engagement through a new Fishermen's Advisory Board (FAB) and Habitat Advisory Board (HAB); and
- Provisions for regular plan updates every five years to ensure adaptive management.

Lessons from its development and implementation since 2010 stress the importance of, building a broad base of leadership; allowing time to build trust; using the planning driver to maintain stakeholder engagement through plan implementation; including clear policy tools in the plan to facilitate streamlined decision- making; and preparing to work even harder during implementation than in the design and development phases (Schumann et al. 2016). Those involved recognise that the process is as important as the plan itself.

4.7.2 Background and context

4.7.2.1 The Coastal Resources Management Council

The CRMC is an independent state regulatory agency. Since its establishment in 1971, the CRMC has had a conservation remit "…to preserve, protect, develop, and where possible, restore the coastal resources of the state…" and developed its role in the planning and management of Rhode Island's coastal zone including the co-ordination and oversight of other state agencies, delivering national coastal zone management

[46]University of Rhode Island Coastal Resources Centre (2016) Case Studies in MSP, Rhode Island: https://www.crc.uri.edu/download/MSP_RhodeIsland_reduced-size.pdf

legislation at State level (CRMC, 2005). The U.S. Coastal Zone Management Act of 1972 (CZMA) requires that the CRMC provide for the protection of natural resources within Rhode Island’s coastal zone. SAMP’s are identified in the CZMA as effective tools to manage coastal development to improve, safeguard, and restore the quality of coastal waters, and protect existing uses of those waters.

There are 16 CRMC members that are appointed by the Rhode Island Governor for a three-year term. The CRMC must include members from coastal communities; state and local government officials, the general public, and the director of the Department of Environmental Management, who serves ex officio. Each year for the past decade, the CRMC processes an average of over 1,100 applications. These proposed activities comprise residential renovations and new homes, boat docks, subdivisions of land, and commercial and industrial work, and everything in-between. When contested cases are heard, the Council must include a representative from the community involved when no CRMC member is from that town[47].

The CRMC operates a number of standing committees, including for the Ocean SAMP, to focus on matters relating to the development and implementation of the SAMP. Its staff work under three units, permitting, policy & planning, and enforcement.

4.7.2.2 The Ocean Special Area Management Plan

The Rhode Island Ocean SAMP (CRMC, 2010) is a comprehensive document published over two large volumes and contains detailed descriptions of the environment and maritime uses in an ocean study area extending beyond state waters (Figure 58), as well as the policies and planning procedures associated with the Ocean SAMP area of 3,800 km^2 (between 150m from land and as far as 50km offshore).

Critical to the Ocean SAMP is the Geographic Location Description (GLD), which is a tool that gives CRMC automatic federal consistency review over certain federal actions and activities in the federal waters of the Ocean SAMP. This allows the Ocean SAMP enforceable policies and regulatory standards to be applied to the federal waters of the Ocean SAMP study area[48]. Following approval by NOAA in 2011, CRMC has the right to review federal actions or activities to ensure they comply with the regulatory standards of Rhode Islands’ coastal program. This effectively devolves governance, including planning, beyond state waters to the federal waters covered by the Ocean SAMP.

The goals for the Ocean SAMP are to (CRMC, 2010):

1. Foster a properly functioning ecosystem that is both ecologically sound and economically beneficial;
2. Promote and enhance existing uses;
3. Encourage marine-based economic development that considers the aspirations of local communities and is consistent with and complementary to the state’s overall economic development, social, and environmental needs and goals;
4. Build a framework for coordinated decision-making between state and federal management agencies.

The Ocean SAMP principles are to:

1. Develop the Ocean SAMP document in a transparent manner;

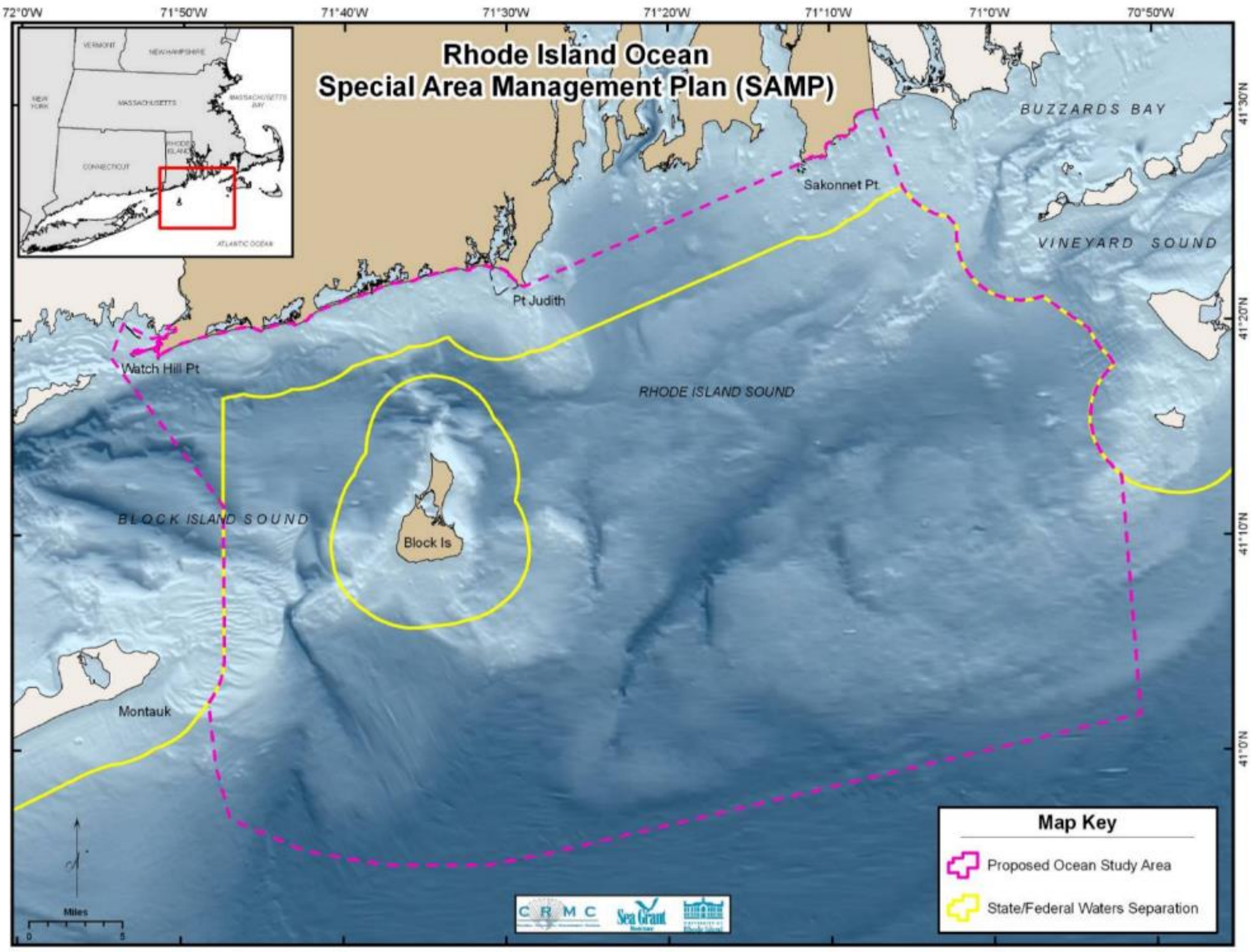
[47] http://www.crmc.ri.gov
[48] https://seagrant.gso.uri.edu/oceansamp/implement_gld.html

2. Involve all stakeholders;
3. Honour existing activities;
4. Base all decisions on the best available science;
5. Establish monitoring and evaluation that supports adaptive management.

In relation to the final point, the process allows for continual amendment through an administrative process. The CRMC will conduct a major review of the Ocean SAMP document every five years.

Those leading the SAMP development and implementation stress that the process is more important than the document, as it brought stakeholders together, facilitated by researchers (URI) and agencies (CRMC) that could benefit from the long-established trust they had built up with those stakeholders.

Figure 58 - Ocean SAMP study area, source: CRMC, 2010



4.7.2.3 The document

The latest information, iterations and reviews of the Ocean SAMP are available on the website, https://seagrant.gso.uri.edu/oceansamp/

Ocean SAMP volume 1 is over 1,000 pages and set out in eleven chapters. Volume 2 consists of over 29 technical reports providing further details on the information provided in Volume 1, including the full ecological assessment reports and the stakeholder engagement & public review process undertaken to develop the SAMP.

4.7.2.4 Outcomes

The Ocean SAMP resulted in the designation of three Special Areas (RI CRMC, 2010).

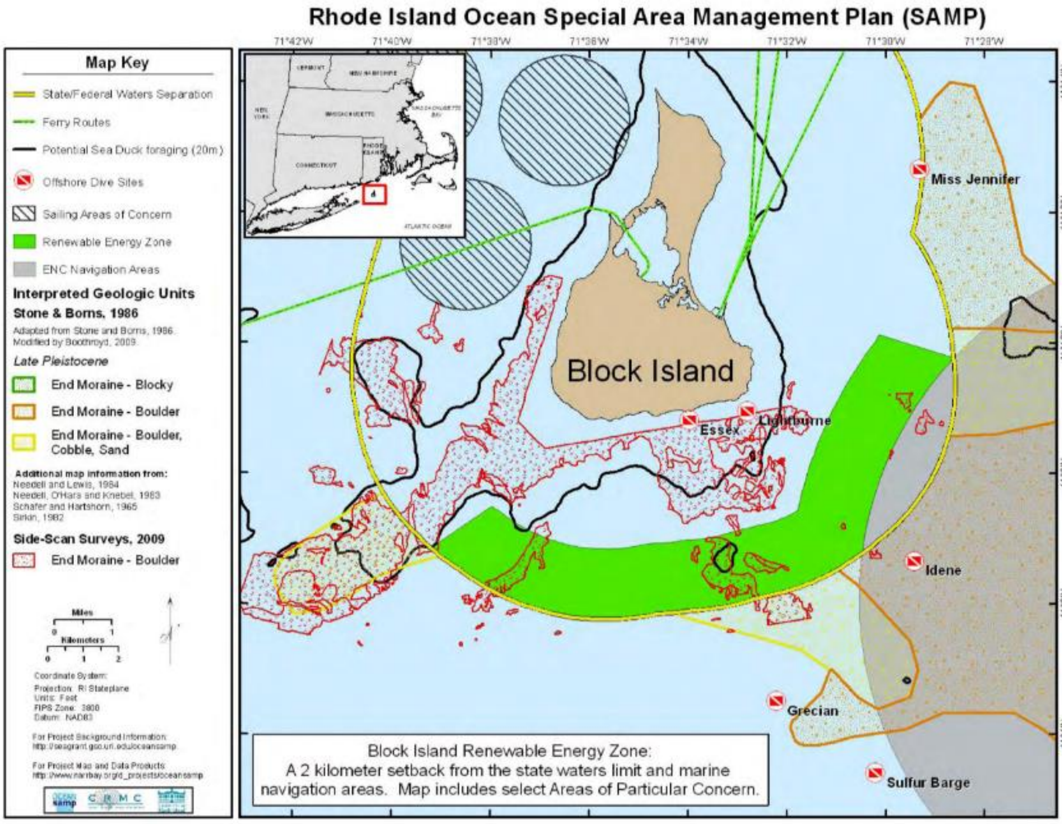
Renewable Energy Zone. A 13-square-mile area in state waters, off the southeast coast of Block Island, designated for potential offshore renewable energy development. This area was identified through the Ocean SAMP's stakeholder process and through the many scientific studies conducted through the Ocean SAMP. This is the only such area identified through the SAMP. The CRMC also established a series of policies and regulations to guide the permitting of any projects in this zone.

Areas of Particular Concern (APC). A series of areas identified in state waters as having high conservation, cultural and historic value, or human use value, APCs designated through the Ocean SAMP include areas with important natural habitats or physical features; areas of high natural productivity; areas with features of historical significance or cultural value; areas of substantial recreational value; areas important for navigation, transportation, and military uses; and areas of high fishing activity. Proposed development in APCs is subject to rigorous performance standards.

Areas Designated for Preservation (ADP). A series of areas designated in state waters for preservation due to their ecological value. Sea duck foraging habitats in waters less than 20 meters deep were designated as ADPs. ADPs receive a higher level of protection than APCs, most large-scale offshore development projects are largely prohibited in these areas.

Figure 59 shows the final area set for the Renewable Energy Zone, which took into account existing maritime users (e.g. naval and ferry navigation), natural (e.g. sea duck foraging) and cultural/recreational (e.g. sailing areas and wreck dive sites) heritage.

Figure 59 - Ocean SAMP study area. Source, CRMC, 2010



The Ocean SAMP also included the development of Ecological Value Maps (EVM) giving a spatial representation of the estimated ecological value of species and habitats present in the area. The resulting composite maps (that can also show seasonal differences to inform scheduling of construction activities) include a weighting scheme that inevitably influences the trade-offs resulting from decision-making, and were used as a screening tool for the siting of the offshore wind facility. There are several challenges in applying ecological valuation as a useable tool for MSP efforts. Difficulties include the following, (1) a lack of standardised input data; (2) patchy or inconsistent data availability/coverage necessitating application of interpolation models or spreading algorithms with uncertain underlying input data; (3) defining the appropriate scale for the valuation effort; and (4) representing habitat components (McCay et al. 2011). This approach was used in conjunction with other environmental information, regulatory and management priorities and stakeholder interests.

The SAMP information base has been continually updated and expanded since its publication to further inform the Block Island Wind Farm development (30 MW from 5 turbines) and further licence applications beyond the REZ (such as the 400 MW 50 turbine project, Revolution Wind located across Rhode Island and Massachusetts state waters). The information base also supports wider regional planning for offshore wind development led by the Federal Agency, the Bureau of Ocean Energy Management (BOEM).

4.7.2.5 Costs and funding

It was estimated that the Ocean SAMP process from development cost $6.6 million, and implementation up to 2016 (seven years) cost $11.4 million ($1.6million per annum), a total of $18 million (McCann et al. 2014). A breakdown of costs is given in the table below. Although the Ocean SAMP team requested $6 million to complete the SAMP, the state initially only provided the effort with $3.2 million from the Rhode

Island Renewable Energy Fund. Several months later, the state recognised that the SAMP process would likely put Rhode Island in the lead on offshore renewable energy installation and additional funds ($2.8 million) were provided by the Rhode Island Economic Development Corporation (McCann et al. 2013).

Table 71 - Breakdown of Ocean SAMP development and implementation costs

Description	Timespan	Amount (US$)
Ocean SAMP Development		
Offish of Energy Resources	2008-2010	6 million
U.S. Department of Energy	2010	634 000
Post-SAMP implementation		
ARRA	2010-2012	2.7 million
National Oceanographic Partnership Program	2010-2012	745 000
Renewable Energy Siting Partnership	2012-2013	3.6 million
John King Lab (BOEM funded projects)	2013-2016	3.7 million
MSP Capacity building (Moore)	2013-2015	659 000
Total	**2008-2016**	**18 million**

Source: McCann et al. 2014

The table illustrates that:

1. there was a need for significant funding post SAMP publication
2. funding shifted from state to Federal and private sector (wind developers)
3. replicating the success of the Ocean SAMP elsewhere needs funds for capacity building

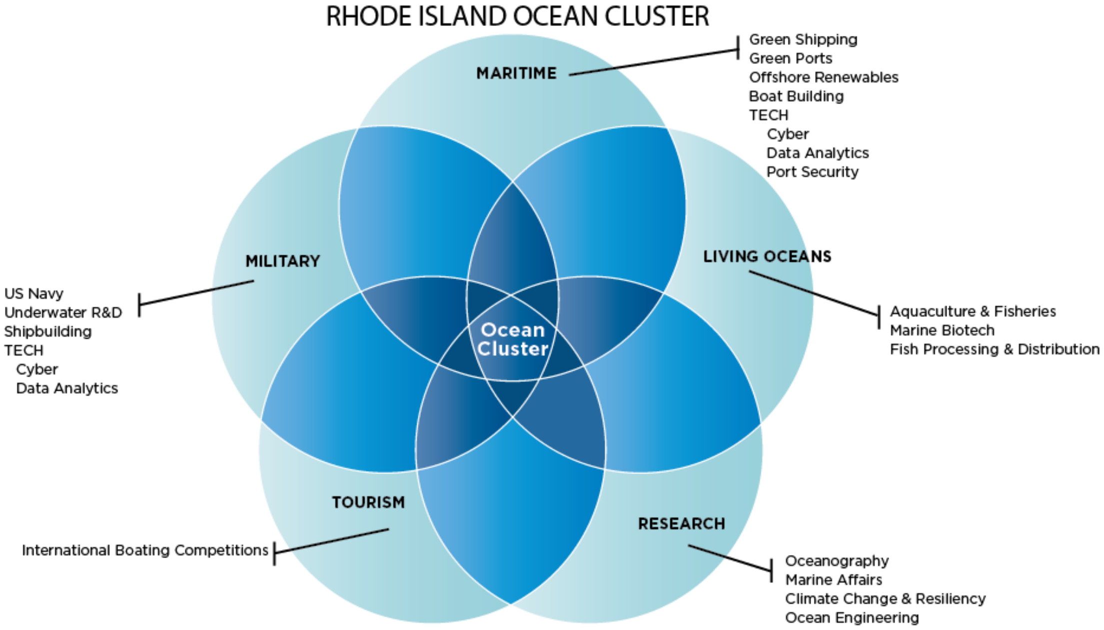
The Ocean SAMP required a significant amount of new information on the marine environment and maritime users, so most of the funding was devoted to research. Although also significant, the smallest component of the budget was the SAMP document development and outreach. This aspect of the budget was applied to project management, including developing the supported goals, sharing the information with the public and decision makers for the formation of policy, synthesising the science, and writing the document (McCann et al. 2013).

Over 200 members of the URI faculty and staff also recognised the significance of this project, and many of them dedicated a significant amount of their state-funded time to the completion of the effort. In addition, the University agreed to donate the use of its research vessel, the Endeavor, to complete many of the required research activities. This in-kind support totalled at least $1 million (McCann et al. 2013).

4.7.2.6 Marine sectors in the SAMP

The SAMP is intended to account for all current and future maritime uses within its planning framework. A Rhode Island Ocean Cluster (Figure 60), which includes a wide range of private and public sector maritime activities, is identified and promoted by economic development agencies in the state.

Figure 60 - Rhode Island Ocean Cluster



Source: http://www.providenceeconomicdevelopment.net/Blue-Economy.php

The maritime sectors covered explicitly under the SAMP are (direct economic sectors in italics):

- Ecology (Living Resources)
- Cultural and Historic Resources
- *Commercial and Recreational Fisheries (27 commercial species listed)*
- *Recreation and Tourism (boating, fishing, diving, wildlife cruises, other)*
- *Marine Transport, Navigation and Infrastructure (including ports, disposal sites, unexploded ordinance and undersea cables)*
- *Renewable Energy and other offshore development (focus on offshore wind, with some consideration of solar, ocean thermal, wave and tidal)*
- *Future uses (Mining, LNG, short-sea shipping, offshore aquaculture, artificial reefs and fisheries enhancement).*

4.7.3 SWOT Analysis

Table 72 - SWOT Analysis of MSP in Rhode Island

Rhode Island

Strengths

- Legislative basis for the plan and its implementation
- Plan covers a functionally appropriate area, rather than an arbitrary geo-political boundary.
- Specific, clear objective underlying the plan ensures all working towards the same, known goal.
- Information gathering and facilitation by bodies that have established a good level of trust with stakeholders.
- Extensive collation of supporting information made available to all.

Weaknesses

- Prioritisation of renewables sector development, so not a level playing field for other sectors.
- Development opportunities for other sectors not explored.
- Complexities of State (regional) v Federal (national) management responsibilities and sometimes conflicting policies.

Opportunities

- Monitoring and review process allows for revisions and for new users and development opportunities to become established.
- Replicating the SAMP process in other areas.
- Capacity-building for other MSP practitioners
- Cost recovery for information collated and maintained under the SAMP.

Threats

- Attempts to 'fast-track' process in other areas, losing stakeholder trust.
- Increased extent of future developments leads to need for more robust decision-making and dispute resolution.
- Disputes (e.g. fishers v renewables developers) lead to protracted consenting process despite the SAMP.
- Sourcing the funds for maintaining knowledge base.

4.7.4 *Quantitative data*

4.7.4.1 Data sources

The US collates data in relation to both the Ocean Economy (marine-related economic sectors) and the Coastal Economy (economic sectors for states or counties at or adjacent to the coast). Here the focus is on the Ocean Economy as this best aligns with the Ocean SAMP.

Economic National Ocean Watch (ENOW) data, are produced by NOAA's Office for Coastal Management. The employment and gross domestic product (GDP) statistics are derived from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages data and the Bureau of Economic Analysis' GDP by State data. It lists six Ocean Economy sectors.

1. Living Resources
2. Non-living resources (Offshore Mineral Extraction)
3. Ship and boat building
4. Tourism and Recreation
5. Marine Transport
6. Marine Construction

Table 73 - Summary of Rhode Island Ocean Economy: no. establishments, jobs and added value, 2016

Ocean economy sector	Establishments	Employment	Value added (US$ million)	% on total value added
1. Living Resources	103	655	129	5%
2. Non-Living Resources	15	160	41	1%
3. Shipping	12	2,354	305	11%
4. Shipbuilding and ship repair	40	4,406	591	21%
5. Tourism and recreation	2,152	36,051	1,720	61%
6. Construction	26	117	22	1%
Total	**2,348**	**43,743**	**2,808**	**100%**

Source: NOAA, 2019

By far the largest Ocean economy sector in terms of value added in Rhode Island is 'Tourism and Recreation' with 61% of total value-added, followed by Shipbuilding and repair and shipping.

Renewable energy is a listed economic activity group consisting of production and transmission services for 'wind energy' and 'other renewables', but there are no data for this group up to 2016. It is expected that the Block Island Wind Farm, becoming operational in 2017, would be accounted for in future data.

The figures below show the trends in each marine economic activity in the state of Rhode Island in terms of total value added and inter-annual variation. A further breakdown of value added per sub-sector (defined by NAICS code) is available in the tables annexed to this report.

Figure 61 - Value Added by Rhode Island Marine Activities 2006-2016

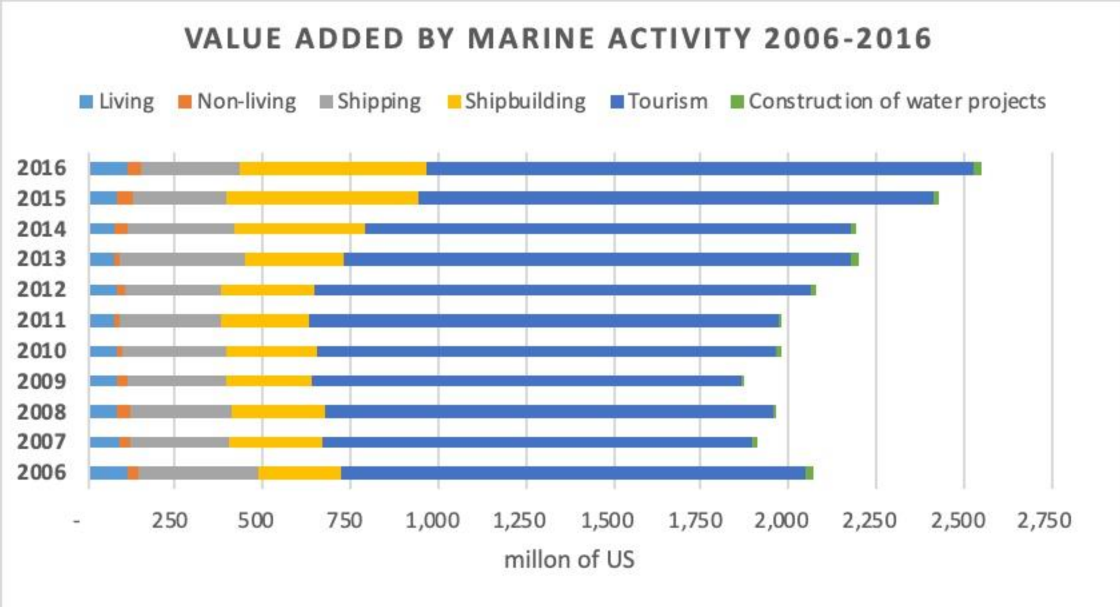
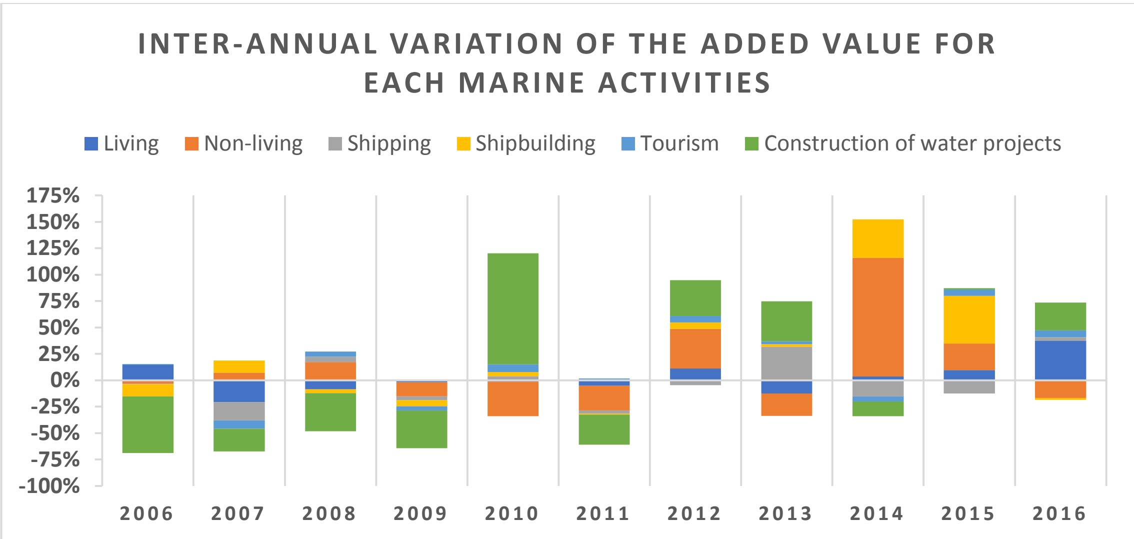


Figure 62 - Inter-annual variation of added value for Rhode Island marine activities 2006-2016



Nearly all the sub-sectors within tourism and recreation have seen year on year growth since 2010, reflecting the economic upturn in the economy. In 2016 revenue from fishing and seafood markets also grew significantly as fish prices increased (C. Glass pers. comm.).

The large relative changes in 2010 for construction of water projects and in 2014 for non-living resources should be seen in the context of a low baseline and that the performance of these sectors fluctuates year to year due to the influence of a few occasional and substantial capital-intensive projects.

The upturn in shipbuilding in 2015/16 is likely the result of companies being awarded large US naval contracts, particularly General Dynamics Electric Boat in Quonset (S. Daly pers. comm.). The Shipping sector in Rhode Island is made up of mainly Marine Freight, for which value added has fluctuated over the last ten years and is yet to recover to 2006 levels, then warehousing (growth from 2011 then static) and marine transport services (modest growth).

Marine-related construction in Rhode Island did show a significant upturn in 2016, which may be related to construction of the Block Island wind farm, but value added from this sector remains at comparatively low level (a 26% increase from 2015 to $20.4million).

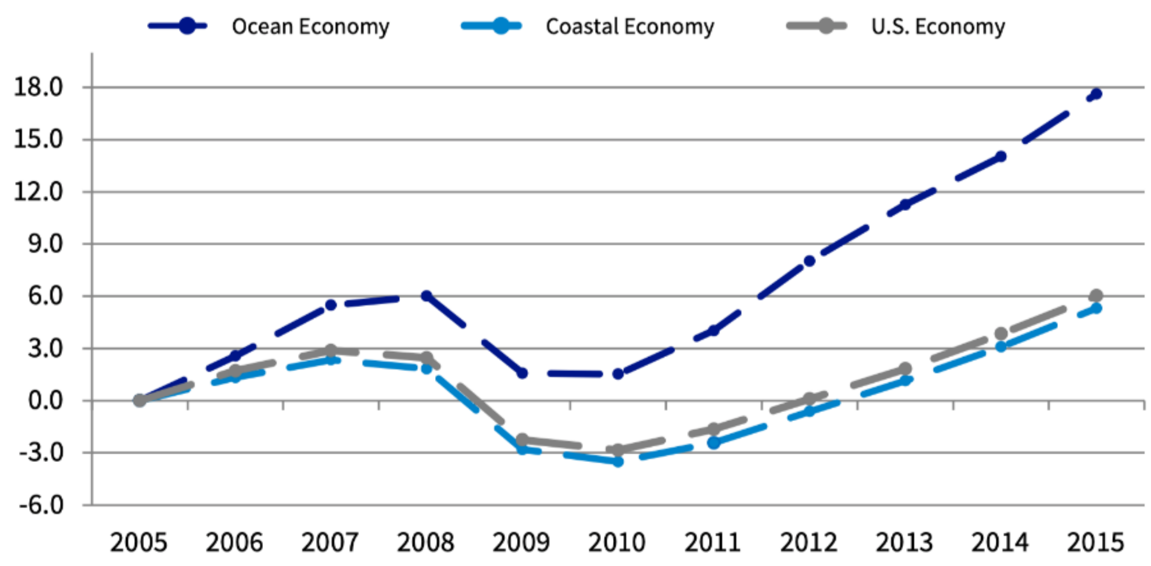
ENOW contains annual time-series data for over 400 coastal counties, 30 coastal states, 8 regions, and the nation, derived from the Bureau of Labor Statistics and the Bureau of Economic Analysis. It describes six economic sectors that depend on the oceans and Great Lakes and measures four economic indicators.

- Establishments
- Employment
- Wages
- Gross Domestic Product (GDP).

NOAA's 2018 report on the Ocean Economy (NOAA, 2018) uses these data to report on US Ocean Economy overall. The trend over the last ten years of a decline between 2008-2010, followed by improved performance, is seen in both the Rhode Island and national ocean economy data.

In 2015, employment in the ocean economy increased by 11.5% from pre-recession levels (2007), while employment in the U.S. economy as a whole grew about 3% from 2007. From 2014 to 2015, the ocean and Great Lakes economy gained about 97,000 employees, an increase of 3.2% — more than the U.S. economy as a whole, which grew by 2.1% during the same period.

Figure 63 - Percentage change in US employment in Ocean, Coastal and National economies



Source: NOAA, 2018

Trends in gross domestic product also show the resilience of the ocean economy. In 2015, inflation-adjusted gross domestic product in the ocean economy was 26.1% higher than pre-recession levels (2007), contrasted with a 9.1% increase in the U.S. economy as a whole. In just one year, from 2014 to 2015, the ocean economy's Inflation-adjusted gross domestic product grew by 5.7% — twice the rate of growth experienced in the nation as a whole (2.7%).

An important contributor to the ocean economy's strong performance in 2015 was the offshore mineral extraction sector, where inflation-adjusted gross domestic product increased by 10.7 percent. This growth was concentrated in the Gulf of Mexico where offshore oil production increased by 8.4 percent (measured in barrels of oil). Employment in the marine transportation sector showed the highest rate of increase (6.1 percent), but employment in the tourism and recreation sector grew the most (79,000 jobs). In 2015, gross domestic product in all six ocean sectors increased, and employment increased in all sectors except offshore mineral extraction.

4.7.5 Commercial and recreational fisheries

The Ocean Economy data reports for 2016 a total of 103 fishing and seafood establishments in Rhode Island employing 655 people with value-added of $ 129 million. However, recent research (Sproul & Michaud, 2018a) taking a bottom-up approach by counting and interviewing businesses suggests this is a significant underestimate with 428 establishments, 3,147 jobs and $165 direct value added. The total economic impact with direct, indirect and induced effect, amounts to $ 269 million value added, $ 419 million output and 4,381 jobs.

74% of RI Fisheries and Seafood employment is found in the largest two subsectors (Commercial Fishing and Wholesalers) comprising 246 (57%) of the 428 firms. The scope of the research includes charter vessels operations, recreational fisheries as well as commercial fisheries, while the federal data includes these in tourism and recreation. Nevertheless, the breakdown shown in the table below does indicate higher numbers for the commercial fishing and wholesale sectors than the national data.

Table 74 - Rhode Island Fisheries sectors, firms, gross sales and jobs

Category	Firms	Jobs	Sales ($million)
Commercial fishing	150	1,711	88.4
Charters	75	182	20
Processors	11	215	67
Professional services	18	73	5.8
Retail dealers	26	136	11.6
Service and supply	27	152	85
Tackle shops	25	62	15
Wholesalers	96	617	246
All fish and seafood	**428**	**3,147**	**538**

Source: Sproul & Michaud, 2018a

Scallop and squid are the two most valuable commercial fisheries in the region, while black sea bass is an important recreational resource. 75 businesses were identified as recreational charter operators.

The Commercial Fisheries Research Foundation (CFRF) was founded in 2005 by commercial fishing interests seeking applied research in response to issues they were encountering and to give New England fishermen a voice, not just in relation to the SAMP and the wind farm proposals. It comprises a board of active fishermen in static (lobster) and scallop sectors as well as, more recently, recreational fishing interests. They continue to be actively involved in the SAMP meetings as several areas are being leased for development as wind farms.

CFRF are positive about the role played by the SAMP, even though overall the impact of developments on commercial fisheries is expected to be negative. The SAMP provided independent information and facilitated discussions to enable compensation packages to be negotiated. Rhode Island was pro-active in conducting a mitigation programme ahead of the SAMP, which provided a template for defining the economic impact of developments. This has allowed for what commercial fishers term the 'least worst' situation with regards to the impact of developments on the sector. There is also the potential to diversify into any fisheries that emerge due to the offshore wind array, and for vessels to provide guard duties. The sentinel fleets managed by the CFRF can also contribute to the fish monitoring activities required by the post-consent developments.

A recent study explored the socio-economic impact of outer continental shelf wind energy development on fisheries in the U.S. Atlantic. It found variable impacts and suggested that the development of wind energy in Rhode Island and Massachusetts is expected to induce limited but negative impacts on the scallop sector; negative to neutral impacts on both the pot and gillnet fisheries; positive change for surf clam and ocean quahog sectors as vessels are pushed into utilising more productive fishing areas (Kirkpatrick et al. 2017).

For recreational fisheries, the wind farm developments are thought to provide some potential in the long term, particularly as black seabass are very territorial and so there could be growth in this fishery. It was estimated that the construction phase may have a marginally negative impact due to exclusion from construction zones and displacement of target resources due to noise. A neutral to positive impact is expected during operation due to aggregation of target resources (artificial reef effect) (Kirkpatrick, 2017).

4.7.5.1 Recreation and tourism

It is difficult to compare different sources of information on the tourism sector as the methodology used for calculating tourism spending (such as the definition of a visitor); the scope of sectors included (such as eating and drinking places, by far the largest sub-sector); and how the 'ocean economy' component of these sectors is defined can vary. Based on the AICS codes included under 'coastal tourism', official statistics show that Recreation and Tourism is Rhode Island's largest sector in the ocean economy, representing over 60% of value added in 2016. 'Eating and drinking places' dominate the sub-sectors, accounting for 78% of establishments and 62% of value-added for the sector.

Tourism and recreation are very important economic sectors for the state of Rhode Island. Visitor spending accounts for 3.6% of the overall RI economy and 5.9% of employment in the state (Tourism Economics, 2017), while the 'travel economy', which includes recreational travel activity, accounts for nearly three times this amount. RI tourism has shown cumulative growth of 23% over five years to 2017.

The protection of the tourism product was therefore an important consideration for the Ocean SAMP. The choice of the seaward side of Block Island included visual impact considerations as the wind farm is hidden from sight on the mainland. However, there are Block Island residents and many tourists visit the area to enjoy marine recreation activities. Researchers have identified an upturn in tourism on Block Island that could be due to additional interest in the wind farm[49]. Boat tour operators have added wind farm visits to their offering. However, the tourism upturn is likely the result of Block Island being the first of its kind and the novelty of the wind farm will diminish over time as more are built. The longer-term impact on recreation and tourism is unknown, although the majority of recreational fishers, an important economic sub-sector, are positive about the wind farm as it adds interest, aids visual navigation and may lead to target species being attracted.

[49] https://today.uri.edu/news/uri-researchers-offshore-wind-farm-increased-tourism-on-block-island/

4.7.5.2 Marine transport, Navigation and Infrastructure

The Ocean SAMP area represents a crossroads between multiple heavily used waterways: Narragansett Bay, Long Island Sound, Buzzards Bay, and Vineyard Sound. Tankers, bulk carriers, and tug and barge units, passenger ferries, naval vessels, government research, enforcement, and search and rescue vessels, and pilot boats pass through the Ocean SAMP area when passing between these waterways. There are two main shipping lanes traversing the Ocean SAMP area, the approach to Narragansett Bay and the approach to Buzzards Bay. There are also two Navy restricted areas within the Ocean SAMP area as indicated in the U.S. Coast Pilot that are used for military testing (CRMC, 2010).

In the Rhode Island ocean economy. this sector is dominated by marine freight (70%) and warehousing (23%) with a smaller contribution from marine transportation services (7%), As the navigation lanes are defined and maintained by the Ocean SAMP, activity is expected to continue with no impact resulting from the Ocean SAMP.

The wind farm development company has invested in local port capacity to facilitate construction operations. Overall for maritime infrastructure the future development of offshore energy is expected to have positive impact on ports and associated services. This is yet to be evidenced in the available economic data.

The Rhode Island Marine Trades Association represents the interests of business that support the marine recreation sector. There is expected to be limited overlap with the commercial sectors servicing the wind farm developments during construction and operation, but some positive knock-on effects are expected with more maritime activity in the long term.

4.7.5.3 Renewable Energy and other offshore development

This sector is reported in Ocean Economy data, but as of 2016 (latest data available) there is no activity currently reported for Rhode Island. The Block Island wind farm, the first commercial offshore wind farm in the United States, is a five-turbine, 30-MW project that began operation in 2017.

Block Island Wind Farm was developed by Deepwater Wind (owned by Ørsted since 2018), the company chosen by Rhode Island government in 2008 to construct a test site and the overall development. Deepwater Wind was therefore in place to contribute to development of the Ocean SAMP. The consenting timescale was extremely rapid with just nine months from application submission to the permit being granted. By contrast one marina in RI has been seeking a permit to expand for over 20 years (CRMC pers. comm.). The first turbine was installed in August 2016, operations were launched in December 2016 and construction complete in August 2018 with the fifth turbine becoming operational.

It is interesting to contrast the experience of the Block Island Wind Farm development under the Rhode Island Ocean SAMP with the Cape Wind Project, which was a proposed offshore wind farm off Cape Cod, Massachusetts. Cape Wind attempted for fifteen years to build 130 turbines. The project was eventually approved, but then lost several key contracts and suffered from several licensing and legislative setbacks. Following stakeholder objections, Cape Wind was required to re-commission bird studies at an overall cost of $4million[50] and ultimately the development was not progressed. The developer eventually terminated the lease rights for the site in late 2017. While there are no public figures available, Cape Wind estimated it has spent

[50] http://www.crmc.ri.gov/samp_ocean/reports/Ocean_SAMP_Planning.pdf

more than $65 million working through the regulatory and legal challenges (Blau & Green, 2015)

The Block Island Wind Farm not only avoided objection, but received support from a number of stakeholders, including fishing interests, and benefitted from the wealth of information developed under the Ocean SAMP. The Ocean SAMP pre-approved renewable energy zones, enabling two wind projects with expected annual gross revenues of $5-10 million and $50-100 million respectively. Rhode Island approved this project in under one year, cutting its permitting process down from nearly five years. According to multiple interviewees, it is quite likely that these projects would not have happened without the plan, which simplified the regulatory process and included stakeholder outreach to all major parties likely to be affected (Blau & Green, 2015).

Following the completion of Block Island Wind Farm, the next project in Rhode Island is the 400-MW, 50-turbine Revolution Wind project. Construction is expected in 2020 with the aim of it becoming operational in 2023. This is located across Rhode Island and Massachusetts marine areas, benefitting from Massachusetts following the Rhode Island model with the publication of its own Ocean Management Plan in 2015[51]. The company estimates this project will create 800 construction jobs and 50 permanent operation and maintenance jobs[52]."In all, Deepwater Wind estimates it will invest over a quarter of a billion dollars on the wind farm and transmission system – one of the largest private investments in Rhode Island history – including $40 million in port upgrades.

In 2019, the Rhode Island Governor announced that Ørsted and Eversource, the companies behind the proposed Revolution Wind project, had pledged $4.5 million for workforce development, research, and outreach, and that $3 million of that would be going to URI[53].

The opinion of stakeholders on the impact of the Ocean SAMP are all very positive, with some suggesting there would be no wind farm development with it. However, the experience from other attempted wind farm developments and planning experiences for other major developments indicate that the Ocean SAMP clearly made the outcomes more certain, reduced project development costs for the developers and significantly sped up the consenting process. A more certain and rapid development phase has tangible benefits in terms of reduced project risk and lower financial costs as interest rates and loan periods can be reduced.

4.7.6 Stakeholders interviewed

Table 75 presents a list of contacted stakeholders who responded to our request for interviews, which were conducted in June and July of 2019. Key interviews were held with the chief executive of CRMC and the director of URI CRC, who led the teams in charge of the production and subsequent implementation of the SAMP.

Table 75 - Rhode Island Ocean SAMP stakeholders

Sector	Organisation	Name	Contacted	Responded
Public Sector				
Management Authority	Coastal Resources Management Council	Grover Fugate	y	y
Researchers	University of Rhode Island (URI) Coastal Resources Center (CRC)	Jennifer McCann	y	y
Data provider	NOAA office for coastal	Gave Sataloff	y	y

[51] https://www.mass.gov/service-details/massachusetts-ocean-management-plan
[52] http://dwwind.com/project/revolution-wind/
[53] https://seagrant.gso.uri.edu/researchers-look-at-how-the-block-island-wind-farm-impacts-recreation-and-tourism/

Sector	Organisation	Name	Contacted	Responded
Public Sector				
Management Authority	Coastal Resources Management Council	Grover Fugate	y	y
	management			
Ocean Economy Sectors				
Commercial Fisheries	Commercial Fisheries Research Foundation	Christopher Glass	y	y
Recreational Fisheries	RI Party & Charter Boat Association	Rick Bellevance	y	n
Renewable Energy	Deepwater Wind	Aileen Kenney	y	n
Tourism & Recreation	RI Commerce Corporation	John Riendeau	y	y
Marine Trades	RI Marine Trades Association	Susan Daly	y	y

The recreational fishers representative did not respond, but this subject was in part covered by the commercial fisheries and marine trades Association, whose membership also includes most of the charter boat companies. Charter fishing is also included in the Economic Impact of Rhode Island's Fisheries and Seafood sector, resulting in some overlap between recreational and commercial fishing in the research conducted by URI on these sectors and marine trades.

The lack of response from the wind developer is unfortunate, however other stakeholders and published information provide significant background. It is known that the first 'pilot' wind farm, Block Island, only became operational in 2017 (later than the latest available economic data, 2016). It is the view of other stakeholders that it is too soon to fully appreciate the impacts resulting from the development of the Renewable Energy sector, but these will be significant over the next ten years as more wind farms are licensed and built.

The first biennial review of the Ocean SAMP interviewed 24 participants in the Ocean SAMP planning process. The assessment identified a number of strengths and accomplishments of the Ocean SAMP including an extensive stakeholder process that sought to better understand existing ecological and human uses of the Ocean SAMP area; recognition of the Ocean SAMP by state and federal governance; and a considerable increase in scientific knowledge about the Ocean SAMP area (Mulvaney, 2013). This corresponds with the messages from the interviews conducted for this case study (summarised below).

4.7.7 Summary and main findings from interviews

Table 76 – Overview of MSP benefits according to stakeholders in Rhode Island

Sector	Positive effects	Reduction of conflicts	Cross-border relations	Access to information	Transaction costs	Investment and business expectations
Commercial fisheries	+2	+2	+2	+2	+2	+1
Tourism & Recreation	+2	+2	+1	+2	0	+2
Marine Trade	+1	+2	+1	+2	0	+1
Government	+2	+2	+2	+2	+2	+2
Research	+2	+1	+1	+2	+1	+2

The overriding perception of the Ocean SAMP from interviewees is very positive and US agencies are attempting to replicate the process elsewhere using the Rhode Island Ocean SAMP as a model, However, stakeholders recognise that the success of the process was in part a result of the trust built up by URI in engaging with Rhode Island's maritime stakeholders and CRMC's long-established role in coastal planning, which were developed over decades prior to the Ocean SAMP. This aspect is not easily replicated or 'fast-tracked'.

The planning authorities also recognise the importance of a clear legal remit for the plan. This was evident in the SAMP, crucially extending the state authorities powers beyond the 3n miles into federal waters with the GLD approval. By contrast, the status of the larger-scale North East Ocean Plan was unclear and the voluntary nature meant that engagement and outcomes were mixed. From 2018 ongoing collaborative actions are being led by Regional Ocean Partnerships, which now provide the framework for collating information, tools and agreeing policies that are suited to a larger-scale regional approach.

Private sector stakeholders (fisheries, marine trades) appreciated being involved from the outset and the level of consultation was maintained throughout the process. This meant that stakeholders got to know each other and the different perspectives of users.

There was an understanding that offshore wind development was going to happen and that Rhode Island would benefit socio-economically from being the first. There was therefore a shared objective to make sure that the development was in the right place. This created more of a shared purpose to the MSP process, rather than each sector vying for space.

The Renewables developers have stated that they consider the SAMP process as very important to gaining first a development license and then consent to construct the wind farm. Previous attempts at offshore wind (such as Cape Wind off Massachusetts) had met with costly delays and demands for environmental information (Cape Wind had to spend $4 million just on bird surveys), which together proved too costly for developers working alone. The major benefit of the Renewable Energy Zone (REZ) is that developers don't have to prove it is a suitable location; the background surveys and stakeholder consultation is done to confirm the location. The REZ is therefore pre-vetted through all the necessary licensing agencies, which significantly speeds up approval of specific developments when they are submitted.

The wind farm developments are located offshore based on restrictions for navigational and military constraints as well as fisheries resources (the shape of the REZ was altered to avoid some key fishing grounds). Commercial fishers could input into the location and orientation of the array, bottom-fishing in the area is mainly in an East-West orientation so E-W corridors are part of the array design to allow fishing between turbines to continue. However, there will still be some negative impact commercial fishers. The SAMP process provided the information and a facilitation process to help agree compensation packages for affected parties.

Stakeholders state it is too soon for data to show most economic impacts that will result from the Ocean SAMP as the first, relatively small, wind development was only operational in 2017. Exponential growth is predicted over the next ten years. Although manufacture is mostly in Europe, it is still to be decided which port(s) and companies will win contracts to service the construction and Operation and Maintenance phases of the various wind farm projects.

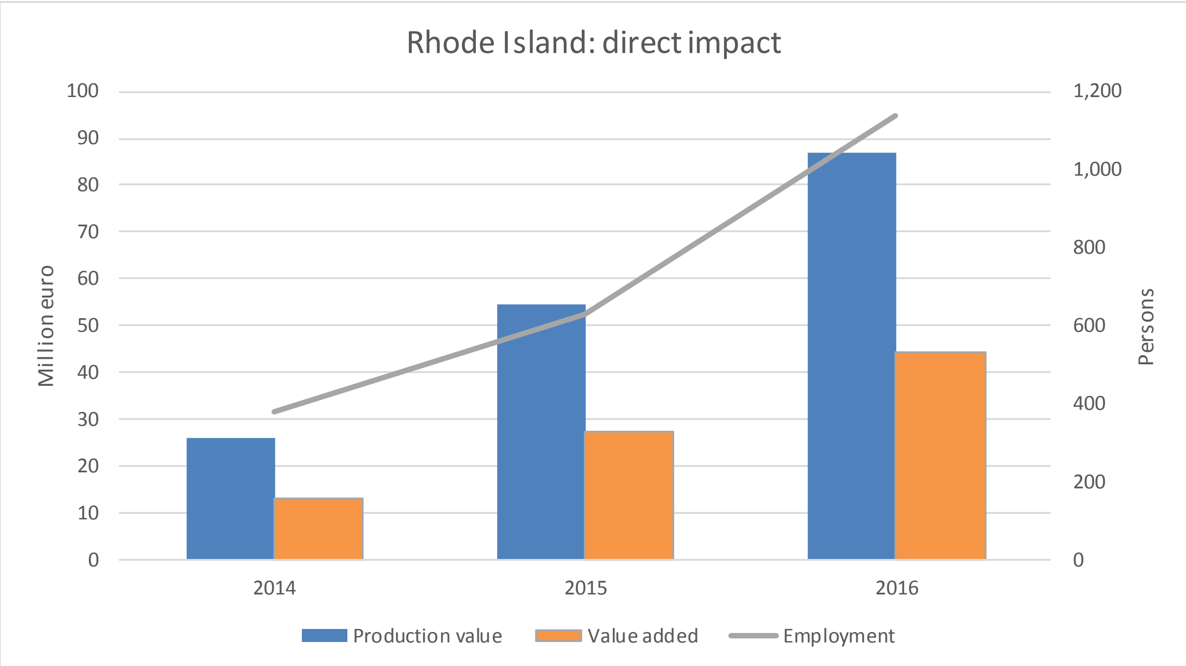
4.7.8 Final economic effects

As the RI stakeholders commented, the most significant economic effect of the MSP will not be shown on data up to 2016 due to the wind farm only becoming operational in 2017. There is no renewable energy production within the available data period as the Block Island wind farm is the first offshore wind farm in the US. Stakeholders are certain that this development was achieved more quickly due to the MSP and some felt that it would not have occurred at all without the MSP, which has been the case in neighbouring states where development plans stalled and were eventually abandoned. The most significant direct economic effects resulting from energy generation are therefore still to be seen.

At the same time, some sectors such as fishing and aggregate extraction, expect some level of negative impact resulting from the wind farm construction, yet these have still seen year on year growth in the years leading up to wind farm construction. No impact of the MSP is identified for these sectors to date.

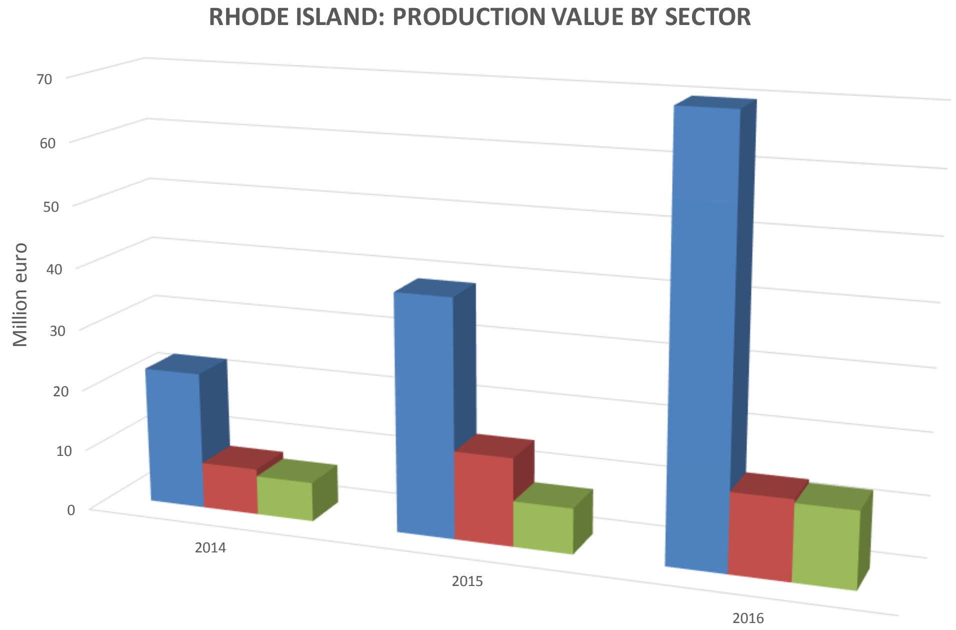
The largest marine economy sector in Rhode Island is recreation and tourism. Tourism operators have reported an upturn of around 20% in occupancy rates since construction of the wind farm began in 2015. This upturn can therefore be indirectly attributed to the MSP. Applying this proportional impact of MSP to the largest economic sector results in some significant direct impacts resulting from MSP, particularly in 2015 and 2016 when construction of the wind farm had actually commenced (see figure below).

Figure 64 – Direct impact of MSP in Rhode Island in the 'medium' scenario



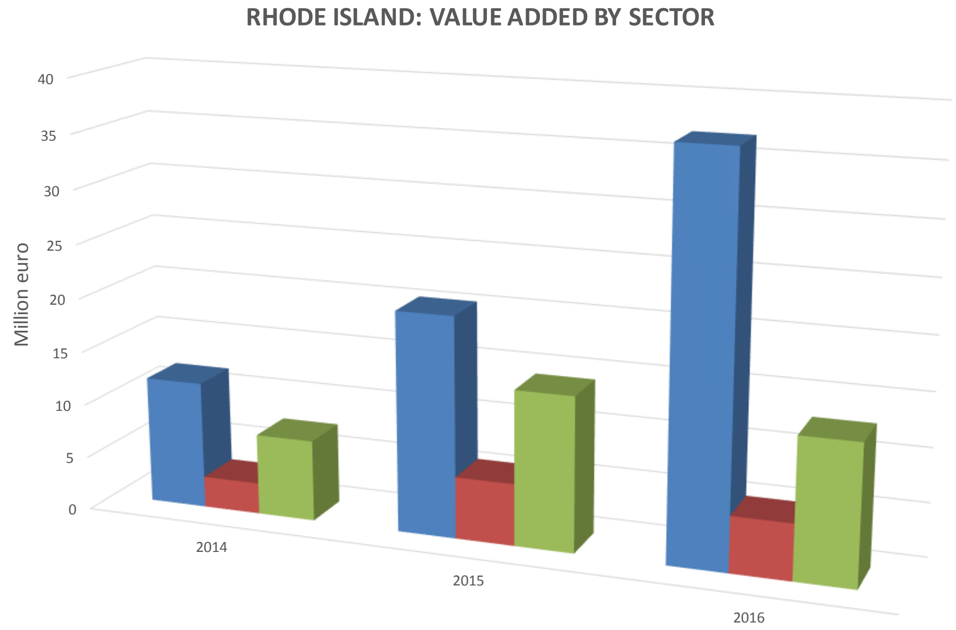
As the largest economic sector is 'recreation and tourism', by far the largest economic activity in terms of employment is 'accommodation and food services', which accounted for nearly all employment impact in 2016. It was also the largest single sector in terms of production and value added, with 72% of the total. The second largest economic activity in terms of production value is 'other transport equipment' (which includes ship and boat building) at 13% of the total (although accounting for only 2% of the employment impact). This is likely to be associated with the growth in the leisure boating sector as part of the more general increases seen in 'recreation and tourism' and therefore indirectly attributable to the MSP.

Figure 65 – Direct impact of MSP in Rhode Island on production value



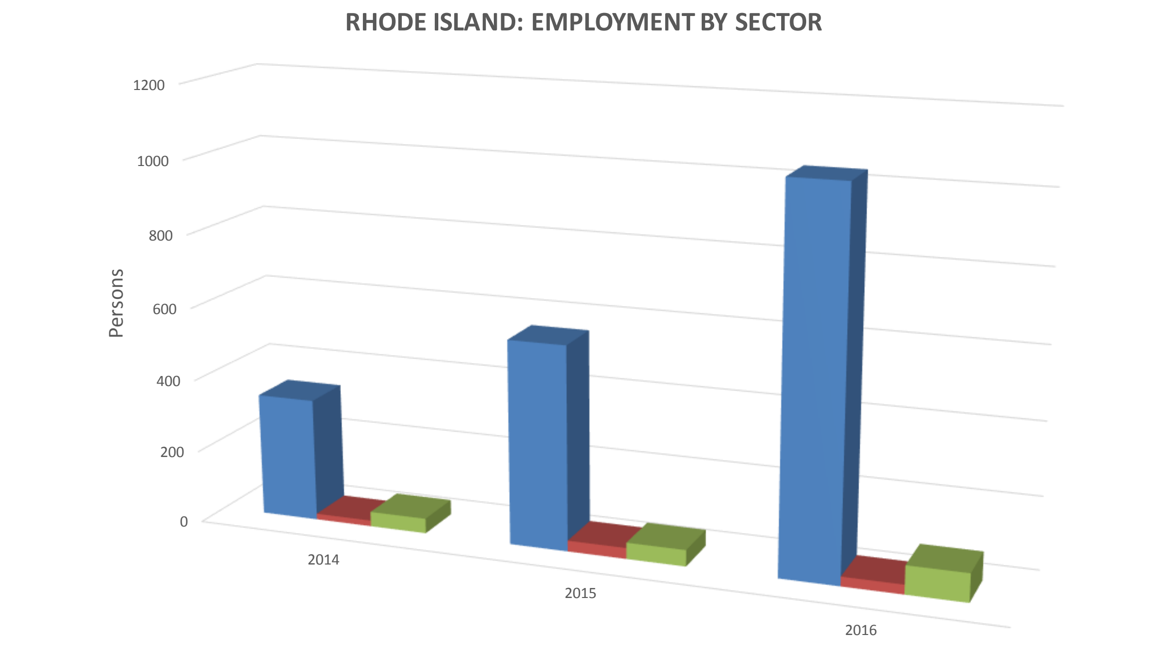
	2014	2015	2016
Accommodation and food services	22.40	38.78	69.78
Other transport equipment	7.53	14.33	12.95
Construction	6.39	7.40	12.39

Figure 66 – Direct impact of MSP in Rhode Island on value added



	2014	2015	2016
Accommodation and food services	11.83	20.44	36.87
Other transport equipment	2.89	5.74	5.19
Construction	7.53	14.33	12.95

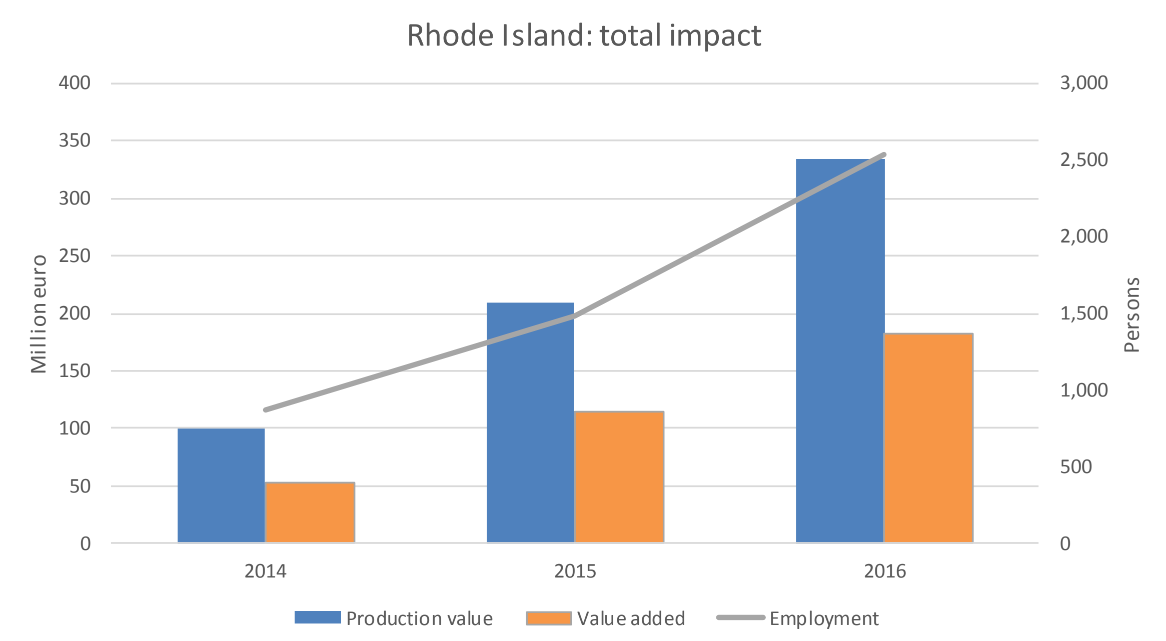
Figure 67 – Direct impact of MSP in Rhode Island on employment



	2014	2015	2016
Accommodation and food services	338	561	1037
Other transport equipment	16	30	26
Construction	41	45	78

The direct impacts of the MSP only tell part of the story as over 50% of the employment impact and 57% of the value added impact is estimated to come from induced expenditure, which is always likely to be high where the dominant economic sectors have high employment levels: the recreation and tourism sector is characterised by a comparatively large workforce that itself lives and spends in the local economy.

Figure 68 - Total impact (direct, indirect and induced) of MSP in Rhode Island on the economy as a whole in the 'medium' scenario



4.7.9 Conclusions

The Rhode Island Ocean SAMP was instigated by a 2006 policy decision to develop offshore renewable energy in Rhode Island. There followed an extensive data collection, survey and consultation process, leading to the Ocean SAMP being published in 2010. It has been continually reviewed and updated since.

The process was led by CRMC, an independent state regulatory agency, which is the planning authority, with scientific and engagement support from the University of Rhode Island. Stakeholders agree that the success of the SAMP has a lot to do with the trust afforded to these long-established organisations.

CRMC also recognise the importance of the legislative power it holds to implement the SAMP, which was extended into federal marine waters through an approval process. This created an area covered by the plan that made operational sense in relation to wind energy development rather than being limited by the artificial constraint of only State waters out 3nmiles.

The catalyst for the SAMP was offshore wind development, but it was launched, prepared and adopted as a comprehensive ecosystem-based marine spatial plan, not as a renewable energy facility siting plan.

The first commercial wind farm, Block Island, is relatively modest in size with five turbines that only became operational in 2017. This is too recent for the available Ocean Economy data up to 2016 to show. A second much larger (50 turbine) wind farm will begin construction in 2020.

The Ocean SAMP clearly made the outcomes more certain; reduced project development costs for the developers and significantly sped up the consenting process. A more certain and rapid development phase has tangible benefits in terms of reduced project risk and lower financial costs as interest rates and loan periods can be reduced. These are highly significant cost savings for the renewable energy sector.

It is too soon to fully appreciate the impacts resulting from the development of the Renewable Energy sector in Rhode Island, but these are expected to be significant over the next ten years as more wind farms are licensed and built.

There has been an upturn in marine construction and transport as these major construction projects get underway. Also benefits to the local economy such as eating and drinking and accommodation providers during the construction phase. In the long term, operation and maintenance will provide permanent jobs and the need for vessel services.

Commercial fishers are expected to see some restrictions to their operations and have agreed a compensation package with developers as a result. The Ocean SAMP facilitated these negotiations with independent information and an ongoing engagement process. Recreational fishers, an important economic sector for Rhode Island, expect there may be benefits to their sport in the long term.

There is some evidence of a positive impact on the most valuable Ocean Economy sector, recreation and tourism, so far and there has been considerable tourist interest in the first U.S. offshore wind farm. The long-term impact is not known as the novelty factor will reduce, but developments are intended to be sufficiently offshore to avoid reducing coastal amenity value.

4.8 Cost-Benefit Analysis

Cost-Benefit Analysis (CBA) is one of the most comprehensive methodologies for assessing whether a public policy such as MSP contributes to improving social welfare, i.e. if the benefits brought about by MSP to the society as a whole exceed its costs, and thus overall welfare is increased in contrast to an alternative scenario without MSP[54]. The practical application of this methodology requires the collection of a set of information (not always easy to obtain) on the social costs and benefits of the main actors involved in MSP.

Regrettably, in the context of this study, the available information is not sufficient to carry out a complete CBA that gives a clear and precise answer to this objective. However, it is still possible to develop an initial framework, by building on the information collected for the Belgian case studies, for which more data are available.

4.8.1 Identification and quantification of social costs and benefits

The implementation of MSP requires a public administration to allocate resources to carry out different activities, such as preparation, implementation and monitoring/feedback. It is important to identify these resources and quantify them in monetary terms, because, once earmarked for MSP, by definition they cannot be allocated to alternative, potentially more productive, uses. In practice, this implies that when an administration spends money to fund MSP, it loses the opportunity to spend the same amount of money for something else. The value of the "lost opportunity" in economics is referred to opportunity cost, which can also be defined as the "value of the road not taken".

While working on the case studies, the public authorities involved in MSP were submitted a questionnaire designed to obtain data on the costs related to the MSP process (Table 77). For each step of the MSP process, the interviewees were asked to allocate the corresponding annual costs. For example, in the preparation phase, information was requested on the annual budget/costs for 8 typical tasks, from the costs associated with initial studies (scoping exercises) to those related to expropriations and compensations. For the elaboration phase, information was requested on 6 tasks, and for the implementation and follow-up phase, information was requested on 7 tasks.

Table 77 - Breakdown of public administration costs associated with MSP

Phases	Activity	Year 1	...	Year n
1. Preparation	1.1. Initial studies	:	:	:
	1.2. Subcontracted services	:	:	:
	1.3. Assessment of conflicts of use	:	:	:
	1.4. Analysis of sources of income to finance the activities of MSP	:	:	:
	1.5. Organization of meetings, departments, etc. to select MSP objectives	:	:	:
	1.6. Ex-ante evaluations of the objectives selected	:	:	:
	1.7. Studies assessing the economic contribution of the various sectors of activity linked to the sea	:	:	:
	1.8. Expropriation and compensation costs	:	:	:
	1.9. Other			

[54] With this approach we are assuming what in economics is known as the *Kaldor-Hicks compensation principle*. These authors recognise that any social change generates gains for some and losses for others, and argue that such changes lead to a Pareto improvement provided that the "winners" can compensate – at least hypothetically with what they gain – the losers.

Phases	Activity	Year 1	...	Year n
2. Elaboration	2.1. Initial studies	:	:	:
	2.2. Subcontracted services	:	:	:
	2.3. Studies on the spatial and temporal distribution density of human the off-shore activities	:	:	:
	2.4. Preparation of maps (GIS)	:	:	:
	2.5. Identification of potential alternative human uses of marine space	:	:	:
	2.6. Analysis of incentives, institutional regimes and criteria for selecting spatial management measures	:	:	:
	2.7. Other			
3. Implementation and follow-up	3.1. Follow-up studies	:	:	:
	3.2. Subcontracted services	:	:	:
	3.3. Creation of a MSP agency	:	:	:
	3.4. Monitoring activities of the plan	:	:	:
	3.5. Cost and expenditures in the control of the plan	:	:	:
	3.6. Adaptation of the plan to new conditions or uses	:	:	:
	3.7. Management of the information reported	:	:	:
	3.8. Other			

However, the information collected from the interviewed public authorities was very limited and in most cases non-existent. According to the interviewees, this might be due to a number of reasons. In some instances, the planning authorities are simply not concerned with monitoring the exact amount of all costs associated with MSP; in some other, a full overview is difficult to obtain, because the totality of costs is apportioned among different branches of public administration.

Incidentally, the lack of information on the costs of MSP highlights a problem that should be dealt with in future work, that is to support public administrations for the collection of precise information about the budget and costs to design and establish MSP.

4.8.2 The Belgian case

The only case study for which there is some information on the costs borne by the Public Administration is Belgium. The data obtained is summarised in Table 78, although not all the costs actually incurred are reported. In 2012, which is the first year for which MSP information is available, the costs are divided into 3 items: subcontracting of services with 49,174 euro; preparation of maps 30,008 euro and; organisation of meetings with 3,000 euro. From 2013 to 2016, no costs are reported (except for 3,000 euro related to the organisation of meetings in 2013). In 2017, 4 cost items are reported for studies, subcontracting of services, supervision activities and adaptation to new uses for a total amount of 112,000 euro. In the last two years (2018 and 2019) there are some costs associated with studies.

Table 78 - Costs and expenditures for the MSP process in Belgium

Phases	Activity	2012	2013	2014	2015	2016	2017	2018	2019
1. Design	1.1 Initial studies	:	:	:	:	:	:	:	:
	1.2. Subcontracted services	49,174.4	:	:	:	:	:	:	:
	1.3. Studies on valuation of conflicts	:	:	:	:	:	:	:	:
	1.4. Analysis of sources of income to finance the activities of MSP	:	:	:	:	:	:	:	:
	1.5. Organization of meetings, departments, etc. to select MSP objectives	3,000	3.000	:	:	:	:	:	:
	1.6. Ex-ante evaluations of the objectives selected	:	:	:	:	:	:	:	:
	1.7. Studies assessing the economic contribution of the various sectors of activity linked to the sea	:	:	:	:	:	:	:	:
	1.8. Expropriation and compensation costs	:	:	:	:	:	:	:	:
	2.1. Initial studies	:	:	:	:	:	:	:	:
2. Elaboration	2.2. Subcontracted services	:	:	:	:	:	:	:	:
	2.3. Studies on the distribution and spatial and temporal density of human off-shore activities	:	:	:	:	:	:	:	:
	2.4. Preparation of maps	30,008	:	:	:	:	:	:	:
	2.5. Identification of potential alternative human uses of marine space	:	:	:	:	:	:	:	:
	2.6. Analysis of incentives, institutional regimes and criteria for selecting spatial management measures	:	:	:	:	:	:	:	:
	3.1. Follow-up studies	:	:	:	:	:	20,000	20,000	30,000
3. Implementation and follow-up	3.2. Subcontracted services	:	:	:	:	:	50,000	:	:
	3.3. Creation of a MSP agency	:	:	:	:	:	:	:	:
	3.4. Monitoring activities of the plan	:	:	:	:	:	12,000	:	:
	3.5. Cost and expenditures in the control of the plan	:	:	:	:	:	:	:	:
	3.6. Adaptation of the plan to new conditions or uses	:	:	:	:	:	30,000	:	:
	3.7. Management of the information reported	:	:	:	:	:	:	:	:

Source: own elaboration based on interviews with the planning authority.

The questionnaire that was sent also requested information on the number of full-time staff that the public administration assigned to tasks related to MSP. In the case of Belgium, from 3 to 6 full-time staff worked on MSP (Table 79).

Table 79 - Staff and staff costs for MSP in Belgium

	2012	2013	2014	2015	2016	2017	2018	2019
Staff assigned to MSP (no. of FTE)	4	3	6.5	4	3.5	5	6	3.5
Staff costs (in euro)	183,544	138,591	301,932	185,916	162,848	237,635	290,730	162,140

Source: own elaboration based on interviews and Eurostat.

With this information and with the information available from Eurostat on average wages received by employees in Belgium, we have calculated the personnel costs for MSP in Belgium. The amount obtained varies between 138,000 and 301,000 euro (current value).

Table 80 - Costs associated with MSP in Belgium

	2012	2013	2014	2015	2016	2017	2018	2019
Cost of MSP activities (€ 2010)	79,009.4	2,854.3	:	:	:	101,218.2	17,873.4	79,009.4
Staff Cost (€ 2010)	176,457.5	131,860.8	285,242	173,906	149,625.6	214,758.9	259,817	176,457.5
Total annual cost	255,466.9	134,715.1	285,242	173,906	149,625.6	315,977.1	277,690.4	255,466.9

For each year, Table 80 reports information on total costs incurred by the public administration, aggregating the costs for carrying out the activities linked to the different stages of MSP and the personnel costs, all expressed in euros for the year 2010. The minimum cost data is obtained in 2013 (with an amount of 134,000 euros in 2010) and the maximum amount is reached in 2014 (with an amount of 285,000 euros in 2010). The aggregate amount for the 2012-2016 period amounts to 998,955 euro.

This information might underestimate the actual costs incurred by the public administration, and it should be considered as a minimum threshold for wage costs. In any case, the available information enables to at least try to answer the question whether the public administration can recover its costs through an increase in the tax revenue of the sectors involved in MSP.

The results obtained in the input-output analysis are the baseline to estimate the tax revenues. Specifically, the results provide information on the direct impact[55] of MSP measured through the variation in production or the gross value added of the sectors directly involved, which make up the blue economy. The direct impact translates into variations in final consumption, compensation of employees and variations in gross operating surplus and mixed income. If these three types of variations are positive, they will lead to a revenue increase for the public administration through the operation of its tax system.

Therefore, the tax revenue resulting from the change in final consumption can be approximated by applying the average VAT rate in Belgium to the amount of that change[56]. On the other hand, the tax collection derived from salary variations can be

[55] The amount of the direct impact may vary based on the scenario used, according to the assessment made by the stakeholders regarding the impact that the MSP has on the results of each sector and for which we have constructed 3 scenarios (low, medium or high incidence).
[56] In Belgium the VAT rate ranges from 21% (which is the standard rate), 12% (in housing, restaurants, etc.) and 6% (in food, water or medicine)

estimated by assuming the minimum nominal rate in income tax[57], and the variation in gross operating surplus and mixed income by applying the nominal rate of corporation tax on small and medium-sized enterprises[58].

As we can see in Table 81, the additional tax revenue exceeds the costs incurred by the public administration. This holds true in each of the 3 scenarios considered (low, medium, high). In the low scenario, the additional tax revenue attributable to MSP during the 2014-2016 period amounts to 45 million euro, which become 98 million euro in the high scenario, against accumulated costs for the Public Administration of almost 1 million euro.

Table 81 - Net income for Public Administration derived from the implementation of MSP (In millions of constant euros €2010)

	Accumulated Tax Income (benefits) 2014-2016	Cumulated costs 2012-2016	Income - Costs
Low Scenario	45,18		44,18
Medium Scenario	71,97	0,998	70,97
High Scenario	98,78		97,78

As seen in the previous sections, with the implementation of MSP, some sectors may reap benefits and some other may bear losses. The CBA allows the quantification of this positive and negative impacts. The impacts originate from changes in the gross value added of the sectors directly involved (direct impacts); they also cause changes in the gross value added of the sectors that provide inputs to the sectors of the blue economy (indirect effects), and in the rest of the sectors of the economy, as a result of an increase in demand (induced effects).

By analysing the direct effects during the period 2014-2016, and considering the 3 impact scenarios of MSP, an approximation of how the benefits and costs are distributed among the different sectors can be developed (see Table 82 and Table 83). As one can see, there are 11 sectors affected, 7 of which reaping benefits. The benefits that MSP brings to these 7 sectors range from 212.8 million euro in the low impact scenario to 490 million euro in the high impact scenario.

At the opposite end of the spectrum, there are 4 sectors that are seemingly bearing losses in connection with MSP. These losses range from 3 to 74.9 million euro.

The overall effect on the 11 sectors directly affected by MSP shows a clearly positive balance ranging from 209.8 to 415 million euros over the period 2014-2016.

Table 82 - Profits from the sectors reaping benefits from MSP in Belgium

Sectors reaping benefits	2014-2016		
	Value Added LOW	Value Added MEDIUM	Value Added HIGH

[57] In Belgium, nominal personal income tax rates range from a minimum rate of 25% to a maximum rate of 50%. We consider that the minimum nominal rate is the one that best approximates the average effective rate.
[58] A nominal rate of 20% is applied to SMEs with an income of less than 100,000 euros.

Sectors reaping benefits	2014-2016		
	Units: million €2010	Units: million €2010	Units: million €2010
B - Mining and quarrying	27,36	31,93	36,48
D - Electricity, gas, steam and air conditioning supply	176,74	206,2	235,65
F - Construction	2,46	32,03	61,62
G46 - Wholesale trade, except of motor vehicles and motorcycles	0,04	0,49	0,93
H50 - Water transport	2,31	29,97	57,64
H52 - Warehousing and support activities for transportation	2,56	33,33	64,09
N 79 - Travel agency, tour operator reservation service and related activities	1,35	17,49	33,65
PROFIT BALANCE	**212,82**	**351,45**	**490,07**

Table 83 - Costs from the sectors bearing losses from MSP in Belgium

Sectors reaping benefits	2014-2016		
	Value Added LOW Units: million €2010	Value Added MEDIUM Units: million €2010	Value Added HIGH Units: million €2010
A03 - Fishing and aquaculture	0,00	-0,03	-0,07
C10-12 - Manufacture of food products; beverages and tobacco products	0,00	-0,02	-0,04
I - Accommodation and food service activities	-1,57	-20,36	-39,16
N77 - Rental and leasing activities	-1,43	-18,53	-35,64
BALANCE COSTS	**-3,00**	**-38,94**	**-74,91**

NET BALANCE PROFIT - COSTS	209,82	312,51	415,16

It is worth noting that a comparison including only the flow of monetary benefits and costs associated with a public policy is not usually sufficient to argue conclusively on the social value of the policy itself. There may be some externalities associated with MSP, such as environmental impact, which are not collected through input-output analysis. As explained throughout the report, environmental benefits can and should be quantified in monetary terms, and so they contribute to the total benefits generated by any given policy. However, MSP-related environmental benefits are out of the scope of this study and will be analysed by another study funded by the EU Commission. Suffice it to say that, without taking them into account, the overall benefits brought about by MSP are most certainly underestimated.

5 Final workshop

Task 5 of the project required organising a Closing Workshop in Brussels and setting up a *peer review* process. The overarching objective was to assess and validate the preliminary results of the study, with a special focus on the five case studies, which sought to quantify the economic benefits derived from the implementation of MSP.

External peer-review is a well-established method to increase the quality of any piece of writing, and so Task 5 plays an important role in ensuring that the results of the study are presented in accordance with the highest academic standards. Therefore, the workshop and the peer review were organised, as required in the Tender Specifications for this Study, so to maximise inputs that could be relevant to the project.

The workshop took place at Hotel Bloom in Brussels on 29 October 2019, towards the end of the project. The morning session consisted of a presentation of the Study results by the project partners, followed by a discussion with economists, international experts and stakeholders. The afternoon session was dedicated to interactive sessions in "world café" format to allow for maximum input and exchange of ideas.

The full workshop report is available as Annex II to this Final Report. It is recommended to look at it to fully understand how the report changed further to the peer-review process.

5.1 Peer-review process

The peer-review process started a few months before the Workshop. Dr Karyn Morrissey, from the University of Exeter (UK), took up the role of Chairperson, supported by the experts of the Consortium. Twelve experts were selected to review the deliverables produced over the course of the Study. The list of experts was established in close collaboration with the Contracting Authority and was approved by the Steering Group.

Bringing together a panel of independent experts was important not only to evaluate and validate the preliminary results of the Study, but also to make sure that any possible gaps or shortcomings as well as potentially relevant missing papers, reports, result interpretation, discussion or other kind of information that was not taken into account in the study were identified.

To facilitate the discussions during the workshop, the background material was distributed to 12 experts (most of whom with an economic background) plus the Chairperson one month in advance of the meeting. A reminder email with a copy of all documents was sent a second time 10 days before the Workshop. The Chairperson managed the peer-review before the workshop, and oversaw the drafting of a report, with the Consortium team supporting the Chairperson in organising the peer-review process. The review report was sent to the Consortium a few days before the workshop, so to optimise its flow and to make sure all of the important issues could be addressed on that day.

5.2 Summary of the discussion

The Consortium highlighted that it would be important to be aware that the Study Report is not to be considered as a scientific publication, even though there was a thorough peer-review.

The Consortium also ensured that they would be working on all comments received, so to give an individual reply to each reviewer. However, it was also stressed that not all comments might be addressed, given the timeframe of the study, and the requests set out in the Tender Specifications.

Several participants pointed out that environmental benefits and ecosystem services should be taken into account in such a study. However, this was beyond the scope of this project and will be addressed in another project soon.

The chairperson thanked all reviewers and Consortium partners for being open to the comments received, the very good support and organisation and the professionalism displayed.

DG MARE stated that the project provides interesting results and the workshop discussions were very interesting. As formally required in the contract, a report of this workshop will need to be provided as an annex to the final report (see Annex II).

6 Lessons learned

Overall, the results of the case study are very much in line with the limited available literature on the economic impact of MSP, as reported in the first three chapters of this report.

The following sections seek to answer certain research questions, based on the study findings.

6.1 Does MSP generate economic benefits

The 5 case studies developed for this study seem to indicate that MSP does generate economic benefits when it is implemented. Belgium and Germany are clear examples of that. In Norway, the overall impact is negative, but that is largely due to the downward trend of the oil and gas industry, which, however, does not seem to be influenced by MSP at all. In Scotland and Rhode Island, it might be too early to draw conclusions grounded on statistical analysis, but the general perception among stakeholders is that MSP is benefitting the blue economy, or at least part of it.

Nevertheless, there cannot possibly be an unequivocal answer to this question. At its heart, MSP is a policy choice of allocating marine space to different, competing economic sectors, based on an array of criteria set by a planning authority. There is no guarantee that the practice can generate economic benefits per se; nor does it have to in the first place, as throughout the study we have seen that when many countries resolve to implement MSP – the Norwegian case study epitomises this – they are primarily driven by environmental concerns, and thus they might in theory be willing to pursue it, even if the strictly economy impact were negative.

However, there is a number of reasons for thinking that, besides being a legal obligation for EU Member States starting from 2021, it might be a wise idea to establish MSP also to spur growth in the blue economy. For millennia, humans used the oceans essentially for procuring food and moving goods and people from one place to another. More recently, however, the emergence of new technologies has transformed the oceans in a source of economic prosperity and sustainable growth, beyond its traditional uses. Today, the blue economy encompasses activities such as offshore wind energy, marine renewable energy, seaweed cultivation, etc.

All these activities compete for the same ocean space. In some cases, they are mutually exclusive, while in some other cases they can peacefully co-exist and also create synergies with each other; either way, a framework to regulate them is necessary. Fishing and shipping contended for ocean space by and large based on the principle of “first come, first served”. With many more activities that could potentially exploit the same area, “first come, first served” might not make much sense from the economic point of view. However vast, ocean space is still finite, and in great demand. If the potential of the blue economy, whether from traditional or emerging sectors, is to be unleashed, economic activities should not be left to compete against each other in their quest for marine space. It is in the interest of society as a whole that the potential benefits from the blue economy in its entirety are maximised, by apportioning and optimising space in such a way as to let all uses be carried out productively and sustainably.

In this sense, it can be argued that MSP is beneficial both to the blue economy and to the economy as a whole. Naturally, whether in practice its benefits outweigh its costs is a matter that needs to be settled case by case. Albeit limited, evidence from the case studies (Belgium, Germany, and Rhode Island) points to some key preconditions for MSP to be successful.

One of these preconditions has to do with cooperation and preparation, which would ideally need to start long in advance before the entry into force of a plan. A stable framework, one that generates certainty, stability and trust, is not built overnight, but rather is meticulously crafted over time. In Belgium, Germany and Rhode Island precursors to the actual maritime spatial plans started even a decade before the entry into force of the legal document. The quantitative and qualitative evidence gathered during the study indicates that this approach pays off in the long run.

Consultation is another important precondition. Oceans are used by different sectors of the economy, and all voices should be heard. States and planning authorities, of course, remain in charge of establishing their own priorities, but it is paramount that no actor that will eventually be affected by MSP feels neglected during the preparation process. Once again, the case studies reveal some interesting clues. Quite often, fishers complained that the MSP process resulted in a loss of fishing opportunities for them. Whether this was right or wrong, the way negotiations are framed can make a difference. For instance, in Rhode Island fishers are positive about the role played by the maritime spatial plan, even though overall the impact of developments on their sector is expected to be negative. The plan provided independent information and facilitated discussions to enable compensation packages to be negotiated. Rhode Island was pro-active in conducting a mitigation programme ahead of the plan, which provided a template for defining the economic impact of developments. This allowed for what commercial fishers term the 'least worst' situation with regards to the impact of developments on the sector.

Finally, while the evidence gathered during the study points towards a positive contribution of MSP to the economy, it should be noted that its impact on economic indicators is rather limited, when compared with other macroeconomic and/or sector drivers (e.g. international agreements on maritime routes, new sources of energy, climate change-, price of raw materials). MSP can thus generate economic benefits, but one cannot expect that it may reverse global sector trends. The Norwegian case study shows that there is nothing MSP could possibly do to reverse the downward trend of the oil and gas industry, which is suffering from depletion of resources, and high extraction costs.

That being said, MSP might act as a catalyst for new political and economic developments; it might anticipate or strengthen a trend, or it might contribute to limiting damage during a downturn.

6.2 Which blue economy sectors benefit the most from MSP?

Once again, it is extremely difficult to give a conclusive answer. Generally speaking, the results of the study are very much in line with the existing literature, and indicate that plans have typically not brought major economic benefits to incumbent industries such as commercial and recreational fisheries, oil and gas extraction, etc. Emerging sectors, especially offshore wind, tend to reap higher benefits, in some cases to the detriment of other traditional activities – or at least that often is the view of stakeholders from the incumbent industries.

At the same time, this cannot possibly be an inherent feature of MSP; it rather is a deliberate policy choice made by the planning authorities. It is perfectly legitimate for a planning authority to prioritise one or more sectors over the others. The MSP Directive goes in the same direction and leaves full leeway to the Member States when it comes to the actual content of their plans.

The German case study offers a perfect example of that. The plan clearly sets shipping and offshore wind as priority uses of Germany's Baltic Sea area, and our analysis confirms that these sectors ended up benefitting the most from the plan itself. In a sense, from the policy angle, it can be argued that Germany's Baltic maritime spatial plan is a success story, because it achieves the objectives it set in the first place.

So, generally speaking, depending on the preferred policy choice, certain sectors may reap more benefits from MSP than others. The fact that most of the times emerging sectors seem to be more advantaged than incumbent industries might reflect a policy preference towards clean energy and sustainable use of resources, as a result of the increasing groundswell of public and policy opinion towards environmental conservation, as well as of the internationally-agreed emission reduction targets.

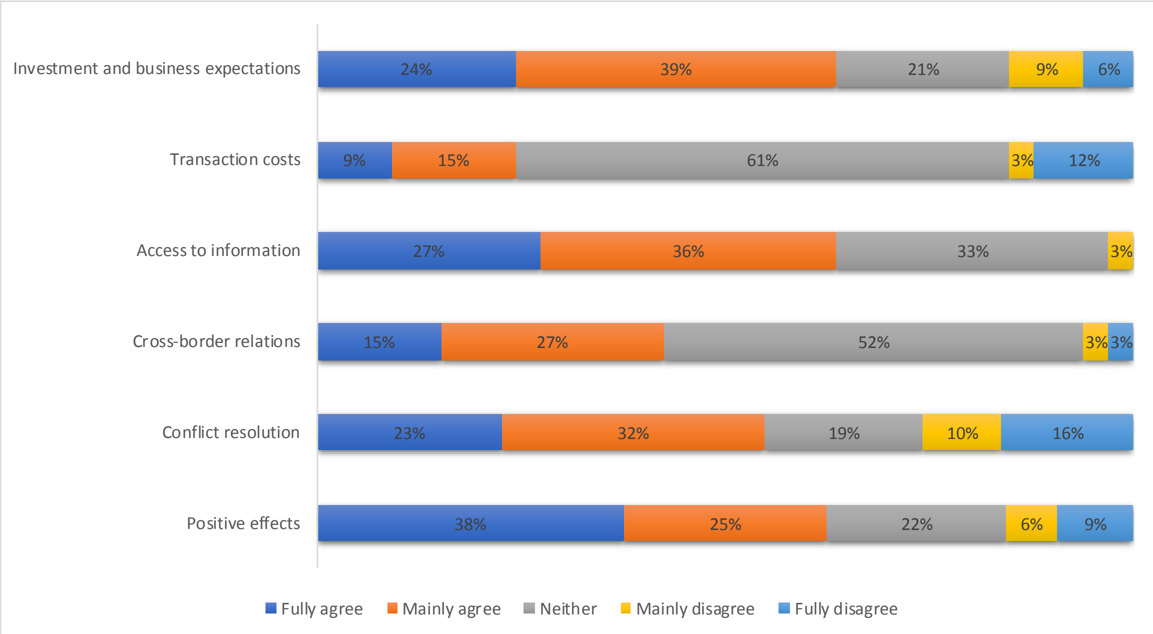
There might also be another reason why the offshore wind sector consistently reaps higher benefits from MSP than its traditional competitors for ocean space. In the past, activities such as fishing and shipping used to have the entire ocean for themselves. Potential conflicts were easily dealt with by establishing shipping lanes and fishing areas. However, over time, ocean space has become increasingly crowded and regulated. While some activities can – and are actually encouraged to – co-exist in the same space, the general rule is that opening up ocean space to a new use leaves existing uses with relatively less space for them. In this moment, offshore wind is the "most mature emerging activity" in the blue economy, and it is perfectly logical that planning authorities allocate new space for it. The case studies of Belgium, Germany, Scotland and Rhode Island cover a time span which coincides with the onset of the offshore wind industry in those regions and with the construction (or authorisation) of the first wind farms. In some cases, it might be argued that the increased competition for space driven by the wind farms made evident the need for planning the use of ocean space. It follows that the offshore wind sector went from ground zero to rapid growth, whereas stakeholders from incumbent industries quite often felt this rapid change as a threat to their business.

At the same time, it should be noted that traditional industries such as fisheries and offshore oil & gas are also affected by structural changes that are having a negative impact on their output, such as endangered commercial stocks and resource depletion. The relative loss of ocean space in favour of the offshore wind sector does not necessarily leads to a linear reduction in their output. In fact, because wind farms would have been built anyway in a way or another, it might well be argued the MSP process helped limit damage and deliver what Rhode Island fishers (see previous paragraph) called the "least worst" outcome.

In conclusion, if one accepts the principle that ocean space may be opened up to new uses, it is true that these new uses might subtract space previously used by incumbent industries, but it is equally true that without planning, consultation and negotiation, the loss of space might be even more harmful. The handbook example here is a wind farm that was going to be built on an especially productive fishing ground[59], but thanks to careful planning was built elsewhere.

6.3 Which type of benefits does MSP bring to stakeholders?

Figure 69 – MSP benefits according to the stakeholders interviewed



* To be noted this table is based on all the answers received, regardless of sector and country. Since stakeholder perception of MSP varies considerably depending on country and sector, it is recommended that the individual case studies be looked at.

Both the analysis of literature and the case studies confirm that MSP brings a number of indirect benefits to stakeholders. Generally speaking, stakeholders also see MSP favourably, even though they are not always able to quantify these indirect benefits. In particular, they seem to think that MSP **increases legal stability and certainty**, which are normally considered as drivers for economic growth. Increased stability and certainty were consistently reported as a benefit in all the case studies developed for this study. Even in Norway, where the link between MSP and economic growth seems to be rather weak, stakeholders clearly saw a benefit in having a stable and predictable framework for their business. However, it remains to be understood to what extent they value increased stability and certainty, as very few of them – mostly from the offshore wind sector – declared that the existence of a maritime spatial plan is influencing their **investments** and their **business decisions**.

Another important benefit is better **access to information** and increased **data availability**. Because the MSP process is quite intensive in terms of data collection and processing, usually the planning process has the unintended benefit of making available a wealth of data on the ocean and its uses, which would otherwise have been unavailable to non-government actors. In this sense, among our case studies, Scotland stands out as a best practice, because its National Marine Plan is supported by an online interactive tool, the NMP interactive (NMPi), together with Scotland's Marine Atlas, which provides an assessment of the condition of the Scottish marine area and a summary of significant pressures The NMPi database was considered by all

[59] Blau J., Green L., Assessing the impact of a new approach to ocean management: Evidence to date from five ocean plans, Marine Policy 56, 2015, pp. 1-8.

stakeholders to provide a comprehensive and accessible information resource, meeting sectoral and societal demands for knowledge and transparency. Its existence means not only that access to marine data has improved significantly with its introduction, but the same data sources are used by regulators/developers/operators to inform decisions, encouraging shared understanding and transparent decision-making.

Another benefit that is consistently reported by stakeholders in all case studies is **conflict resolution**, which in a way is at the heart of MSP. By bringing different actors together in a participatory process, MSP tends to minimise or pre-empt conflicts between uses, between users, as well as between users and regulators. In the case study on Belgium, several interviewees mentioned that MSP stimulated interaction and mutual understanding. Increased legal certainty thanks to MSP enabled coexistence without conflict. A similar point of view was detected in all the other case studies. In Norway, the fishing industry and the oil and gas industry used to agree on how to use marine space bilaterally. Since the entry into force of the Management Plan for the North Sea and the Skagerrak, they have been doing it in the framework of the MSP process.

However, a certain degree of conflict persists, and it is once again recurring in nearly all the case studies. Be it in Germany or Rhode Island, fishers seem rather concerned by new developments in the offshore wind sectors. As mentioned above, albeit worthy of respect, fishers' concerns might fail to acknowledge that, if wind farms are to be built, MSP can offer an effective and participatory framework to reconcile conflicting interests. In other words, if there is a conflict between fisheries and the offshore wind sector, there does not seem to be any evidence to think that without MSP this conflict could be resolved or forestalled.

Much to the surprise of the authors, the study did not confirm the existence of certain benefits traditionally associated with MSP, namely reduction of **transaction costs and reduction of administrative burden**. Stakeholders' opinion on reduction of transaction costs and administrative burden is controversial: very few of them are able to quantify them, but nearly all of them believe that in the end there are no real savings. On the one hand, MSP reduces some administrative costs (e.g. by cutting administrative burden), on the other it increases the costs of compliance (by requiring additional studies). The two effects might cancel each other out. There is one important exception, though: in principle, it is possible that certain sectors are "fast-tracked" by planning authorities and governments, and thus experience a reduction in both transaction costs and administrative burden. For instance, the Rhode Island maritime spatial plan identified a specific development location for a wind farm development, which provided much greater consent certainty. A plan specifying an area that is a preferred location for a development will be of more direct benefit to developers (in terms of reducing risk) than a plan which only provides guidance, perhaps specifying the areas where a development would not be accepted, rather than where it would.

It is interesting to contrast the experience of the Block Island Wind Farm development under the Rhode Island maritime spatial plan with the Cape Wind Project, which was a proposed offshore wind farm off Cape Cod, Massachusetts. Cape Wind attempted for fifteen years to build 130 turbines. The project was eventually approved, but then lost several key contracts and suffered from several licensing and legislative setbacks. Following stakeholder objections, Cape Wind was required to re-commission bird studies at an overall cost of $4million and ultimately the development was not progressed. The developer eventually terminated the lease rights for the site in late 2017. Cape Wind estimated it has spent more than $65 million working through the regulatory and legal challenges. The Block Island Wind Farm not only avoided objection, but received support from a number of stakeholders, and benefitted from the wealth of information developed under the maritime spatial plan. The plan pre-approved renewable energy zones, enabling two wind projects with expected annual gross revenues of $5-10 million and $50-100 million respectively. Rhode Island approved this project in under one year, cutting its permitting process down from nearly five years. According to multiple interviewees, it is quite likely that these projects would not have happened without the plan, which simplified the regulatory process and included stakeholder outreach to all major parties likely to be affected

Therefore, at least based on the limited sample of case studies, the existence of some alleged benefits of MSP seems to rest on anecdotal evidence. Reduction of administrative burden and reduction of transaction costs do not seem to be perceived as such by stakeholders. They might be appreciable for the sectors which a plan prioritises, but overall their do not have a big impact on business.

6.4 How stakeholders view MSP

The previous section gives an overview of the main benefits that stakeholders associate with MSP. As shown in Figure 69 above, it is evident from the case studies that, generally speaking, stakeholders view MSP as a good opportunity to foster coordination between different industries, and generally perceive it as positive.

Nonetheless, the case studies also reveal that the opinion on MSP may vary to a great extent across stakeholders from different sectors (and from different countries). While differences in how MSP is perceived might simply be due to the fact that each plan is the product of unique, local circumstances, some common patterns may be identified.

Apart from few exceptions – which are discussed in the next paragraph – there seems to be a clear fracture between traditional and emerging sectors. For example, it is often the case that fishers associate MSP with diminished opportunities in favour of emerging sectors of the blue economy, such as wind energy. In these cases, as one might expect, those who believe to have been damaged by MSP tend to view it negatively, whereas other groups may hold neutral or more positive opinions.

Interestingly, certain views seem to be common to all stakeholders, regardless the impact (they believe) MSP has had on their business. As discussed in the previous section, nearly all stakeholders believe that MSP increases legal stability and certainty. In other words, simply instigating a public process of allocating ocean space according to clear criteria increases stability and certainty. To be noted that a group of stakeholders might not necessarily think that increased stability and certainty are beneficial to their business, as their judgement depends by and large on whether the new and more predictable business environment favours their sector.

The same can be said when it comes to the impact of MSP on investment and business expectations. 63% of stakeholders believe that MSP exerts some influence on the investment climate, thus altering business expectations. Whether this is seen as a good or a bad feature of MSP is an entirely different story. Again, those who typically benefit from MSP – possibly because it creates a new legal framework for a nascent industry – obviously hold an optimistic outlook on their business. At the same time, it should be noted that in many cases also the stakeholders who are very vocal about MSP have no hesitation in admitting that the process does have an impact on investment climate and business expectations; the difference is that the latter attach a negative connotation to the word impact. It follows that MSP does produce a tangible economic impact, which can be perceived as positive or negative by stakeholders depending on how it affects their business. The net effect of MSP on the whole economy, on the other hand, has to be calculated by factoring in all costs and benefits, as repeated throughout this study.

So, overall, once again it might be difficult to give a full and unambiguous account of how stakeholders view MSP, because their views are inevitably affected by the impact that the plan has had on their business. After all, each plan has unique characteristics, which make it unique and often difficult to compare with other plans. From the point of view of a planner, the real question, thus, is how to win buy-in even from those stakeholders who, absent an inclusive and participatory process, might feel neglected by MSP. This is analysed in the following paragraph.

6.5 Examples of successful stakeholder buy-ins and reasons for success

A buy-in is the fact of accepting a policy or change because one agrees with it. Ideally, the chief objective of any planning authority should be to win every stakeholder's buy-in, even though this might be unrealistic to achieve.

The case studies show that it is relatively easy to win the favour of stakeholders from emergent industries, as quite often the onset of a planning process coincides with the need for securing ocean space to new economic activities. If, in the case studies, one looks at stakeholder replies broken down by sector, it is evident that wind energy developers are enthusiastic about MSP, and for a good reason; the dawn of the industry is accompanied by a stable legal framework, which allocates ocean space and quite often, in the case of wind energy, reduces transaction costs. It is equally as easy to win stakeholders' buy-in, when certain ocean uses are prioritised over others. Certain plans clearly place the development of certain sectors at the top of their priority list. Admittedly, barring unforeseen circumstances, stakeholders from those sectors are supportive of the planning process.

Hence, the real challenge is to win stakeholders' buy-in when conflicts between uses exists, and when some stakeholders, rightly or wrongly, believe that their business has been damaged by MSP. There are multiple ways to do this, and the case studies offer some good examples.

The Scottish case study briefly mentions Multi-Use in European Seas (MUSES), an H2020-project focusing on commercial fisheries and offshore wind farm development on the east coast of Scotland. The project found enhanced multi-use of marine space to bring great potential for improved value for society and local economy, such as longevity of the fishing industry. Opportunity was also noted for combining offshore wind farms with other activities, such as offshore storage, enhanced oil recovery, desalination, wave energy and low-maintenance aquaculture. Specific to offshore wind and commercial fisheries, multi-use recommendations on marine planning included:

- Consideration of multi-use opportunity mapping, as opposed to constraints mapping
- Stronger coexistence policies with explicit reference to multi-use
- Development of good practice guidance on how to construct a wind farm to make it fishing-friendly.

The lesson to learn is that where conflicts exist and when some stakeholders might be damaged by an emerging sector, it would be wise to design the planning process in such a way as to create synergies between competing uses. In practice, this should be done through consultation and negotiation, as ideally all the parties sitting at the same table should be ready to make some concessions to each other.

For instance, in Rhode Island, private sector stakeholders (fisheries, marine trades) appreciated being involved from the outset and the level of consultation was maintained throughout the process. This meant that stakeholders got to know each other and the different perspective of users. There was an understanding that offshore wind development was going to happen and that Rhode Island would benefit socio-economically from being the first. There was therefore a shared objective to make sure that the development was in the right place. This created more of a shared purpose to the MSP process, rather than each sector vying for space. The wind farm developments in Rhode Island are now located offshore, based on restrictions for navigational and military constraints, as well as fisheries resources (the shape of the renewable energy zone was altered to avoid some key fishing grounds). Commercial fishers could input into the location and orientation of the array; bottom-fishing in the area is mainly in an East-West orientation so E-W corridors are part of the array design to allow fishing between turbines to continue.

The Rhode Island case study is particularly inspiring in this sense, because it is one of the few exceptions in which fishers are not unhappy with the development of the offshore wind industry. Even though some losses are still expected, they fully realised that sooner or later wind farms would have been built anyway, and so reconciling conflicting views in the framework of a well-designed planning process has led to what they call the 'least worst' outcome.

Central to this shared solution is the fact that the planning process provided the information and a facilitation process to help agree compensation packages for affected parties. The idea of compensating those who bear losses from MSP may be controversial. In most legal systems, nobody is assigned property rights on ocean space. In fact, even when there is exclusive use of an area, this is normally leased rather than sold. Without an existing allocation of property rights, it is difficult to argue that a new industry bears liability for any damaged caused to the existing industries vying for the same ocean space. Hence, on what grounds ought a wind farm developer compensate, say, fishers?

Reality, however, is more nuanced, and compensation may be an effective means to contribute to solving conflicts. Planning authorities might help negotiate compensation packages to be paid to those suffering economic losses as a consequence of a new allocation of space brought about by MSP. Two approaches can be envisaged: compensation packages can be funded by governments through taxpayers' money, and in this case they would account as costs of MSP, in that they subtract resources from government budget; however, compensation packages can also be paid by those stakeholders who reap benefits as a consequence of a new allocation of space, provided that with what they gain they can compensate the other stakeholders and still make profits.

6.6 Which gaps should be tackled in the future?

Despite the effort made, this study can only be seen as a first step towards the definition of a framework for the quantification of the economic impact of MSP, which can be further improved in the future.

There remain a number of challenges and gaps that ought to be tackled to obtain a more refined measurement of a plan.

The most important challenge regards availability of statistical data. Poor data availability is consistently reported as one of the toughest barriers to economic research on the blue economy. This is mostly due to the current statistical classification systems grouping economic activities according to their function, rather than to where they take place. As a consequence, it is extremely difficult to have access to reliable data for many sectors of the blue economy unless strong assumptions are made.

More and better data would strengthen the reliability and accuracy of the results obtained. The method used for this study mostly relies on Eurostat's Structural Business Statistics (SBS), following the approach of the Blue Economy Report published by the European Commission. However, in many cases MSP is carried out at regional and / or sea-basin level, and the resolution of SBS does not make it possible to break down the data at the desired level.

At the same time, planning authorities do not seem to place too much attention on measuring the economic effects of their plans, probably because environmental conservation is their main concern. They do not measure the impact the plan, they do not measure its cost for the administration. In absence of data from who is implementing the plan, measuring the economic impact of MSP may often remain an exercise fraught with uncertainties.

Another important gap to address regards environmental benefits and ecosystem services. As repeated throughout the report, these are explicitly out of the scope of this work, as another study funded the by EU Commission is dealing with them. However, a complete assessment of the economic benefits from MSP cannot ignore environmental benefits. Quite often, environmental concerns are the main driver behind the MSP process. In addition, through a variety of methods – some of which mentioned in the first chapters of this study – they can and should be quantified in monetary terms. While carrying out cost-benefit analysis, it is not unusual for a project or an investment to be considered viable only when environmental externalities are factored in. This is because the benefits from a healthier environment often outweigh the flow of strictly economic benefits, or make up for high investment costs.

Without data from planning authorities on the costs of MSP, and without taking into account environmental externalities, it is not possible to carry out a complete cost-benefit analysis, i.e. it is not possible to establish the viability of MSP in terms of social welfare.

Over the next year, it is expected that an increasing number of EU Member States will publish their maritime spatial plans, as the 2021 deadline set by the MSP Directive gets closer. It might be the perfect occasion to fine-tune the framework developed under this study and test it with better and more abundant data. Should some Member States approve regional plans at different moments in time, it could be an opportunity to use different regions within the same Member State as control groups for each other and verify whether the effects of MSP materialise with the same time lag.

Annex I - Bank of documents

The 'bank of documents' is a collection of 'fiches' with basic information on the reviewed papers and reports from aggregate 'N4'. For more details, please see Chapter 1 'Review of literature'.

Identification	**Author**	Jason Blau, Lee Green
	Title	Assessing the impact of a new approach to ocean management: Evidence to date from five ocean plans
	Source/journal	Marine Policy
	Impact Factor	Impact factor: 2.109 5-year Impact factor: 2.495
	Year	2015
Classification	**Functional classification**	Economic environment
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Benefits and impacts
	Sectors involved	Wind energy, fisheries, shipping, tourism
	Number and profile of stakeholders involved (e.g. private, public, organisation)	50 interviewees: agency personnel, conservation groups, wind industry professionals, fishermen, other ocean users and academics (not specified)
	Temporal Scope	Not available
	Geographical Scope	Belgium, Norway (Barents Sea), Massachusetts, Rhode Island, Australia (Great Barrier Reef)
	Status (ongoing, fully implemented)	Fully-implemented plans
	Methods used	Semi-structured (confidential) interviews; cost-benefit analysis
Qualitative assessment	**Informative summary**	• The study aims to quantify the economic costs and benefits of spatial plans • It undertakes 5 case studies: in Massachusetts, Rhode Island, Great Barrier Reef Marine Park, Norway and Belgium • Case studies and expert interviews are used because the plans are relatively new and there's a lack of quantitative data. • The plans studied likely created approximately $310 million, mainly through offshore wind developments in Rhode Island and Belgium. • Belgium's new (as of 2015) offshore wind farms provide approximately $230 million in annual gross revenues • Money was saved thanks to the plan, by speeding up the permitting process • Some sectors were damaged by the plans. E.g. in Australia and Rhode Island the government decided to compensate fishermen for their expected losses. However, in the Netherlands and Germany, planners expect losses to be negligible, as fishing revenue is more constrained by overfishing than by lack of space. • Sand and gravel extraction was also 'damaged' by the plans in Massachusetts and Belgium. • In all case studies outside the US, government have shouldered any additional costs within agency budgets. • Not all economic benefits have been shared equally. Major capital-intensive projects like wind farms have reaped the biggest economic benefits mainly arising from greater certainty and speed of regulatory processes. • Plans have typically not brought major economic benefits to incumbent industry such as commercial and recreational fisheries, tourism and shipping. • The net impact on government costs is likely small
	Main aspects and contributions to our study	The scope of the paper is quite similar to that of our study. The method is also quite similar: a quantification of costs and benefits for the sectors involved, complemented with semi-structured interviews, because of lack of quantitative data. However, the method is not well detailed, and it is not clear how costs and benefits have been quantified. The paper shows that some sectors may reap benefits from MSP while some other may bear additional costs. The net effect found is positive, but this essentially depends on the policy choices made. Government costs (estimated through interviews) seem to be negligible.
	Any reference source to economic data	GHK Consulting, Wilson S. Potential benefits of marine spatial planning to economic activity in the UK. Sandy, United Kingdom: Royal Society for the Protection of Birds; 2004. (http://www.rspb.org.uk/Images/MSPUK_tcm9-132923.pdf)
	Comments	In Rhode Island fishermen negotiated a compensation package worth $285,000 per year from the smaller Block Island wind farm (Kaldor-Hicks Improvement)

Identification	**Author**	Reniel B. Cabral, Steven D. Gaines, Brett A. Johnson, Tom W. Bell, and Crow White
	Title	Drivers of redistribution of fishing and non-fishing effort after the implementation of a marine protected area network
	Source/journal	Ecological Applications, 27(2), 2017, pp. 416-428
	Impact Factor	Impact factor: 4.393
	Year	2017
Classification	**Functional classification**	Economic environment
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Methods (spatial analysis)
	Sectors involved	Fisheries
	Number and profile of stakeholders involved (e.g. private, public, organisation)	No stakeholders involved
	Temporal Scope	1997-2011
	Geographical Scope	California Channel Islands
	Status (ongoing, fully implemented)	Fully-implemented marine protected areas (not spatial plans)
	Methods used	Aerial surveys, statistical analysis (generalised linear model, Poisson regression), spatial analysis
Qualitative assessment	**Informative summary**	• The establishment of a MPA can change the spatial pattern of commercial and recreational fisheries.
	Main aspects and contributions to our study	The paper provides a method to understand how fishing effort is redistributed following the implementation of a marine protected area. In theory, this method could be used to estimate the economic benefits or costs generated for the fisheries sector by a spatial plan. In practice, it is difficult to replicate it, as it requires long time-series of fly-over data, which are not normally available.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Francois Bastardie, J. Rasmus Nielsen, O. R. Eigaard, H. O. Fock, P. Jonsson, and V. Bartolino
	Title	Competition for marine space: modelling the Baltic Sea fisheries and effort displacement under spatial restrictions
	Source/journal	ICES Journal of Marine Science (2015), 72(3), 824-840
	Impact Factor	Impact factor: 2.906 5-year Impact factor: 2.969
	Year	2015
Classification	**Functional classification**	Transaction costs
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Theoretical/Methodological
	Thematic	Methods
	Sectors involved	Fisheries
	Number and profile of stakeholders involved (e.g. private, public, organisation)	No stakeholders involved
	Temporal Scope	Not available
	Geographical Scope	Western Baltic Sea (Danish, German, and Swedish vessels)
	Status (ongoing, fully implemented)	Planned restrictions
	Methods used	Logbook landing declarations coupled to VMS data; Quantitative bio-economic analysis (DISPLACE model); elaboration of scenarios (revenue, GVA, energy efficiency)
Qualitative assessment	**Informative summary**	• The baseline 2012 situation reveals that the planned offshore wind mill parks in the western Baltic Sea do not really interfere with important fishing grounds for the Danish fisheries. A notable exception is the large "Kriegers Flak" site where wind turbines are intended to beshared between Denmark, Germany, and ultimately Sweden. • Overall, most of the investigated scenarios affect the trip planning decisions with adverse significant consequences on energy efficiency (so, a cost) • However, two scenarios did not alter the current profitability of the fisheries more than a 2%decrease, and no net increase in fuel cost is estimated • There is extensive contrast in the outcomes of the scenarios between the individual vessels because of adverse impact on fuel cost and the profitability. The positive effects measured at the fishery scale could, among other explanations, be due to the detriment of some vessels that cannot easily cope economically with the implementation of the restricted areas by lowering their catch rates and individual catches. • The effort displacement is beneficial for the stocks under study, and therefore beneficial for the Baltic fisheries overall
	Main aspects and contributions to our study	The tool is designed to assist optimal decision-making in reaction to stock fluctuations, changes in available space for fishing, and management actions, at the finest scale available. The model offers a detailed level of understanding on how stable profits and more energy-efficient fisheries are possible, even if a zonation reduces the fishing opportunities and the number of fishing grounds. The paper is partially out of scope with respect to the MSP study and plus, DISPLACE is quite data demanding, including satellite-based VMS data and biological information that are included in the modelling at various scales over a range of species and biological and economic processes and functional relationships.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Alison W. Bates
	Title	Revisiting Approaches to Marine Spatial Planning: Perspectives on and Implications for the United States
	Source/journal	Agricultural and Resource Economics Review 46/2 (August 2017) 206–223
	Impact Factor	Impact factor: 0.93 (2015)
	Year	2017
Classification	**Functional classification**	Public policy
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Descriptive
	Thematic	Key success factors; Positive relations for stakeholders involvement
	Sectors involved	Mainly wind energy
	Number and profile of stakeholders involved (e.g. private, public, organisation)	No stakeholders involved
	Temporal Scope	Not applicable
	Geographical Scope	Mainly US
	Status (ongoing, fully implemented)	No plan is analysed specifically
	Methods used	No methods are used. The paper is simply a description of possible approaches
Qualitative assessment	**Informative summary**	• MSP in the United States can be implemented at multiple spatial scales: national, regional, or state-level. • MSP in the United States bears little similarity to experiences abroad • In the US, there is no coordinated MSP effort, although President Obama addressed MSP through Executive Order 13547, establishing the National Ocean Policy (NOP) for the oceans, coasts and great lakes. However, this order emphasises a regional, rather than national, approach to ocean planning. • In Rhode Island, proactive stakeholder engagement may have alleviated implementation delays due to opposition from key ocean users, and could also lead to jointly determined siting decisions for new technologies or mitigation measures that are effective, minimise costs, and are mutually agreeable. • The process of engaging the public in a meaningful way is a vital step in planning for future uses of the ocean • Thorough assessments of affected communities before energy developments are underway can increase economic efficiency and avoid lengthy and costly delays in project development • Quantitative studies can analyze the potential conflicts between current and future ocean uses, and optimise scenarios for development that maximise value. • Although MSP aims to balance multiple uses of the ocean simultaneously, it is often both useful and practical to consider two high-priority uses at a time, in order to facilitate an analysis of tradeoffs and properly account for each use.
	Main aspects and contributions to our study	The paper mostly focuses on the planning process rather than on how to quantify its economic impact. However, some potentially useful insights are: • One aspect of public choice of offshore wind energy considers Willingness to Pay (WTP), and more specifically, the spatial dimension of choice. For example, Krueger, Parsons, and Firestone (2011) used a stated preference choice model to capture the external costs to coastal residents where wind turbines would be seen from shore at different distances. The authors were able to determine the external cost differences by distance and identify distances at which the external costs drop dramatically. See reference below • Participatory mapping is a tool that can help wind energy planners and industry alike by asking the fishing community to identify and assign a relative importance value to productive fishing grounds and associated supporting services. See the paper below by Klain et al. on how to quantify intangible values and cultural benefits. • Cost-effective analysis (CEA) was implemented by Samoteskul et al. (2014) to compare the costs and benefits to society from building offshore wind projects near shore or farther off the coast. See reference below.
	Any reference source to economic data	Krueger, A., G. Parsons, and J. Firestone. 2011. "Preferences for Offshore Wind Power Development: A Choice Experiment Approach." Land Economics 87(2): 268–283. Klain, S.C., and K.M.A. Chan. 2012. "Navigating Coastal Values: Participatory Mapping of Ecosystem Services for Spatial Planning." Ecological Economics 82: 104–113. Samoteskul, K., J. Firestone, J.J. Corbett, and J. Callahan. 2014. "Changing Vessel Routes Could Significantly Reduce the Cost of Future Offshore Wind Projects." Journal of Environmental Management 141: 146–154. Collie, J.S., M.W. Beck, B. Craig, T.E. Essington, D. Fluharty, J. Rice, and J.N. Sanchirico. 2013. "Marine Spatial Planning in Practice." Estuarine, Coastal and Shelf Science 117: 1–11.

Identification	**Author**	Ajita Atreya, Warren Kriesel, Jeffrey D. Mullen
	Title	Valuing open space in a marshland environment: development alternatives for coastal Georgia
	Source/journal	Journal of Agricultural and Applied Economics, 48, 4 (2016): 383–402
	Impact Factor	Impact factor: 0.24 5-year Impact factor: 0.34
	Year	2016
Classification	**Functional classification**	Related topics
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	Descriptive
	Thematic	Key success factors; Positive relations for stakeholders involvement
	Sectors involved	No blue economy sectors involved
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Real estate owners
	Temporal Scope	Not applicable
	Geographical Scope	Georgia (US)
	Status (ongoing, fully implemented)	No plan is analysed specifically
	Methods used	Spatial hedonic price framework
Qualitative assessment	**Informative summary**	• The paper is irrelevant to the Study. It focuses on the real estate market in coastal areas. There is no link with MSP, as the existence of a plan is not even considered among the variables.
	Main aspects and contributions to our study	• See above
	Any reference source to economic data	
	Comments	

Identification	**Author**	Ban, N. C.
	Title	Systematic marine conservation planning in data-poor regions: Socioeconomic data is essential
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2009
Classification	**Functional classification**	Economic environment
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied
	Thematic	Positive relations: stakeholders involvement as element which adds social value to marine protected areas (MPAs) established for the marine conservation of biodiversity
	Sectors involved	Environmental management , marine biology, fishing, fish industry
	Number and profile of stakeholders involved (e.g. private, public, organisation)	The study involved local people (fishermen) and fish industry which exploits marine resources in the reference area, as well as the Project Seahorse Foundation (and its partner organizations), working for a good management of marine ecosystems
	Temporal Scope	Not available
	Geographical Scope	Danajon Bank (Central Philippines) - and developing countries where MPAs could be established
	Status (ongoing, fully implemented)	Fully implemented
	Methods used	Spatial analysis with a site selection tool (Marxan software)
Qualitative assessment	**Informative summary**	• The paper demonstrates that biophysical/ecological data are insufficient to provide a good guidance on identifying areas of marine conservation importance in data-poor areas: socioeconomic data and local knowledge ("community-driven criteria") may help to distinguish among possible areas for protection • The key element of the paper is the idea of a pragmatic/mixed approach that combines available data with engagement of people, community or stakeholders. This approach was very useful for marine resource management in the community of reference.
	Main aspects and contributions to our study	None, except for the idea of a pragmatic/mixed approach that combines available (often few) data with engagement of people, community or stakeholders (through interviews).
	Any reference source to economic data	Data provided by Project Seahorse Foundations and its partners. No further info provided. No economic data used.
	Comments	No contribution to our study: the paper does not focus on MSP but on assessing marine biodiversity protection by MPAs in developing countries. Also the use of Marxan software is specific in searching for areas of marine conservation.

Identification	**Author**	Breen, B.
	Title	Shortcomings in the European principles of Integrated Coastal Zone Management (ICZM): Assessing the implications for locally orientated coastal management using Biome Portfolio Analysis (BPA)
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2012
Classification	**Functional classification**	Transaction costs
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied
	Thematic	Methods/conflicts reduction: the opportunity to apply a Biodiversity Portfolio Analysis (BPA) as valid tool to test the EU Commission's ICZM and limit conflicts among different stakeholders
	Sectors involved	Environmental management, fishing and aquaculture, agriculture, tourism, building, energy, marine biology and coastal defence, culture/education, aggregation extraction, legal
	Number and profile of stakeholders involved (e.g. private, public, organisation)	The stakeholder group involved consisted of 14 individuals: 3 inshore fishermen, 2 small farmers, 1 hotel employee, several homemakers, 1 journalist, 1 policeman, 1 school teacher, 1 priest. A local project development officer was also present.
	Temporal Scope	Not available
	Geographical Scope	Iarras Aithneach (Ireland west coast)
	Status (ongoing, fully implemented)	Fully implemented
	Methods used	Spatial analysis through a BPA
Qualitative assessment	**Informative summary**	• The starting point of the study is that one of the main weaknesses of the ICZM was that strategic scientific principles, that guide any coastal management initiative, are incompatible with local principles, which focus on the "specific needs of specific people in specific places". This is due to conflicting objectives. • The aim of the paper is to analyse the differences in the attitudes of marine scientists and local, strategic and relevant stakeholders towards an environmentally sensitive area by applying a BPA, which requires the identification of geographic areas, or "biomes", from which ecosystem services, or "returns" are derived, compared and assessed. • The study suggests that a BPA can be used to set a panel of various stakeholders and scientific experts, representing diverse interest groups, and evaluate their perspectives to draw distinctions and understand where attitude gaps and similarities lie. • Coastal management decisions should be based on data from local participatory stakeholders and data from scientific consultations: management decisions based on achieving local objectives should first be analysed through the scientific consultation data; where no predetermined "red lights" with respect to scientifically based considerations are set off, local development oriented decisions cold be implemented • Clearly, many individuals do not understand the various environmental and ecosystem processes which provide the services society consumes. Environmental decision making is fundamental to understand when consumers' preferences can be satisfied and when it is necessary to rely only on expert opinions • This strategy may help future European coastal management to balance the various objectives of multiple interests
	Main aspects and contributions to our study	The interesting aspect of the paper is its methodology (including the possibility to consider many sectors affected by the policy intervention). However, such methodology can be considered just as starting point for our study.
	Any reference source to economic data	The analyses were carried out on the basis of stakeholders' interviews and scientific consultation data. No further information are provided. No economic data is used to develop the analyses.
	Comments	The study is interesting from the methodological point of view. It may be interesting to deepen the BPA, since the strategy it implies could be used to assess a MSP. We could try to know more about possible application of BPA. E.g: does its use strictly linked to coastal management?

Identification	**Author**	Caldow C.
	Title	Biogeographic assessments: A framework for information synthesis in marine spatial planning
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2014
Classification	**Functional classification**	Public policy
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	Applied
	Thematic	Methods/conflicts reduction/stakeholders involvement: definition of a possible framework (tool) to summarise all information needed to evaluate a MSP and increase stakeholders involvement to reduce possible conflicts
	Sectors involved	All sectors which can be involved in a MSP: marine biology, environmental management, legal, fishing and aquaculture, energy, aggregation extraction, transportation and infrastructures etc.
	Number and profile of stakeholders involved (e.g. private, public, organisation)	This aspect is described in a very general way: from a methodological point of view, all stakeholders (public, private and organizations) of a MSP can be involved: biologists, environmental managers, political leaders, local community and civil society, fishermen, builders, energy operators, transport and infrastructure operators etc.
	Temporal Scope	BAF was used as support decision tool in 2012 (case study on New York offshore) and in 2014 (case study on Gray's Reef National Marine Sanctuary - Georgia, U.S.).
	Geographical Scope	2 case studies: New York offshore; Gray's Reef National Marine Sanctuary (Georgia, U.S.)
	Status (ongoing, fully implemented)	Fully implemented
	Methods used	Spatial analysis through BAF (Biogeographic Assessment Framework): spatial interpolation integrating GIS, remote sensing image analysis software, statistical data mining algorithms for predictive modelling, web-based mapping tools and database Management applications
Qualitative assessment	**Informative summary**	• The paper presents the Biogeographic Assessment Framework (BAF) as useful tool to support decision process for MSP (it is mainly theoretical/methodological) • It is recognised that a MSP involves multiple stakeholder groups with different, and sometimes competing, goals for the use and management of the same geographical space • BAF provides a pragmatic, flexible and multi-disciplinary approach to analyse, assess and forecast all possible information on key elements and features of systems involved and affected by MSP • The BAF structure is clear and rigorous. It has 4 components to support MSP: planning, data evaluation, data elaboration and ecosystems characterization, management application of MSP. They all requires a constant consideration of sectors and stakeholders affected, as well as their interests' synthesis and conciliation • The authors have clear the successful elements of a MSP and are very convincing about this approach • 2 case studies (in U.S.) are reported. They are interesting but not very detailed
	Main aspects and contributions to our study	The methodology presented into the paper is valid, rigorous and interesting, but it can be a reference (just starting) point for our study.
	Any reference source to economic data	Data provided by the U.S National Oceanic and Atmospheric Administration's National Centers for Coastal Ocean Science and Office of National Marine Sanctuaries. In paragraph 2.2.2 we find specified several portals from which data for supporting MSP can be taken (es. OBIS, Marine Map, Ocean.Data.Gov, Multipurpose Marine Cadastre).
	Comments	The document is well structured. Reference documents and bibliography could be kept in mind for a possible deepening.

Identification	**Author**	Agostini, V. N
	Title	Marine zoning in St. Kitts and Nevis: A design for sustainable management in the Caribbean
	Source/journal	Ocean and Coastal Management
	Impact Factor	0.9
	Year	2014
Classification	**Functional classification**	Public policy
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied
	Thematic	Stakeholders involvement and conflict reduction
	Sectors involved	All sectors which can be involved in a MSP: marine biology, environmental management, legal, fishing and aquaculture, tourism, energy, aggregation extraction, transportation and infrastructures, business sectors, etc.
	Number and profile of stakeholders involved (e.g. private, public, organisation)	The development of the study involved individuals from government departments, local NGOs and several business sectors (fishermen, biologists, environmental managers, builders, energy operators, transport and infrastructure operators etc).
	Temporal Scope	The technical framework proposed was used as support for the case study analysed (MSP launched in 2010).
	Geographical Scope	St. Kitts and Nevis (Caribbean)
	Status (ongoing, fully implemented)	Fully implemented
	Methods used	Spatial analysis (GIS), to incorporate spatial datasets integrated with decision support tools
Qualitative assessment	**Informative summary**	• The paper describes the key activities that should be carried out in order to implement a valid MSP: engaging stakeholders, establishing clear objectives, building an information base that spatially represents marine uses, generating tools to assist stakeholders and decision makers to generate together the plan, defining all aspects of MSP via a participatory process. In order to do that, it refers to what has been applied to the case study analysed. • Each activity to be carried out is divided into further steps. A key step is in activity n.3 (decision support tools), where compatibility matrices and maps can be generated in order to identify where different stakeholders' activities can be allocated and how they can interact in using marine resources. This allow to well define marine activities and available resources. • All activities described allow to provide an integrated view of marine space use. Moreover, they help improve future planning through a list of lessons learned in the case study.
	Main aspects and contributions to our study	Valid approach to identify a MSP able to take into account all activities and agents involved. It can be as support to the very starting point of our study
	Any reference source to economic data	Not available. No economic data used
	Comments	The study is really interesting, but this is not sufficient to be integrated in our study: economic aspects are just listed but not quantified.

Identification	**Author**	Brown, C. J.
	Title	Social, economic and environmental effects of closing commercial fisheries to enhance recreational fishing
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2016
Classification	**Functional classification**	Economic environment
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied
	Thematic	Benefits and impacts
	Sectors involved	Environmental management, legal, fishing, marine biology, fishery science, fish industry, tourism, culture/education
	Number and profile of stakeholders involved (e.g. private, public, organisation)	This aspect is not well described in the paper. In general, the study involved civil society and management authorities, as well as commercial fishermen, recreational fishermen, management fish agencies, fish consumers, fish sector operators, social media operators, aquaculture operators.
	Temporal Scope	The technical framework proposed was used as support for the case study analysed (2016) and it aims at being useful also for future recreational fishing rules and regulation for Queensland
	Geographical Scope	Queensland (Australia)
	Status (ongoing, fully implemented)	Fully implemented
	Methods used	Statistical description and regression analysis
Qualitative assessment	**Informative summary**	• The paper focuses on recreational fishing areas in Queensland and examines their effects on coastal ecosystems and society in general. • The (general) analysis suggests that, when recreational fishing areas are appropriate to manage coastal fish stocks, additional measures are needed, in order to: determine ecological effects (ecosystem impact assessment), estimate the profitability of commercial fishing, assess the effects on market competition for local fish producers, compute the impact on fish consumption.
	Main aspects and contributions to our study	None
	Any reference source to economic data	Data provided by QFish portal. No economic data used
	Comments	Paper completely out of topic.

Identification	**Author**	Castanedo, S.
	Title	Oil spill vulnerability assessment integrating physical, biological and socio-economical aspects: Application to the Cantabrian coast (Bay of Biscay, Spain)
	Source/journal	Journal of Environmental Management
	Impact Factor	1.16
	Year	2009
Classification	**Functional classification**	Related topics
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied
	Thematic	The assessment of the oil spill vulnerability of coastal environments as key issue in planning oil spill and in the implementation of Integrated Coastal Zone Management (ICZM)
	Sectors involved	Environmental management, legal, marine biology, fishing and aquaculture, tourism, scientific research, maritime sport (activities and business)
	Number and profile of stakeholders involved (e.g. private, public, organisation)	This aspect is not well described in the paper. In general, the study involved civil society and management authorities, as well as marine biologists, fishermen, fish sector operators, tourism operators, scientific researchers etc.
	Temporal Scope	Not available
	Geographical Scope	Cantabrian Coast (Bay of Biscay, Spain)
	Status (ongoing, fully implemented)	Fully implemented
	Methods used	Spatial analysis through GIS and a Relational Data Base Management System (RDBM). Static support provided by Atlas (hard-copy maps).
Qualitative assessment	**Informative summary**	• The study develops a methodology to assess the oil spill vulnerability on its physical, biological and socio-economic characteristics. In order to do that, it carries out an integrated oil spill vulnerability index on the basis of three intermediate indexes. • Three different integration methods are also proposed: worse-case, average and survey-based. • The conclusions of the paper are obtained from the application of these integration methods to the Cantabrian Coast. In particular, in order to get different coastal categorizations, the three methods are analysed separately.
	Main aspects and contributions to our study	None, but maybe one point could be interesting and (in case) very important: the construction of the socio-economic index. The index estimates the economic loss suffered from all activities involved and that can be the result of the regulation applied. Reading the paragraph 2.2.3, it seems a good strategy to measure the economic impact of a planning in maritime environments (also when the impact is positive? → negative loss)
	Any reference source to economic data	Economic data (used to construct the socio-economic index) from: - Statistic Institute of Cantabria - Deloitte and Exceltur - Clubs and schools for marine sport activities - Spanish Ministry of Environment - ESRI knowledgebase
	Comments	Paper completely out of topic.

Identification	**Author**	Steve Hull, Ian Dickie, Rob Tinch, Justine Saunders
	Title	Issues and challenges in spatio-temporal application of an ecosystem services framework to UK seas
	Source/journal	Marine Policy45(2014)359–367
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2014
Classification	**Functional classification**	Related topics
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Modelling to support planning decisions
	Thematic	Ecosystem services
	Sectors involved	Offshore renewables, maritime transport, tourism
	Number and profile of stakeholders involved (e.g. private, public, organisation)	No stakeholders involved
	Temporal Scope	Future (forecasting)
	Geographical Scope	UK
	Status (ongoing, fully implemented)	No plan is analysed specifically
	Methods used	Modelling, scenario building, prediction
Qualitative assessment	**Informative summary**	• Quantification of final ecosystem service benefits; • Development of spatio-temporal models to evaluate changes in final ecosystem service benefits using existing data; • No direct calculation of UK MSP on these benefits; • Forecast: decline in oil and gas revenues, partially replaced by offshore renewables revenues; • Although the marine environment has a large economic value, it is not an economic unit that can be sustained independent of terrestrial activity. The limitations of the model therefore need to be recognised and taken into account within decision-making processes.
	Main aspects and contributions to our study	The paper mostly focuses on forecasting building different scenarios based on existing data. It is not evaluating an existing MSP. However, some potentially useful insights are: • While energy may remain the highest-value marine industry, a more balanced exploitation of multiple services should yield greatest value towards the end of this century. decline in oil and gas revenues, partially replaced by offshore renewables revenues
	Any reference source to economic data	

Identification	**Author**	Mark J. Kaiser, Allan G. Pulsipher
	Title	The potential value of improved ocean observation systems in the Gulf of Mexico
	Source/journal	Marine Policy 28 (2004) 469–489
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2004
Classification	**Functional classification**	Related topics
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Estimating added value of ocean observation systems, modelling
	Thematic	Ocean observation systems
	Sectors involved	Marine transportation, commercial fishing, recreational fishing, search and rescue operations, and pollution management.
	Number and profile of stakeholders involved (e.g. private, public, organisation)	No stakeholders involved
	Temporal Scope	-
	Geographical Scope	Gulf of Mexico
	Status (ongoing, fully implemented)	No plan is analysed specifically
	Methods used	modelling
Qualitative assessment	**Informative summary**	• Description of ocean observation systems that currently (i.e. in 2004) exist in the Gulf of Mexico; • Identification and quantification of the expected economic benefits that may result from the implementation of an integrated regional network; • The value of the benefits derived from improved ocean observation systems was estimated to range between $85M and $126 M;
	Main aspects and contributions to our study	The paper mostly focuses estimating potential added value of ocean observation systems • No MSP evaluated
	Any reference source to economic data	

Identification	**Author**	Janet Mason, Rosemary Kosaka, Aaron Mamula, Cameron Speir
	Title	Effort changes around a marine reserve: the case of the California Rockfish Conservation area
	Source/journal	Marine Policy 36 (2012) 1054-1063
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2012
Classification	**Functional classification**	Economic environment
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Fishing effort displacement because of MPA
	Thematic	MPA
	Sectors involved	Fisheries
	Number and profile of stakeholders involved (e.g. private, public, organisation)	No stakeholders involved
	Temporal Scope	2002-2012
	Geographical Scope	California Coast (USA), The Rockfish Conservation Area
	Status (ongoing, fully implemented)	No plan is analysed specifically
	Methods used	
Qualitative assessment	**Informative summary**	• Analysis of reduction of effort and/or effort displacement because of an MPA; • The analysis tests whether a marine reserve affected the level of effort in a fishery and examines changes in the spatial distribution of effort following implementation; • Any changes in effort levels due to the closure appear to have been small relative to changes induced by other regulations
	Main aspects and contributions to our study	The paper mostly focuses estimating the changing fishing effort as a result of MPA implementation • No MSP evaluated
	Any reference source to economic data	

Identification	**Author**	Di Jin, Porter Hoagland, Brooke Wikgren
	Title	An empirical analysis of the economic value of ocean space associated with commercial fishing
	Source/journal	Marine Policy 42 (2013) 74–84
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2013
Classification	**Functional classification**	Transaction costs
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Economic valuation (economic productivity and fishing effort)
	Thematic	Commercial fishing
	Sectors involved	Fisheries
	Number and profile of stakeholders involved (e.g. private, public, organisation)	No stakeholders involved
	Temporal Scope	1999-2008
	Geographical Scope	Gulf of Maine (USA)
	Status (ongoing, fully implemented)	No plan is analysed specifically
	Methods used	
Qualitative assessment	**Informative summary**	• In contrast with the mostly theoretical or simulation approaches taken by other authors, this paper focuses on whether commercial fisheries data are available at temporal and spatial scales appro- priate for MSP purposes; • Understanding the spatial patterns of fishery resources is important to implementing MSP; • to facilitate the implementation of MSP, a careful assessment of the economic values of existing and proposed ocean uses and their spatial distributions is required: this paper analyses fisheries; • fishing efforts exhibited a positive response to increases in expected revenues and a negative response to variability in revenues • The spatial patterns of fishery resources are relatively stable • Analysis of reduction of effort and/or effort displacement because of an MPA; • The analysis tests whether a marine reserve affected the level of effort in a fishery and examines changes in the spatial distribution of effort following implementation; • Any changes in effort levels due to the closure appear to have been small relative to changes induced by other regulations
	Main aspects and contributions to our study	The paper mostly focuses estimating the fishing effort distribution and the link with revenues • While it is well known that the economic values of commercial fishing vary across different coastal regions at very large scales, there has been a lack of studies on the topic at relatively smaller scales.
	Any reference source to economic data	

Identification	**Author**	S. Marzetti, M.Disegna, E.Koutrakis, A.Sapounidis, V.Marin, S.Martino, S. Roussel, H.Rey-Valette, C.Paoli
	Title	Visitors' awareness of ICZM and WTP for beach preservation in four European Mediterranean regions
	Source/journal	Marine Policy 63(2016)100–108
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2016
Classification	**Functional classification**	Other topics
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Beach preservation(intended here as defence from erosion)
	Sectors involved	- Public - Local authorities - Policy makers - ICZM managers
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Face-to-face interviews of approximately 15 min. In July/August 2007 a total of 846 questionnaires were completed.
	Temporal Scope	In all the pilot areas a survey by questionnaire was carried out in 2007 by using CVM
	Geographical Scope	multi-country survey - four coastal sites of Greece, Italy and France: research concerns the following four coastal pilot sites: Nestos Delta in East Macedonia and Thrace, Greece; Tarquinia in Lazio, and Riviera del Beigua in Liguria, Italy; and Hérault De- partment in Languedoc-Roussillon, France
	Status (ongoing, fully implemented)	Completed
	Methods used	willingness to pay (WTP) (for beach preservation); regression analysis
Qualitative assessment	**Informative summary**	paper discusses the results of a multi-country survey about private stakeholders' contribution to coastal preservation
	Main aspects and contributions to our study	The study does not directly cover economic aspects related to MSP. It considers willingness to pay related to ICZM specifically related to measure of coastal protection to erosion.
	Any reference source to economic data	No economic data is being used as basis. Rather the WTP methodology is based on an econometric model based on input data from the survey/interviews.
	Comments	This particular study appears to have limited value for the current study in framework of MSP economic impacts. Out of scope.

Identification	**Author**	Wei Huang, James J.Corbett, Di Jin
	Title	Regional economic and environmental analysis as a decision support for marine spatial planning in Xiamen
	Source/journal	Marine Policy 51(2015)555–562
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2015
Classification	**Functional classification**	Economic environment
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied
	Thematic	The Study applies the EIO framework to marine spatial planning. Input–output (IO) analysis is a powerful tool in estimating the economic impacts of change in economic activities on a regional economy
	Sectors involved	EIO model is developed to examine the economic and environmental impacts associated with two leading ocean industries in Xiamen: - waterfront tourism; and - marine transportation (includes waterborne passenger transport, freight transport, port and other auxiliary services)
	Number and profile of stakeholders involved (e.g. private, public, organisation)	
	Temporal Scope	The research investigates (1) regional economic impacts and (2) selected resource and environmental implications, associated with these two marine industries in both - the base year (2007) and - the planned year (2015)
	Geographical Scope	Xiamen (China)
	Status (ongoing, fully implemented)	Completed
	Methods used	Environmental input–output (EIO) model as a decision-support tool for marine spatial planning at the regional level
Qualitative assessment	**Informative summary**	• the EIO model presents a useful method to examine multidimensional human activities and their tradeoffs, implementing the conceptual framework of MSP. • The EIO analysis can investigate alternative economic structures and associated environmental conditions and simulate various large-scale policy scenarios
	Main aspects and contributions to our study	• Applied methodology to assess economic (and environmental) impact of different sectors in context of MSP. • While it is intended as an input source to inform MSP decisions rather than showing the impact of MSP, it illustrates that the MSP process has a (positive) economic impact if trade-offs are assessed appropriately and hence illustrates that the MSP process can contribute to ensure highest (economic and societal) return of planning process.
	Any reference source to economic data	• Projections for annual regional economic growth • demands for marine transportation and waterfront tourism ○ demand for marine transportation is estimated based on predictions for cargo throughput for the Port of Xiamen, ○ demand for tourism is calculated using predications on annual person-trips in Xiamen • Using the final demand estimates in economic impacts of the two marine industries under difference scenarios are calculated separately
	Comments	Relevant study as it assesses economic and environmental impacts of specific sectors in the framework of Marine Spatial Planning

Identification	**Author**	Kristian Metcalfe, Nathalie Bréheret, Eva Chauvet, Tim Collins, Bryan K Curran, Richard J Parnell, Rachel A Turner, Matthew J Witt, Brendan J Godley
	Title	Using satellite AIS to improve our understanding of shipping and fill gaps in ocean observation data to support marine spatial planning
	Source/journal	Journal of Applied Ecology
	Impact Factor	IF: 5.74 5-year IF: 6.16
	Year	2015
Classification	**Functional classification**	Related topics
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Methods
	Sectors involved	Fisheries, mining, conservation, petrochemicals
	Number and profile of stakeholders involved (e.g. private, public, organisation)	No stakeholders involved
	Temporal Scope	Use of S-AIS data between 1/01/2012 – 31/12/2014
	Geographical Scope	Republic of Congo (Congo-Brazzaville)
	Status (ongoing, fully implemented)	Congo has no marine spatial plan, but is interested in developing one
	Methods used	Goal: to address crucial data gaps in spatiotemporal distribution of maritime vessels in territorial and offshore waters using S-AIS. ○ - Spatial analysis based on Decoded Satellite-derived automatic identification systems (S-AIS) data in combination with commissioned AIS systems, dynamic outputs based on vessel sensors or voyage-related information ○ - data processing using quality control procedure that combined several techniques S-AIS processing and spatial analyses performed in R.
Qualitative assessment	**Informative summary**	The paper highlights the five key advantages of using S-AIS data in the understanding of shipping: • S-AIS provided insights on different vessel types and number of vessels that operate from the coast out to the limits of an EEZ → could help identifying range of stakeholder groups that should be engaged in decision-making processes • S-AIS help revealing true extent of vessel activity beyond the range of convention AIS • S-AIS help visualise patterns of vessel behaviour (intensity and occupancy) → highlight areas that are consistently utilised in space and time • S-AIS data can be used to develop putative threat maps that identify how different vessel types and their associated pressures overlap with marine ecosystems, habitats and species • Static visualisations of the spatiotemporal distribution of shipping activity can also identify current levels of overlap with areas allocated to other human uses Compared to conventional AIS data, S-AIS data offer a cost-effective solution to address current knowledge gaps and help supporting decision-making processes in relation to EBM and MSP.
	Main aspects and contributions to our study	The study does not cover economic aspects related to MSP.
	Any reference source to economic data	n.a.
	Comments	

Identification	**Author**	Klain S.C., Chan K.M.A
	Title	Navigating coastal values: Participatory mapping of ecosystems services for spatial planning
	Source/journal	Ecological Economics
	Impact Factor	IF: 3.895 5-year IF: 4.803
	Year	2012
Classification	**Functional classification**	Economic environment
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Methods
	Sectors involved	RDMW inhabitants
	Number and profile of stakeholders involved (e.g. private, public, organisation)	RDMW inhabitants, whose profession and/or means of livelihood were linked to the marine environment (people who played active role in marine resource management, as well as people whose income indirectly or directly relied on the ocean).
	Temporal Scope	2010
	Geographical Scope	Regional District of Mount Waddington (RDMW), a sub-region of the Pacific North Coast Integrated Management Area → in northern region of Vancouver Island, British Columbia, Canada.
	Status (ongoing, fully implemented)	n.a.
	Methods used	• 30 (7 women, 23 men) in-depth, map-based interviews • On a map, interviewees had to draw polygons around locations (i) they rely on for income; (ii) they identified important for non-monetary reasons; (iii) that are threatened and/or sources of threat. Then, tokens were allocated to the polygons to represent relative value/importance of each polygon. • Calculation of the relative value (i.e. monetary, non-monetary or threat intensity) by area • Spatial correlation of monetary, non-monetary and threat values
Qualitative assessment	**Informative summary**	• Study addresses: (i) the extent to which is it possible, or not, for people to spatially identify and quantify the relative monetary and non-monetary value of ecosystems and environmental threats; (ii) which categories of non-monetary benefits were deemed most important by interviewees. • Minority of respondents refused to identify and/or assign relative monetary/non-monetary value to particular locations, because of a variety of reasons, among which: (i) fear that the non-assigned locations would become available for development; (ii) compared to gradients, interviewee thought that drawing hard boundaries around locations offer a less good representation of human values and ecological characteristics of the ocean; (iii) fear of misuse of identified culturally sensitive locations; (iv) given extensive range of valued species, the utility of isolating different patches was questioned. • Most of the high-valued places (both monetary and non-monetary) were close to towns • Non-monetary value ascribed to biodiversity/wildlife was higher than value assigned to other non-monetary values • The study did not include the diversity of indigenous perspectives on ES values and threats, as it targeted people with a variety of marine-related professions. • There was no explicit recognition of supporting ecosystems, many rather focused on how much they value wildlife. • The results provide indication of the success of the interview protocol in eliciting a wide array of reasons why nature is important to locals. • Other methods are necessary to properly account for other values discussed/identified by interviewees, but which were not adequately represented spatially and quantitatively. • To reflect what matters to people in RDMW, protecting these valued attributes and locations for particular activities should be a priority in MSP. • Intangibles are difficult to map, it does not mean they are less important.
	Main aspects and contributions to our study	The study wanted to assess the utility of a protocol (interview and mapping), that is compatible with a marine spatial planning process, and feasible to employ on a short time line with a modest budget. The study addressed people's views and opinions, through social value mapping of Ecosystem Services, and states these should be used to inform decision-making related to MSP.
	Any reference source to economic data	n.a.

Identification	**Author**	Nobre A.M., Musango J.K., de Wit M.P., Ferreira J.G.
	Title	A dynamic ecological-economic modelling approach for aquaculture management
	Source/journal	Ecological Economics
	Impact Factor	IF: 3.895 5-year IF: 4.803
	Year	2009
Classification	**Functional classification**	Economic environment
	Sequential classification	n.a.
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Methods
	Sectors involved	Shellfish aquaculture
	Number and profile of stakeholders involved (e.g. private, public, organisation)	n.a.
	Temporal Scope	n.a. Simulation period considered = 50 years
	Geographical Scope	Xiangshan Gang, Zhejiang Povince, East China Sea
	Status (ongoing, fully implemented)	n.a.
	Methods used	• Modelling Approach to Resource economics decision-maKing in EcoaquaculTure (MARKET): illustrates major interactions which should be considered between ecological and economic systems • MARKET was implemented using a visual modelling platform (PowerSim) • The model calculates the desired production rate in each simulation year, thereby changing production inputs
Qualitative assessment	**Informative summary**	• The MARKET model resulted in expected trends regarding the standard economic theory for consumption and production. Also, the interrelationship between net profit, physical space and food limitation was modelled successfully according to ecological economics theory. • The MARKET model allows for integrated dynamic analysis of (i) the demand for mariculture products, (ii) economic production and cost limiting factors, (iii) biological growth of aquatic resources, (iv) interactions with environmental conditions, (v) spatial limitations of culture in coastal ecosystems.
	Main aspects and contributions to our study	No discussion about MSP. MARKET model however can help creating insights on when space can be expected to impose limitations on production.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Jacob C, Pioch S, Thorin S
	Title	The effectiveness of the mitigation hierarchy in environmental impact studies on marine ecosystems: A case study in France
	Source/journal	Environmental Impact Assessment Review
	Impact Factor	IF: 3.054 5-year IF: 3.768
	Year	2016
Classification	**Functional classification**	Public policy
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Descriptive
	Thematic	Review of 55 environmental impact studies linked to marine and coastal development projects
	Sectors involved	Most studies dealt with 4 types of activities: sediment dredging, disposal of dredging material, port infrastructure, water withdrawal and discharge.
	Number and profile of stakeholders involved (e.g. private, public, organisation)	n.a.
	Temporal Scope	studies dating from between 2003 - 2015
	Geographical Scope	France (mainland and its overseas)
	Status (ongoing, fully implemented)	No MSPlan discussed
	Methods used	• Review of environmental impact studies (literature) • Quantitative assessment of pressures and impacts on marine environment (habitats, species) and socio-economic uses, caused by development activities and measures proposed to mitigate these.
Qualitative assessment	**Informative summary**	• Literature study resulted in a set of recommendations with regard to the quality of proposed mitigation plans in environmental impact studies in marine realm. • Better mapping of biological functional zones should be encouraged and linked to MSP process.
	Main aspects and contributions to our study	Better synergies should be created with current European marine environmental policies such as MSFD and MSPD, in order to improve current EIA practices. Important aspect could be: better mitigation measures will also benefit Blue Growth in the long run.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Hoagland P, Dalton T.M., Jin D, Dwyer JB
	Title	An approach for analysing the spatial welfare and distributional effects of ocean wind power siting: the Rhode Island/Massachusetts area of mutual interest
	Source/journal	Marine Policy 58: 51-59
	Impact Factor	IF: 2.109 5-year IF: 2.495
	Year	2015
Classification	**Functional classification**	Transaction costs
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Methods: modelling
	Sectors involved	Commercial fisheries, renewable energy facility
	Number and profile of stakeholders involved (e.g. private, public, organisation)	n.a.
	Temporal Scope	n.a.
	Geographical Scope	Rhode Island and Massachusetts
	Status (ongoing, fully implemented)	POTENTIAL siting of a renewable energy facility (wind power) in an offshore area that is also used for commercial fishing.
	Methods used	• Regional input-output model • IMPLAN software and database • Computable general equilibrium model • Optimisation solver (GAMS)
Qualitative assessment	**Informative summary**	• Study = approach for the potential opportunity costs of the displacement of pre-existing ocean uses by new uses on a regional scale. • This example comprised an implementation of coastal and MSP by allocating part of the ocean to a specific use. It was assumed these uses were mutually exclusive. Focus of article is on effects related exclusively to commercial fishing. • Effects of the potential siting of a renewable energy facility in an area that is also used for commercial fishing • Complete displacement of commercial fishing would result in estimated direct output impacts to the regional economy of $5 million, leading to $11 million in direct, indirect and induced impacts and a corresponding loss of about 150 jobs. • Regional economy involves linkages among onshore industry sectors and offshore activities
	Main aspects and contributions to our study	Human uses in the coastal ocean: just as these uses are distributed spatially over the ocean, so are the economic effects distributed spatially over both the ocean and the land.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Andrew Rassweiler, Christopher Costello, Ray Hilborn and David A. Siegel
	Title	Integrating scientific guidance into marine spatial planning
	Source/journal	Proceedings of the Royal Society B: Biological Sciences
	Impact Factor	2,83
	Year	2014
Classification	**Functional classification**	Public policy
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Positive relationships between the scientific guidance and the results achieved in MSP (in the case of marine-protected areas, MPA)
	Sectors involved	Public (Designers of marine spatial planning related with Marine-protected areas, MPA). Fishing activity.
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Public managers, Fishers and Scientist
	Temporal Scope	2008-2010
	Geographical Scope	Southern California (USA)
	Status (ongoing, fully implemented)	On-going
	Methods used	Spatial analysis and bioeconomic modelling. Econometrics: sensitive analysis.
Qualitative assessment	**Informative summary**	A methodology is developed to assess the role of scientific management when designing a network of MPAs. They apply this methodology to the design of the MPA in Southern California. They conclude that with a good initial design of the MPA network based on scientific criteria (using distances between the protected patches and the minimum size thereof), it significantly increases the chances of success in obtaining results from the MPA network (measured by the size of the biomass of 8 fishing species and the income from fishing), even if this initial design is subsequently modified by stakeholder consultations.
	Main aspects and contributions to our study	There are no contributions that can be used directly for our study.
	Any reference source to economic data	It uses biological data from 8 fishing species and simulates the behaviour of the fishing effort of the flora of Southern California. In the article hardly appear data, but it is indicated that they are available as supplementary material.
	Comments	Interesting work but little useful for the objectives of our project.

Identification	**Author**	Coccoli, C
	Title	Conflict analysis and reallocation opportunities in the framework of marine spatial planning: A novel, spatially explicit Bayesian belief network approach for artisanal fishing and aquaculture
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2018
Classification	**Functional classification**	Transaction costs
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Method and Social Network analysis
	Sectors involved	Fishing, aquaculture and MPAs
	Number and profile of stakeholders involved (e.g. private, public, organisation)	129 artisanal vessels, offshore aquaculture developers, regional government
	Temporal Scope	na
	Geographical Scope	SE Bay of Biscay, Spain
	Status (ongoing, fully implemented)	Fully implemented
	Methods used	a spatially explicit Bayesian belief network (BBN)
Qualitative assessment	**Informative summary**	Scenario analysis for user-user conflict resolution where offshore aquaculture is being developed, displacing artisanal fishers.
	Main aspects and contributions to our study	Can combine qualitative and quantitative information using spatially-explicit BBN
	Any reference source to economic data	Data on fishing activity and revenues (in this specific case study) http://dx.doi.org/10.1016/j.marpol.2018.04.015.
	Comments	

Identification	**Author**	Cordier, M.
	Title	Quantification of interdependencies between economic systems and ecosystem services: An input–output model applied to the Seine estuary
	Source/journal	Ecological Economics
	Impact Factor	1,66
	Year	2011
Classification	**Functional classification**	Economic environment
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Ecological-economic input-output model
	Sectors involved	Maritime transport, Harbour development impacting on fish nursery areas
	Number and profile of stakeholders involved (e.g. private, public, organisation)	na
	Temporal Scope	8 yrs
	Geographical Scope	Seine estuary, France
	Status (ongoing, fully implemented)	completed
	Methods used	I-O analysis
Qualitative assessment	**Informative summary**	Adapted supply use tables to integrate estimated values of ecosystem services
	Main aspects and contributions to our study	Method to quantify potential habitat restoration costs using I-O methods. Regionalisation of national I-O data.
	Any reference source to economic data	National supply-use tables from Eurostat Then regionalised to the scale of the French region of Haute-Normandie, based on techniques developed inter alia in McDonald (2005) and discussed in Riddington et al. (2006). The conventional methods were completed with data from the MEDDAT (2009) on interregional flows of goods between the French regions. The SLQ technique was applied for the interregional flows of services (Miller and Blair, 2009).

Identification	**Author**	F. Picone, E. Buonocore, R.D'Agostaro, S. Donati, R. Chemello
	Title	Integrating natural capital assessment and marine spatial planning: A case study in the Mediterranean sea
	Source/journal	Ecological Modelling
	Impact Factor	1,08
	Year	2017
Classification	**Functional classification**	Economic environment
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	
	Thematic	Relationship between the value of the natural capital of a marine area (calculated through an environmental accounting model) and the design of a Marine Protected Area (MPA) in Italy
	Sectors involved	Public (Designers of marine spatial planning related with Marine-protected areas, MPA). Fishing activity and activities related to tourism.
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Public managers.
	Temporal Scope	2016
	Geographical Scope	Egadi Islands, to the west of the coast of Sicily (Italy)
	Status (ongoing, fully implemented)	On-going
	Methods used	Spatial analysis: software Marxan for conservation planning. Econometrics: the emergy accounting method to assess the value of natural capital.
Qualitative assessment	**Informative summary**	An assessment of the natural capital of a Marine Protected Area (MPA) is carried out through an environmental accounting method. In this method, all the inputs that sustain the system are accounted for in terms of the energy directly or indirectly required to provide the services generated by the marine ecosystem (and is measured in solar equivalent Joules). The economic impacts are introduced considering the negative effects derived from excluding human uses in the different zones of the MPA. The results obtained are converted into monetary units applying a fixed exchange rate and are carried out simply to offer a valuation of natural capital (non-market capital) in units understandable to managers and decision-makers. The results by zones of the MPA offer a vision of the priority zones to increase the levels of protection under different scenarios: without considering human uses or considering them.
	Main aspects and contributions to our study	The study focuses on the valuation of non-market goods linked to an MPA, type of goods that are excluded in our analysis.
	Any reference source to economic data	Mainly data of environmental variables are used. Socioeconomic data are not specified. The results, obtained in solar equivalent Joules, are transformed into monetary units with the sole purpose of facilitating the understanding and scope of them.
	Comments	The work is carried out from an environmental perspective, far removed from impact evaluations from a conventional economic perspective.

Identification	**Author**	Fernandes, M. da L.
	Title	How does the cumulative impacts approach support Maritime Spatial Planning?
	Source/journal	Ecological Indicators
	Impact Factor	1,41
	Year	2017
Classification	**Functional classification**	Public policy
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Methods and benefits and impacts
	Sectors involved	22 marine activities with pressures and indicators
	Number and profile of stakeholders involved (e.g. private, public, organisation)	All maritime users
	Temporal Scope	
	Geographical Scope	Portugal
	Status (ongoing, fully implemented)	ongoing
	Methods used	Spatial analysis and cumulative impacts model
Qualitative assessment	**Informative summary**	combined ecosystem vulnerability and anthropogenic drivers to produce a Cumulative Impact (CI) score. CIM map overlapped with current uses and proposed MSP to identify areas that require
	Main aspects and contributions to our study	Improves the ability to make more informed management decisions and protection measures
	Any reference source to economic data	Supplementary data: http://dx.doi.org/10.1016/j.ecolind.2016. 09.014.
	Comments	Improved decision-making

Identification	**Author**	Freeman, M. C
	Title	Assessing potential spatial and temporal conflicts in Washington's marine waters
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2016
Classification	**Functional classification**	Transaction costs
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Methods and Positive relations
	Sectors involved	27 segments of fishing and shipping
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Private operators, public authorities
	Temporal Scope	Monthly results
	Geographical Scope	Washington state coastal waters
	Status (ongoing, fully implemented)	Fully implemented
	Methods used	Spatial /temporal analysis and Conflict reduction
Qualitative assessment	**Informative summary**	Spatio-temporal mapping of users to determine Marine Potential Conflict index (MPCI)
	Main aspects and contributions to our study	Seeks to identify and so reduce conflict/collision risk in multi-use areas
	Any reference source to economic data	Washington's MSP Data catalogue: http://www.msp.wa.gov/explore/data-catalog/
	Comments	Identifies most intensive areas and user groups in conflict.

Identification	**Author**	Gaddis, E. B.
	Title	Full-cost accounting of coastal disasters in the United States: Implications for planning and preparedness
	Source/journal	Ecological Economics
	Impact Factor	1,66
	Year	2007
Classification	**Functional classification**	Related topics
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Theoretical - method
	Thematic	Natural capital accounting
	Sectors involved	Coastal users, but categorised into built social human natural capital
	Number and profile of stakeholders involved (e.g. private, public, organisation)	All coastal users (public, private and gov)
	Temporal Scope	na
	Geographical Scope	US-focused, but applicable elsewhere
	Status (ongoing, fully implemented)	completed
	Methods used	Full cost accounting using env economics to value natural capital.
Qualitative assessment	**Informative summary**	Examines the full costs related to coastal disasters including losses to natural, social, human and built capital. Main addition is factoring in natural capital.
	Main aspects and contributions to our study	Informs better disaster preparedness with climate change increasing the likelihood of extreme weather events.
	Any reference source to economic data	Some numbers, but mostly theoretical approach
	Comments	

Identification	**Author**	Gimpel, A
	Title	A spatially explicit risk approach to support marine spatial planning in the German EEZ
	Source/journal	Marine Environmental Research
	Impact Factor	1,06
	Year	2013
Classification	**Functional classification**	Public policy
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Methods
	Sectors involved	Fishing (displacement due to offshore renewables), Pipelines, marine transport, cables, fisheries, platforms, windfarms, aggregate mining
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Impact on fisheries habitat by
	Temporal Scope	n/a (spatial)
	Geographical Scope	German North Sea EEZ
	Status (ongoing, fully implemented)	Fully implemented
	Methods used	spatially explicit risk assessment
Qualitative assessment	**Informative summary**	Assesses risk of over-exploitation of plaice nursery grounds due to displacement through risk identification, characterisation, assessment and management.
	Main aspects and contributions to our study	Can be applied to. Other sectors. A risk-assessment approach to factor in MSFD requirements into MSP, rather than quantification or evidence of benefits.
	Any reference source to economic data	
	Comments	Combines GES targets into MSP decision-making

Identification	**Author**	Gimpel, A
	Title	A GIS-based tool for an integrated assessment of spatial planning tradeoffs with aquaculture
	Source/journal	Science of the Total Environment
	Impact Factor	1,55
	Year	2018
Classification	**Functional classification**	Transaction costs
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Spatial analysis
	Sectors involved	Aquaculture interactions with other sectors
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Multiple stakeholders involved in Aquaspace workshop
	Temporal Scope	n/a (spatial
	Geographical Scope	German North Sea EEZ
	Status (ongoing, fully implemented)	Fully implemented
	Methods used	Aquaspace GIS-based tool
Qualitative assessment	**Informative summary**	Developed GIS tool to inform optimal siting of aquaculture (seabass and mussel examples used)
	Main aspects and contributions to our study	Considered interactions and trade-offs between sectors
	Any reference source to economic data	Open source data at: http://aquaspace-h2020.eu
	Comments	Combines GES targets into MSP decision-making

Identification	**Author**	Goti-Aralucea, L
	Title	Assessing the social and economic impact of small scale fisheries management measures in a marine protected area with limited data
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2017
Classification	**Functional classification**	Economic environment
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Methods and Benefits and Impacts
	Sectors involved	Fishing and marine conservation
	Number and profile of stakeholders involved (e.g. private, public, organisation)	SSCF, public authority & scientists
	Temporal Scope	annual
	Geographical Scope	MPA in German Baltic waters
	Status (ongoing, fully implemented)	theoretical
	Methods used	NUSAP pedigree matrix and ‘wicked problem’ approaches
Qualitative assessment	**Informative summary**	Compares the EU IA methodology with NUSAP pedigree matrix & wicked problem approach
	Main aspects and contributions to our study	approach for data-poor situations – better definition of issues using qualitative approaches. Not v applicable in our study.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Griffin, R.
	Title	Incorporating the visibility of coastal energy infrastructure into multi-criteria siting decisions
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2015
Classification	**Functional classification**	Related topics
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Methods
	Sectors involved	Marine renewables
	Number and profile of stakeholders involved (e.g. private, public, organisation)	public
	Temporal Scope	2015
	Geographical Scope	Block Island, Rhode Island
	Status (ongoing, fully implemented)	unknown
	Methods used	Spatial analysis
Qualitative assessment	**Informative summary**	Optimal siting of offshore energy using geotagged photos from an island compared with NPV of wind resource
	Main aspects and contributions to our study	Wind energy value using InVEST wind energy model. http://dx.doi.org/10.1016/j.marpol.2015.09.024.
	Any reference source to economic data	Applicable in heavily populated or tourism destinations Used to justify location of pilot wind farm
	Comments	

Identification	**Author**	Holger Janßen and Franziska Schwarz
	Title	On the potential benefits of marine spatial planning for herring spawning conditions—An example from the western Baltic Sea
	Source/journal	Fisheries Research 170 (2015) 106–115
	Impact Factor	Impact Factor: 1.903
	Year	2015
Classification	**Functional classification**	Economic environment
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Methods
	Sectors involved	Fisheries (western Baltic spring-spawning herring); All other sectors as pressures
	Number and profile of stakeholders involved (e.g. private, public, organisation)	From academia
	Temporal Scope	2010 to 2012
	Geographical Scope	Western Baltic Sea
	Status (ongoing, fully implemented)	Draft plan
	Methods used	Spatial analysis
Qualitative assessment	**Informative summary**	Mapping and detailing human activities impact spawning ground.
	Main aspects and contributions to our study	
	Any reference source to economic data	
	Comments	

Identification	**Author**	Guerry, A. D
	Title	Modeling benefits from nature: using ecosystem services to inform coastal and marine spatial planning
	Source/journal	International Journal of Biodiversity Science, Ecosystem Services and Management
	Impact Factor	0,56
	Year	2012
Classification	**Functional classification**	Related topics
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Env economics
	Sectors involved	Fisheries, recreation, wave energy, ecosystem services
	Number and profile of stakeholders involved (e.g. private, public, organisation)	
	Temporal Scope	
	Geographical Scope	West Coast of Vancouver Island
	Status (ongoing, fully implemented)	Ongoing (Stanford natural capital initiative)
	Methods used	InVEST (valuation of ecosystem services)
Qualitative assessment	**Informative summary**	Developed Marine InVEST model to value several ecosystem services provided by marine sectors.
	Main aspects and contributions to our study	Method to calculate multiple ecosystem services from fisheries, recreation, wave energy, carbon sequestration
	Any reference source to economic data	Marine InVEST: http://www.naturalcapitalproject.org/
	Comments	

Identification	**Author**	Keiko J. Nomura, David M. Kaplan, Jennifer Beckensteiner, Andrew M. Cheld
	Title	Comparative analysis of factors influencing spatial distributions of marine protected areas and territorial use rights for fisheries in Japan
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2017
Classification	**Functional classification**	Economic environment
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Relationships between the spatial distribution of marine protected areas (MPA) and the distribution of Fishery Cooperative Associations in Japan, with territorial use rights for fisheries (TURFs)
	Sectors involved	Public (Designers of marine spatial planning related with Marine-protected areas, MPA). Fishing activity.
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Public managers and Fishers.
	Temporal Scope	2016
	Geographical Scope	Japan
	Status (ongoing, fully implemented)	
	Methods used	Spatial analysis: spatial data, multivariable factor analysis, autocorrelations. Econometrics: regression analysis (Genelarised Linear Models).
Qualitative assessment	**Informative summary**	They analyze the variables that can explain the current spatial distribution in Japan of the marine-protected areas (MPAs) and the Fishery Cooperative Associations (FCAs). They distinguish 3 types of variables: Environmental, Socioeconomic and Fisheries. The coast of Japan is divided into 47 prefectures grouped into 4 regions (North, South, East and West). Through a statistical analysis, they conclude that the distribution of FCAs is related to socioeconomic and fishing factors, but they do not obtain conclusive results on the variables that can explain the distribution of MPAs.
	Main aspects and contributions to our study	There are no contributions that can be used directly for our study.
	Any reference source to economic data	The Socioeconomic variables considered are: population density, per capita income, trade ports per km coastline. The source of information is the Portal Site of Official Statistics of Japan. In the article hardly appear data, but it is indicated that they are available as supplementary material.
	Comments	As a result of interest, it can be highlighted that MPAs do not always develop where they could be more justified. Often, they can only be implemented in areas where conflicts with other potential users are minimal.

Identification	**Author**	Kemal Pinarbasi, Ibon Galpasoro, Ángel Borja, Vanessa Stelzenmüller, Charles N. Ehler, Antje Gimpel
	Title	Decision support tools in marine spatial planning: Present applications, gaps and future perspectives
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2017
Classification	**Functional classification**	Public policy
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Decision support tools (DSTs) to improve MSP implementation process
	Sectors involved	Public (Designers of marine spatial planning).
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Public managers and Scientist
	Temporal Scope	1975-2017
	Geographical Scope	World
	Status (ongoing, fully implemented)	
	Methods used	Review of the scientific literature and MSP experiences
Qualitative assessment	**Informative summary**	They review 28 MSP implementation experiences around the world and identify 34 decision support tools (DSTs) used to assist planners. The aim is to characterise and analyze the use of DSTs in current MSP experiences, identify the features and gaps in the use of these tools and propose new functionalities. The results of the review show that in most of the MSP reports the DSTs used are not explicit. Where they are explicit, most of the DSTs are applicable in the early stages of the MSP process (define goals and objectives, gather data, identify issues, constrains and future conditions). They detect that the main gaps are related to the shortage of DSTs related to the planning of future scenarios (eg in the face of climate change), and also to the consideration of socio-economic aspects and the communication and participation of stakeholders. They also conclude that it will be necessary to develop DSTs that are easier to use by the broad type of agents involved.
	Main aspects and contributions to our study	They point out the lack of data to help evaluate socio-economic impacts linked to the spatial decisions adopted in MSP.
	Any reference source to economic data	It is a review of the literature, without reference to economic data.
	Comments	Good review on a very specific aspect of the implementation of MSP: the DSTs.

Identification	**Author**	Kenchington, R. A. & Day, J. C
	Title	Zoning, a fundamental cornerstone of effective Marine Spatial Planning: lessons learnt from the Great Barrier Reef, Australia.
	Source/journal	Journal of Coastal Conservation, 15 (2), 271-278.
	Impact Factor	Impact Factor: 1.160
	Year	2011
Classification	**Functional classification**	Public policy
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Descriptive
	Thematic	Key success factors
	Sectors involved	Public (Designers of marine spatial planning).
	Number and profile of stakeholders involved (e.g. private, public, organisation)	None
	Temporal Scope	-
	Geographical Scope	Australia, Great Barrier Reef
	Status (ongoing, fully implemented)	Fully implemented
	Methods used	None
Qualitative assessment	**Informative summary**	MSP needs to be part of EBM, marine zoning and other management tools (eg fisheries management tools, development licensing) Describes emergence of MSP in the GBR management. Zoning is one of several parts to MSP
	Main aspects and contributions to our study	Suggests scale is equivalent to transboundary MSP. Various lessons: Zone objectives not on specific activities Can take years to establish an effective zoning system Activities can continue is several shared zones Possible activity doesn't always mean any will be permitted Co-operation needed & co-ordination with land-based planning Reminds that zoning is not the only tool used in the GBRMP and several are needed for effective management.
	Any reference source to economic data	It is a review of the literature, without reference to economic data.
	Comments	Good review on a very specific aspect of the implementation of MSP: the DSTs.

Identification	**Author**	Papathanasopoulou, Eleni; White, Mathew P.; Hattam, Caroline; Lannin, Aisling; Harvey, Andrea; Spencer, Anne
	Title	Valuing the health benefits of physical activities in the marine environment and their importance for marine spatial planning
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2016
Classification	**Functional classification**	Related topics
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Non-market benefits valuation: health benefits of outdoor aquatic physical activities
	Sectors involved	Not economic sectors: Households
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Private (households: 8290 adults)
	Temporal Scope	2012
	Geographical Scope	England
	Status (ongoing, fully implemented)	
	Methods used	Econometrics: Logistic regressions
Qualitative assessment	**Informative summary**	Qualitative and quantitative estimations of health benefits from outdoor aquatic activities based on the sample of people partaking in each activity form Health Survey. Qualitative estimation in terms of Quality adjusted life year: increase of 24,853 QALYs for population (0.062 per person for the year). Quantitative estimation using WTP from Mason et al (2009): £176,721,512 would be gained by society (in terms of money saved through non-occurring health care expenditure).
	Main aspects and contributions to our study	Not appropriate: non-market valuation of sport aquatic activities
	Any reference source to economic data	Not data sources. Reference of economic estimation of WTP: H. Mason, M. Jones-Lee, C. Donaldson, (2009). Modelling the monetary value of a QALY: a new approach based on UK data. Health Economics 18(8), 933–950.
	Comments	Unhelpful for our study. Interesting study if ecosystem services are considered.

Identification	**Author**	Pomeroy S.,. Baldwin K., McConney P.
	Title	Marine Spatial Planning in Asia and the Caribbean: Application and Implications for Fisheries and Marine Resource Management
	Source/journal	Desenvolvimento e Meio Ambiente, v. 32, p. 151-164, dez. 2014.
	Impact Factor	n.a.
	Year	2014
Classification	**Functional classification**	Public policy
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Descriptive
	Thematic	Implications and practical application of MSP
	Sectors involved	Fisheries
	Number and profile of stakeholders involved (e.g. private, public, organisation)	none
	Temporal Scope	-
	Geographical Scope	St. Kitts and Nevis, Grenadine, Philippine, Indonesia
	Status (ongoing, fully implemented)	Depends on the region analysed. Some plans are fully implemented, some others are ongoing.
	Methods used	No method used.
Qualitative assessment	**Informative summary**	The purpose of this paper is to discuss the implications and practical application of MSP as an ocean resource management paradigm in Asia and the Caribbean. Where will MSP fit in the range of management paradigms? Where and how can it be best utilised for integrated resource management? What are challenges for implementation? Examples of use of MSP and marine zoning are presented and discussed.
	Main aspects and contributions to our study	The paper is merely descriptive.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Punt, Maarten J.; Groeneveld, Rolf A.; van Ierland, Ekko C.; Stel, Jan H.
	Title	Spatial planning of offshore wind farms: A windfall to marine environmental protection?
	Source/journal	Ecological Economics
	Impact Factor	1,66
	Year	2009
Classification	**Functional classification**	Economic environment
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Spatial planning of wind farms
	Sectors involved	Wind energy
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Private (electricity firms)/Public (Society for environmental benefits)
	Temporal Scope	Not appropriate, the authors use data form different references (in 2007 euros)
	Geographical Scope	Netherlands' coast (Dutch EEZ)
	Status (ongoing, fully implemented)	Not appropriate, MSP implementation or other maritime measure isn't contemplated in the study (Economic and ecological estimation of current wind farms)
	Methods used	Spatial (multi-objective) analysis (economic and environment). Econometrics: sensitivity analysis
Qualitative assessment	**Informative summary**	How wind farms can contribute to protection of the marine environment through strategic and economically viable location choices. They analyse the problem of finding the optimal location for offshore wind farms, by considering both economic and ecological aspects (on razorbill and plaice species). They use a spatially explicit model that includes energy generation as well as the effects on bird and fish species. The model maximises the revenues from wind farms under constraints for ecological impacts related to bird collisions and impacts on fish stocks for four scenarios for different restrictions imposed for ecological targets. Results: Revenues interval (4,104 , 4,330 million euros), Forgone existence value razorbills (0.64 , 3.24 million €), Gained existence value plaice (0.12 , 0.84 million €).
	Main aspects and contributions to our study	Not appropriate: non-existent relation with other economic activities
	Any reference source to economic data	Data sources of energy prices: Eurostat. In addition, references for investment, operation and maintenance costs: Kooijman HJT. (2002). Cost parameters and resource assessment of wind energy in Europe. Remarks and Recommendations within the Framework of the ECN Project BETER. ECN, Petten. Mathew S. (2006). Wind Energy. Fundamentals, Resource Analysis and Economics. Springer, New York. Noord M.D., Beurskens, L.W.M., Vries, H.J.D., (2004). Potentials and costs for renewable electricity generation. A data overview. ECN, Petten.
	Comments	Unhelpful for our study. Interesting reference for quantification of the economic-ecological relationship.

Identification	**Author**	Rees, S.E., Mangi, S.C., Hattam, C., Gall, S.C., Rodwell, L.D., Peckett, F.J. and Atrill, M.J.
	Title	The socio-economic effects of a Marine Protected Area on the ecosystem service of leisure and recreation
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2015
Classification	**Functional classification**	Economic environment
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Benefits and impacts; blue economy improvements
	Sectors involved	Sectors of the marine leisure and recreation industry (sub-aqua diving, sea angling and wildlife watching)
	Number and profile of stakeholders involved (e.g. private, public, organisation)	dive businesses, divers, sea anglers and charter boat operators
	Temporal Scope	2008-2011
	Geographical Scope	Lyne Bay (south west England)
	Status (ongoing, fully implemented)	fully implemented
	Methods used	Spatial data. Estimating the value of direct use
Qualitative assessment	**Informative summary**	This research develop a method to monitor how recreation and leisure activity associated with an MPA changes in the years following designation. The use of the resource has changed following designation and that MPAs can attract a greater proportion of the leisure and recreation expenditure and associated turnover to sites within the MPA boundary. Spatial and economic data were verified with the stakeholders via a series of quantitative and qualitative questions.
	Main aspects and contributions to our study	Quantification of economic impacts , But for only some recreational uses
	Any reference source to economic data	Data obtained from interviews (number of visits, spending on food, accommodation, etc.)
	Comments	This study can be used to analyse relationships with stakeholders in relation to: how does MPS affect their leisure behaviour (frequency, expense, etc.) or their economic activity (turnover, employment, etc.)

Identification	**Author**	Rees, S.E., Rodwell, L.D., Atrill, M.J., Austen, M.C., and Mangi, S.C.
	Title	The value of marine biodiversity to the leisure and recreation industry and its application to marine spatial planning
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2010
Classification	**Functional classification**	Economic environment
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Benefits and impacts; blue economy improvements
	Sectors involved	Sectors of the marine leisure and recreation industry (sub-aqua diving, sea angling and wildlife watching)
	Number and profile of stakeholders involved (e.g. private, public, organisation)	8 dive businesses, 42 divers, 49 sea anglers and 21 charter boat operators
	Temporal Scope	2008
	Geographical Scope	Lyne Bay (south west England)
	Status (ongoing, fully implemented)	fully implemented
	Methods used	Spatial data. Estimating the value of direct use.
Qualitative assessment	**Informative summary**	Incorporation the value of the marine leisure and recreation industry, as an indicator of the value of the ecosystem service, into decision making for resource use planning. Four questionnaires were developed to determine the value of the activity of the different recreation groups. Monetary values were elicited by asking questions designed to determine expenditure (anglers and divers), and business turn- over (charter boats and dive businesses). The total value for recreation activities was estimated of £18.3 M per year.
	Main aspects and contributions to our study	Quantification of economic impacts , But for only some recreational uses
	Any reference source to economic data	Data obtained from interviews (number of visits, spending on food, accommodation, etc.)
	Comments	Little useful for our study since an only type activities is considered.

Identification	**Author**	Reimer, Matthew N.; Haynie, Alan C.
	Title	Mechanisms matter for evaluating the economic impacts of marine reserves
	Source/journal	Journal of Environmental Economics and Management
	Impact Factor	2,2
	Year	2018
Classification	**Functional classification**	Economic-environment
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Marine reserves (implementing in 2011)
	Sectors involved	Commercial Fishing (catcher processor trawlers)
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Private: 10 companies (18 vessels)
	Temporal Scope	2008-2014
	Geographical Scope	North Pacific Ocean: US waters off the coast of Alaska (Aleutian Islands)
	Status (ongoing, fully implemented)	Not appropriate, non-existent MSP (Marine reserve fully implemented)
	Methods used	Econometrics: Structural equation modelling
Qualitative assessment	**Informative summary**	Short run economic impact of marine reserve on commercial fishery. They estimate the evolution of a result of interest for vessels affected by the reserve and compare it to the evolution of the same outcome estimated for unaffected vessels. They employ propensity-score-weighted difference-in-differences (more closely balances the treated and control groups based on pre-intervention characteristics) and synthetic control method (allows for vessel-specific comparison units and effects of unobserved vessel-specific factors to vary with time. They identify mechanism through which the treatment impacts units using a structural equation model. Results: negative effects on net revenues for 2011-2013 and positive effect (increase by 3.6%) for 2014.
	Main aspects and contributions to our study	Quantification of economic impacts of regulatory measures (marine reserves) ,but only for one economic sector (fishing)
	Any reference source to economic data	Yes. Economic Data Reports, Vessel-level production reports, and data from onboard observers. All of them are confidential data.
	Comments	The economic impact of marine reserve is estimated only on the fishing sector. Other BG activities not included. Positive effect on net revenues for last year studied of implementing a marine reserve. But little useful for our study since an only sector is considered.

Identification	**Author**	Ritchie & Ellis (2010)
	Title	A system that works for the sea”? Exploring stakeholder engagement in marine spatial planning
	Source/journal	Journal of Environmental Planning and Management
	Impact Factor	0,66
	Year	2010
Classification	**Functional classification**	Public policy
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Theoretical
	Thematic	Positive relations
	Sectors involved	NGOs, civil servants, marine policy officers, project managers of marine renewables and academics
	Number and profile of stakeholders involved (e.g. private, public, organisation)	6-Public, private and NGO
	Temporal Scope	2007-2008
	Geographical Scope	EU-UK,Ireland
	Status (ongoing, fully implemented)	Analysis for Planning
	Methods used	Interview-Discourse analysis
Qualitative assessment	**Informative summary**	The recognition of differentiated perspectives on the ‘marine problem’ and their consequences for policy The need to use the MSP process to mediate the different forms of knowledge and conflicts of interest that emerge from the process, through deliberative practice
	Main aspects and contributions to our study	
	Any reference source to economic data	
	Comments	

Identification	**Author**	Ruiz-Frau, A., Hinz, H., Edwards-Jones, G and Kaiser, M.J
	Title	Spatially explicit economic assessment of cultural ecosystem services: Non-extractive recreational uses of the coastal environment related to marine biodicersity
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2013
Classification	**Functional classification**	Economic environment
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Non-extractive uses of marine biodiversity (diving, kayaking, wildlife watching from boats and seabird watching)
	Sectors involved	156 diving, 110 kayaking, 198 wildlife watching from boats and seabird watching
	Number and profile of stakeholders involved (e.g. private, public, organisation)	6-Public, private and NGO
	Temporal Scope	2008
	Geographical Scope	Coastal temperate area of Wales
	Status (ongoing, fully implemented)	fully implemented
	Methods used	Spatial Analysis. Travel cost (on-line questionnaire; face to face questionnaire)
Qualitative assessment	**Informative summary**	assessment of recreational uses. Characteristics of the user's trip. In this study, an analysis of spatial distribution and related expenditure is made. A total of 558 questionnaires were carried out among the different user grups (156 divers, 110 kayakers and 198 wildlife cruise customers were interviewed between May and November 2008. The total expenditure incurred by was estimated at £ 7.8 million per annum (95% C.I £ 4.7 M, £ 10.9 M). The total expenditure associated with recreational user was estimated to be between £ 21.8 and £ 33 million per annum: the total expenditure associated to sea-Kayaking was estimated at £ 2.5 million per annum (95% C.I £ 2.1 M, £ 2.9 M). The total expenditure incurred by boat passengers was estimated at £ 13.4 million per annum (95% C.I £ 12.1 M, £ 14.7 M). The total expenditure derived from seabird watching activity was estimated at approximately £ 3.7 million per annum (95% C.I £ 2.9 M, £ 4.5 M).
	Main aspects and contributions to our study	Quantification of economic impacts , But for only some recreational uses
	Any reference source to economic data	Data obtained from interviews (number of visits, spending on food, accommodation, etc.)
	Comments	Little useful for our study since an only type activities is considered.

Identification	**Author**	Ruiz-Frau, A.,Kaiser, M.J., Edwards-Jones, G., Klein, C.J., Segan, D. And Possingham, H.P
	Title	Balancing extractive and non-extractive uses in marine conservacion plans
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2015
Classification	**Functional classification**	Economic environment
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Benefits and impacts; blue economy improvements
	Sectors involved	Commercial and recreational fisheries, diving, kayaking, wildlife watching from boats and seabird watching
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Commercial and recreational fisheries, diving, kayaking, wildlife watching from boats and seabird watching
	Temporal Scope	2008
	Geographical Scope	Wales (U.K)
	Status (ongoing, fully implemented)	fully implemented
	Methods used	Spatial analysis. Spatial data. The systematic conservation software Marxan with Zones. Integration extractive and non-extractive interest
Qualitative assessment	**Informative summary**	Design of an MPA network. An extension of Marxan software was used to design networks of MPAs that incorporate conservation and socioeconomic dates. A 5x5 km grid covering the entire planning region was created. Assessment the socioeconomic effects of integrating fine scale resolution data of non-extractive recreational uses and extractive uses of the marine environment. To evaluate advantages associated with the design of multizoned-protected areas. Planning scenarios. Three planning configurations were compared: fisheries scenario, Recreational single zone scenario, recreational multizone scenario. The present study shows that the inclusion socioeconomic spatial data of both extractive and non-extractive uses significantly reduced the potential economic impacts on the non-extractive sector without extra cost to the fisheries sector. Furthermore, results also indicate that the design of a multiple-zone MPA outperformed that of a single-zone MPA by reducing and generating more equitable impacts for both extractive and non-extractive interests.
	Main aspects and contributions to our study	Integrating interests in the planning process. Importance of including the interest of any groups.
	Any reference source to economic data	Each planning unit contained spatial information on the biological and socioeconomic aspects considered. Data on the spatial distribution and economic importance of commercial and recreational fisheries was included. The data for recreational use were obtained from interviews (number of visits, spending on food, accommodation, etc.)
	Comments	Interesting work to address the design of protected areas. Contribute ideas to zoning areas and reconcile opposing interests

Identification	**Author**	Sanchirico and Wilen, 2007
	Title	Sustainable Use of Renewable Resources: Implications of Spatial-Dynamic Ecological and Economic Processes
	Source/journal	International Review of Environmental and Resource Economics
	Impact Factor	1,09
	Year	2008
Classification	**Functional classification**	Economic environment
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Theoretical/Methodological
	Thematic	Methods
	Sectors involved	Fishers
	Number and profile of stakeholders involved (e.g. private, public, organisation)	
	Temporal Scope	
	Geographical Scope	
	Status (ongoing, fully implemented)	
	Methods used	Marginal use, bieoeconomic models
Qualitative assessment	**Informative summary**	-The connectivity of metapopulation should be taken into account when developing MSP
	Main aspects and contributions to our study	-Methodologies on bieconomic modelling for applying on ecological-economic performance of MSP
	Any reference source to economic data	None
	Comments	

Identification	**Author**	Sanchirico J., Lew D., Haynie A., Kling D., Layton D.
	Title	Conservation values in marine ecosystem-based management
	Source/journal	Marine Policy
	Impact Factor	1,11
	Year	2013
Classification	**Functional classification**	Related topics
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied method
	Thematic	Positive relations
	Sectors involved	Fisheries and conservation
	Number and profile of stakeholders involved (e.g. private, public, organisation)	None
	Temporal Scope	19 years
	Geographical Scope	Regional
	Status (ongoing, fully implemented)	Analysis for planning
	Methods used	Willingness to Pay
Qualitative assessment	**Informative summary**	The challenge of using benefits and costs methods to evaluate conservation actions
	Main aspects and contributions to our study	An economic efficiency-based framework for evaluating trade-offs is applied to assess the relative benefits and costs of conservation actions versus WTP
	Any reference source to economic data	Alaska Department of Fish and Game landings and fish ticket data and Commercial Operator Annual Reports, provide the first wholesale value, which includes fishing revenues and the value added in the processing of the fish, across the period 1990–2009
	Comments	

Identification	**Author**	Sangiuliano, S., & Mastrantonis
	Title	From Scotland to New Scotland: Constructing a sectoral marine plan for tidal energy for Nova Scotia
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2017
Classification	**Functional classification**	Transaction costs
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	Applied Methods
	Thematic	Methods
	Sectors involved	Fisheries, aquaculture, marine renewable energy, tourism and recreation,
	Number and profile of stakeholders involved (e.g. private, public, organisation)	8-Public and private
	Temporal Scope	none
	Geographical Scope	Regional
	Status (ongoing, fully implemented)	Analysis for Planning
	Methods used	GIS
Qualitative assessment	**Informative summary**	The applied methodology demonstrated a (98.1%) possible increase in suitable area for marine renewable energy areas compared to the current Act.
	Main aspects and contributions to our study	None
	Any reference source to economic data	None
	Comments	

Identification	**Author**	Severen, C., & Plantinga
	Title	Land-use regulations, property values, and rents: Decomposing the effects of the California Coastal Act
	Source/journal	Journal of Urban Economics
	Impact Factor	2,32
	Year	2018
Classification	**Functional classification**	Related topics
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied Methods
	Thematic	Benefits and impacts
	Sectors involved	Coastal land owners
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Public administration and Private Real State
	Temporal Scope	1989-2014
	Geographical Scope	Regional
	Status (ongoing, fully implemented)	Management Plan Approval
	Methods used	Spatial regression discontinuity design, spatial differences in differences
Qualitative assessment	**Informative summary**	the Coastal Act has affected the prices of properties that were built be- fore the regulation took effect
	Main aspects and contributions to our study	California Coastal Act raises the price and rental income of multifamily housing units located within the Coastal Zone. The total effect of regulation on prices, an increase of 13–21%, results from local benefits generated from restrictions on immediate neighbours and from amenities operating at a larger spatial scale
	Any reference source to economic data	price per square foot of building or lot size
	Comments	

Identification	**Author**	Spencer-Cotton et al 2018
	Title	Spatial and Scope Effects: Valuations of Coastal Management Practices
	Source/journal	Journal of Agricultural Economics
	Impact Factor	1,16
	Year	2018
Classification	**Functional classification**	Related topics
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied Methods
	Thematic	Methods
	Sectors involved	Aboriginal, the general Public, Conservation
	Number and profile of stakeholders involved (e.g. private, public, organisation)	The Public
	Temporal Scope	2015
	Geographical Scope	Regional
	Status (ongoing, fully implemented)	Pre-planning
	Methods used	Discrete choice experiment, WTP
Qualitative assessment	**Informative summary**	Willingness to pay for the attributes increased when management occurs at the larger geographical scope
	Main aspects and contributions to our study	The scope and geographical scale of management units is relevant for the public acceptance of MSP
	Any reference source to economic data	
	Comments	

Identification	**Author**	Stelzenmuller et al 2015
	Title	Quantitative environmental risk assessments in the context of marine spatial management: current approaches and some perspectives
	Source/journal	ICES Journal of Marine Science
	Impact Factor	1,59
	Year	2015
Classification	**Functional classification**	Public policy
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	Applied Methods
	Thematic	Methods
	Sectors involved	Fishers, Conservation, Offshore windfarms
	Number and profile of stakeholders involved (e.g. private, public, organisation)	none
	Temporal Scope	3 years
	Geographical Scope	Regional
	Status (ongoing, fully implemented)	Analysis for planning
	Methods used	Bayesian Belief Network
Qualitative assessment	**Informative summary**	MSP processes should embed ERA frameworks which allow for the integration of multiple risk assessments and the quantification of related uncertainties
	Main aspects and contributions to our study	The combined methods of Bayesian with GIS would help to design case studies to evaluate risk assessments to evaluate the performance of a MSP.
	Any reference source to economic data	None
	Comments	

Identification	**Author**	Stelzenmüller et al 2016
	Title	Co-location of passive gear fisheries in offshore wind farms in the German EEZ of the North Sea: A first socio-economic scoping
	Source/journal	Journal of Environmental Management
	Impact Factor	1,16
	Year	2016
Classification	**Functional classification**	Transaction costs
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied Methods
	Thematic	Positive relations for…
	Sectors involved	Fisheries and Offshore windfarms
	Number and profile of stakeholders involved (e.g. private, public, organisation)	7-Fishers, Fishing processing industry, Offshore windfarms, Planning institutions, Tourism, Environmental NGO, Maritime techniques
	Temporal Scope	2010-2012
	Geographical Scope	Regional
	Status (ongoing, fully implemented)	Management Plan Approval
	Methods used	GIS, spatial overlap analysis, stakeholder consultation
Qualitative assessment	**Informative summary**	MSP process requires comprehensive and spatial explicit socio-economic viability studies factoring in also ecological effects of offshore wind farms on target species
	Main aspects and contributions to our study	The study states future economic losses due to the current MSP due to access restrictions of the fisheries on the offshore windfarms
	Any reference source to economic data	None
	Comments	

Identification	**Author**	Teixeira et al (2018)
	Title	A habitat-based approach to predict impacts of marine protected areas on fishers
	Source/journal	Conservation Biology
	Impact Factor	3,08
	Year	2018
Classification	**Functional classification**	Economic enviroment
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied Methods
	Thematic	Benefits and Impacts/ Methods
	Sectors involved	Fishers, Conservation
	Number and profile of stakeholders involved (e.g. private, public, organisation)	1-NGO, organization
	Temporal Scope	1 year
	Geographical Scope	Regional
	Status (ongoing, fully implemented)	Pre-planning
	Methods used	MARXAN-GIS-FISHCAKE-Opportunity cost methods
Qualitative assessment	**Informative summary**	-Novel approach for using MSP taking into account the opportunity costs of fisheries - the opportunity cost approach allows for the incorporation of economic interests of different stakeholders and evaluation of trade-offs among different stakeholder groups
	Main aspects and contributions to our study	A methodology basic in datasets to assess with economic outcomes the benefits of a given marine spatial plan.
	Any reference source to economic data	Catch first commercialisation price. Brazilian Ministério da Pesca e Aquicultura. http://sinpesq.mpa.gov.br/rgp
	Comments	

Identification	**Author**	Townend
	Title	Marine science for strategic planning and management: The requirement for estuaries
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2002
Classification	**Functional classification**	Public policy
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Descriptive
	Thematic	Benefits and impacts
	Sectors involved	Recreation, Renewable energy, Oil refineries, water treatment
	Number and profile of stakeholders involved (e.g. private, public, organisation)	
	Temporal Scope	1996
	Geographical Scope	Country
	Status (ongoing, fully implemented)	Analysis for Planning
	Methods used	Cost-Benefit
Qualitative assessment	**Informative summary**	Due to the specific nature of estuaries managers and planners are require to move away from a prescriptive interventionist approach towards a more adaptive one
	Main aspects and contributions to our study	Water treatment is the largest activity in terms of revenue generation
	Any reference source to economic data	Inter-Agency Committee on Marine Science and Technology.
	Comments	

Identification	**Author**	Van de Geer et al. 2013
	Title	Impacts of the Moreton Bay Marine Park rezoning on commercial fishermen
	Source/journal	Marine Policy
	Impact Factor	Impact Factor: 2.109; 5-Year Impact Factor: 2.495
	Year	2013
Classification	**Functional classification**	Economic environment
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied Methods
	Thematic	Positive relations
	Sectors involved	Fishers
	Number and profile of stakeholders involved (e.g. private, public, organisation)	1-Private (fishers)
	Temporal Scope	3 years
	Geographical Scope	Regional
	Status (ongoing, fully implemented)	Management Plan Development
	Methods used	Opportunity cost
Qualitative assessment	**Informative summary**	-Re-zoning of the MPA have caused a detrimental economic impact on fishers -Limited knowledge of fisheries data is entangling the effectiveness of MSP
	Main aspects and contributions to our study	-Despite this case study is only focused on fisheries, this study presents the impact of MSP on economic terms.
	Any reference source to economic data	Queensland Department of Environment and Resource Management
	Comments	

Identification	**Author**	Verutes et al 2017
	Title	Integrated planning that safeguards ecosystems and balances multiple objectives in coastal Belize
	Source/journal	International Journal of Biodiversity Science, Ecosystem Services and Management
	Impact Factor	0,56
	Year	2017
Classification	**Functional classification**	Related topics
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Applied Methods
	Thematic	Positive relations
	Sectors involved	Aquaculture, Fishing, Dredge, Marine transportation, marine recreation, oil exploration
	Number and profile of stakeholders involved (e.g. private, public, organisation)	4-NGO, Public authorities, Scientists, local individual stakeholders
	Temporal Scope	6 years, 15 years scenario assess
	Geographical Scope	Country
	Status (ongoing, fully implemented)	Management Plan Approval
	Methods used	GIS/Invest
Qualitative assessment	**Informative summary**	MSP that consider trade-offs among alternative scenarios by comparing key metrics for ecosystem services will resonate more deeply with local people, planners, government officials, and policy-makers
	Main aspects and contributions to our study	Informed management MSP scenario has the capacity to increase and sometimes double the revenues of fishery, tourism and avoided damages in coastal protection compared to previous state before the implementation of MSP
	Any reference source to economic data	None
	Comments	

Identification	**Author**	Volckaert, A. & Rommens, W.
	Title	Update socio-economic analysis of the use of the Belgian marine waters and of the cost of degradation. Marine Strategy Framework Directive - Art. 8.1.c
	Source/journal	ARCADIS Belgium nv: Gent. 105 + (15 p. Dutch summary) pp. Flanders Marine Institute Library: Open access 313262
	Impact Factor	n/a
	Year	2018
Classification	**Functional classification**	Transaction costs
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Socio-economic analyses
	Thematic	Applied method
	Sectors involved	Fisheries and aquaculture, Shipping (or maritime transport), Ports, Oil and Gas, Offshore Wind Energy, sand extraction, tourism.
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Where possible, internally available data from authorities were used and complemented by external data from stakeholders. Number and profile are not detailed.
	Temporal Scope	The reference period is 2011-2015, with a preference for 2014-2015
	Geographical Scope	Marine environment of the Belgian part of the North Sea
	Status (ongoing, fully implemented)	Completed
	Methods used	Estimation of annual costs based on the current cost of existing measures to avoid (reduce or minimise) degradation and the restoration costs based on additional/new measures to reach Good Environmental Status (GES). This method is described as the thematic approach within the European guidance document (European Commission, 2010).
Qualitative assessment	**Informative summary**	• An initial assessment of the state of the marine waters in Belgium was made in 2012, as required by the MSFD. This assessment included an economic and social analysis of the use of the Belgian waters and the costs associated with the degradation of the marine environment. • This study updates and extends the economic and social analysis reported in 2012 according to the Marine Water Accounts approach (European Commission, 2010), further considering progress and recommendations made at EU and OSPAR level. • This report provides further insight into the cost of degradation of the marine environment of the Belgian part of the North Sea by an estimation of annual costs based on the current cost of existing measures to avoid (reduce or minimise) degradation and the restoration costs based on additional/new measures to reach Good Environmental Status (GES).
	Main aspects and contributions to our study	• The study presents results for the OSPAR common socioeconomic indicators: Gross value added (unit: Million EUR), Employed persons (unit: FTE), Production value (unit: Million EUR). Besides the sectors considered under the common OSPAR approach, the study takes further into consideration sectors with high relevance for the Belgian context (e.g. sand extraction, tourism). • Bearing in mind assumptions used, and lack of data in some cases, the total costs of measures that avoid degradation of the Belgian North Sea environment have been calculated to be at least € 2.873.031 per year. A large share of this total cost is related to monitoring of the environmental impacts e.g. from aggregate extraction. • Insight is also provided into the potential applicability of the ecosystem services approach methodology to calculate ecosystem benefits gained when GES is reached. • In terms of the applicability of the ecosystem services approach concept, it is concluded that the methodology and empirical application are not mature enough yet to be applied within the current reporting cycle of the Marine Strategy Framework Directive and that further progress is needed to apply this.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Belgian minister, state secretary with input from relevant stakeholders and governmental services
	Title	Bijlage 1: ruimtelijke analyse van de zeegebieden (Annex 1: spatial analysis of the sea areas)
	Source/journal	FEDERALE OVERHEIDSDIENST VOLKSGEZONDHEID, VEILIGHEID VAN DE VOEDSELKETEN EN LEEFMILIEU (federal public service health, food chain safety and environment)
	Impact Factor	n.a.
	Year	2016
Classification	**Functional classification**	Public policy
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Description and framing of the future Belgian MSP.
	Thematic	Based on scientific and socio-economic information, analysis and description of Belgian sea areas, in order to obtain an overview of the space, the ongoing activities and potential conflicts, and the potentially combinable activities.
	Sectors involved	Within the plan, various activities are mentioned: pipelines and cables, commercial fishing, platforms and radars, shipping and ports, marine aquaculture, scientific research, tourism and recreation, energy production, dredging works, sand mining.
	Number and profile of stakeholders involved (e.g. private, public, organisation)	n.a.
	Temporal Scope	2020-2026
	Geographical Scope	Belgium
	Status (ongoing, fully implemented)	Ongoing Preliminary marine spatial plan for 2020-2026 (adaptation of MSP 2014) – was accepted early 2018, will be fully accepted in 2019
	Methods used	• - Spatial analysis of the sea areas (spatial & legal boundaries) • - Description of physical characteristics, existing nature statuses in Belgian sea areas • - Inventory of activities on sea, and usage of the sea • - Overview of existing spatial alliances & conflicts • - Description of legal context
Qualitative assessment	**Informative summary**	This describes MSP in Belgium (why is it needed, how was it made, what does it do, …).
	Main aspects and contributions to our study	Small reference to economic value of "merchant fleet" (page 69): • - GT (Gross (?) Tonnage): almost 4 million • - Deadweight Tonnage (DWT): more than 6.5 million • - Annually, shipping generates €4.2 million; with more than 12.100 jobs. • - The port industry created almost 115.000 direct & 135.000 indirect jobs. • - In 2016, the direct added value of the shipping industry was 1.8 billion.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Department of Tourism, Republic of South Africa
	Title	Final Report: Development of a Framework to Assess the Economic Impact of Coastal and Marine Tourism in South Africa, Cape Peninsula University of Technology, 2017
	Source/journal	Grey literature
	Impact Factor	n.a.
	Year	2017
Classification	**Functional classification**	Transaction costs
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Methods
	Thematic	Tourism
	Sectors involved	Coastal tourism
	Number and profile of stakeholders involved (e.g. private, public, organisation)	n.a.
	Temporal Scope	N.a.
	Geographical Scope	Western Cape, Eastern Cape and KwaZulu–Natal coastal provinces
	Status (ongoing, fully implemented)	Established MPAs
	Methods used	Cost-Benefit Analysis, Input-Output models, General equilibrium models, Tourism Satellite Accounts, Time-series foracasting methods
Qualitative assessment	**Informative summary**	• The report offers a method to calculate the impact of MPAs and (potentially) MSP on tourism • There are a couple of common errors that come with using CBA, such as secondary benefits and multiplier effects, double counting, failure to recognise such costs and ignoring implicit or opportunity costs • Regional input output tables are often not available (also in South Africa) and are expensive to develop because of the extensive data required. • General equilibrium and economic base models have also been used to quantify economic impact studies in marine tourism and in countries such as New Zealand, Australia, Mauritius, the United States of America, Malaysia and Indonesia. • the TSA is the single most important new macro-economic policy • analysis tool developed in the last several decades to measure tourism demand and its implications for a national economy • In Western Australia, the researchers successfully used tourism direct expenditure data when presenting a business case which is accepted to the Western Australian Treasury for increased management resources (Jones et al. 2011).
	Main aspects and contributions to our study	• • The report is mainly a review of possible methods to measure the size of coastal tourism and/or understand the impact of a give policy on it.
	Any reference source to economic data	Jones et al., Ningaloo collaboration cluster: socio-economics of tourism, 2011.
	Comments	

Identification	**Author**	Weig, B.
	Title	BONUS BALTSPACE Internal project report: Spatial Economic Benefit Analysis.
	Source/journal	BONUS BALTSPACE Project
	Impact Factor	n/a
	Year	2017
Classification	**Functional classification**	Public policy
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	Economic benefit analyses to support MSP
	Thematic	Applied method
	Sectors involved	Shipping, offshore wind, fishing, marine tourism in particular, but also sand and gravel exploitation, cable and pipelines and aquaculture/ mariculture
	Number and profile of stakeholders involved (e.g. private, public, organisation)	n/a
	Temporal Scope	2016
	Geographical Scope	Baltic Sea with focus on German Baltic Sea
	Status (ongoing, fully implemented)	Complete
	Methods used	Sectoral value chain analyses and data visualisation through map generation using specialised software
Qualitative assessment	**Informative summary**	The report explores the use of Spatial Economic Benefit Analysis (EBA) as a tool to support MSP practitioners respond to current and future challenges through the development of a spatial analysis of economic benefits in MSP relevant sectors. The study recognises that a one-size-fits-all solution is not applicable to all sectors and so shipping and offshore wind were chosen for full analysis, including the development of an appropriate tool and its empirical testing. And the first ideas of how to conduct a spatial EBA in marine tourism and fishing were explored.
	Main aspects and contributions to our study	It is noted that official statistics aggregate economic sectoral data in categories that do not allow for extracting maritime sectoral data exclusively. This data gap is the reason why an alternative method to approach economic benefits had to be chosen. The developed approach puts the actors at the centre of the analysis. It analyses which enterprises/ industries in which regions benefit from the different uses of the sea considered in maritime spatial planning. The tool offers a new and alternative perspective, revealing interesting actor-centred insights regarding the analysed sectors. Relevant sectors differ so much that a single approach is not reasonable. Sector-specific tools seem to be more appropriate. The given task can be approached from different angles: beneficiaries can be understood as being firms (as in the offshore wind approach), users of services (as in the shipping case), jobs, tax income for regions/ communities or other indicators. The empirical application of the tool is limited by lack of data. Suitable statistics are not available for all sectors. Therefore, own research and/ or data compilation from different sources is necessary and this is very time-consuming. Putting too much information in one map reduces readability of the map and therefore its usefulness. Careful selection of indicators and thorough categorisation are two important steps within the approach, to develop useful maps. The main contribution of this tool is to generate sectoral knowledge about different uses of the sea. The maps showing the regional distribution of economic benefits can be used as decision support tools in practical MSP.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Stephen Jay
	Title	Marine Spatial Planning: Assessing net benefits and improving effectiveness
	Source/journal	OECD Ocean Economy Week
	Impact Factor	n/a
	Year	2017
Classification	**Functional classification**	Economic enviroment
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Review of benefits and effectiveness of MSP to date
	Thematic	Descriptive
	Sectors involved	Various – reviews application of MSP in
	Number and profile of stakeholders involved (e.g. private, public, organisation)	n/a
	Temporal Scope	
	Geographical Scope	Australia, UK, Germany, Philippines, Europe
	Status (ongoing, fully implemented)	Complete
	Methods used	Review
Qualitative assessment	**Informative summary**	The report explores the following through review and analyses of specific case studies: The application of MSP has been growing in several parts of the world, through both pilot projects and official processes. MSP is developing partly in conjunction with the establishment of marine protected areas (MPA) and integrated coastal zone management (ICZM), and is also being connected to other spatial planning frameworks. There are established principles and recommended processes for MSP. However, it is being carried out in a variety of ways, reflecting different legal and administrative frameworks, as well as local characteristics of the marine environment and maritime activities. Attention is now turning to the evaluation of MSP, to assess whether or not it is achieving desired outputs. Evaluation frameworks are being developed, though practice in this regard varies considerably between different contexts. Within this, some attention has also been given to assessing the socio-economic benefits, with some efforts being made in assessing the benefits of individual marine spatial plans. There is scope here for learning from the longer-standing experience of the evaluation of MPA and ICZM programmes.
	Main aspects and contributions to our study	Main findings were the following: • Gaining resources and political support: responsible bodies for MSP should ensure adequate financial and skills resourcing and support; • Data–gathering: data should be gathered in order to support the monitoring and evaluation of the implementation of marine spatial plans; • Addressing key priorities: focusing the marine spatial plan on achievable, clearly stated objectives, reflecting wider policy goals; • Ensuring integration with other planning frameworks: there should be coordination across land and sea, in cross-border areas and with sectoral plans; • Gaining meaningful stakeholder participation: ensuring that MSP is conducted in an inclusive and culturally sensitive manner; • Maintaining flexibility in MSP practice: the planning measures that are used should reflect the context and needs of the plan area and bodies affected; • Committing to plan implementation: consideration should be given from the outset to how a plan’s proposals are going to be put into practice; • Giving greater consideration to costs and benefits of MSP: a more systematic approach to economic valuation should be developed, as well as integrating economic analysis of trade-offs, and building into the MSP cycle.

	Any reference source to economic data	
	Comments	

Identification	**Author**	GHK Consulting Ltd. In association with Scott Wilson
	Title	Potential Benefits of Marine Spatial Planning to Economic Activity in the UK
	Source/journal	Report of the UK's Royal Society for the Protection of Birds (RSPB)
	Impact Factor	n/a
	Year	2004
Classification	**Functional classification**	Economic environment
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Review
	Thematic	Descriptive
	Sectors involved	Ports, fisheries, oil & gas, tourism & recreation, aquaculture, aggregates, and renewables
	Number and profile of stakeholders involved (e.g. private, public, organisation)	n/a
	Temporal Scope	Not defined but includes historical review and future perspective
	Geographical Scope	Focus on applicability to UK but case studies reviewed in USA, Australia, Canada, South America, south Africa and Belgium
	Status (ongoing, fully implemented)	Complete
	Methods used	Qualitative review
Qualitative assessment	**Informative summary**	The review examines the potential economic benefits, and to inform debate about the likely implications of MSP for particular sectors in the UK. The review involved: • an analysis of the economic sectors likely to be affected by MSP; • a literature review; • a review of international experience of MSP, and • an examination of the planning context, with reference to the lessons to be learnt from terrestrial planning and coastal zone management.
	Main aspects and contributions to our study	The review concluded that marine spatial planning could have a range of significant potential economic benefits to the UK, by: • Facilitating sector growth - MSP can provide a framework that facilitates the sustainable development of different economic activities, therefore helping to enhance incomes and employment • Optimising the use of the sea - MSP can help to ensure that maximum benefits are derived from the use of the sea by encouraging activities to take place where they bring most value and do not devalue other activities. • Reducing costs - MSP can reduce the costs of information, regulation, planning and decision-making. And that these benefits arise through: • Strategic Planning. • Conflict Resolution. • Sustainable Resource Use. • Provision of Development Space. • Promoting Appropriate Uses. • Supporting the Environmental Economy. • Improving Stakeholder Involvement. • Information Efficiencies. • Regulatory Efficiencies. The report also made recommendations for future actions
	Any reference source to economic data	
	Comments	

Identification	**Author**	MARSPLAN-BS Project
	Title	Cross-Border Maritime Spatial Plan for the Black-Sea – Romania and Bulgaria (MARSPLAN-BS)
	Source/journal	MARSPLAN-BS Project
	Impact Factor	n/a
	Year	2015-2018
Classification	**Functional classification**	Public policy
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Interactive Web-based Platform
	Thematic	Spatial analyses and qualitative reviews
	Sectors involved	various
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Not specified
	Temporal Scope	2015-2018
	Geographical Scope	Black Sea
	Status (ongoing, fully implemented)	complete
	Methods used	Literature review and GIS
Qualitative assessment	**Informative summary**	The MARSPLAN-BS project aimed to: • Support the implementation of the directive on EU maritime spatial planning; • Create an institutional framework for Romania-Bulgaria cross-border maritime spatial planning; • Consolidate the cross-border cooperation and exchange of information between Romania and Bulgaria on issues related to maritime area; • Create a vision and strategic objectives for the Black Sea area, also taking into account the interaction between the territory and the sea; • Elaborate of the maritime spatial plan for the identified Romania-Bulgaria cross-border area (Mangalia - Shabla); • Contribute to a wider dissemination of information on maritime spatial planning for the Black Sea and good practices to all relevant actors.
	Main aspects and contributions to our study	The following were developed during the course of the project and are available via the project's website platform: • Maritime spatial plan for the cross-border area (Romania -Bulgaria); • Report on institutional and legislative framework of Black Sea maritime spatial planning; • Integrated report – detailed analysis of Bulgarian and Romanian maritime areas; • Case studies; • Common methodology for analysis and for spatial planning; • Common principles, strategic vision and objectives of MSP.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Mats Ivarsson, Kristin Magnussen, Anna-Stiina Heiskanen, Ståle Navrud and Markku Viitasalo
	Title	Ecosystem services in MSP: Ecosystem services approach as a common Nordic understanding for MSP
	Source/journal	TemaNord 2017:536 ©Nordic Council of Ministers
	Impact Factor	n/a
	Year	2017
Classification	**Functional classification**	Related topics
		Preparation
	Type (descriptive, theoretic.-method., applied)	Report on Ecosystem Services in MSP
	Thematic	Review, analyses and methodological tool
	Sectors involved	Energy, Mining (extraction non-living resources), Marine transports, Fisheries, Hunting, Ecosystem service approach as a common Nordic understanding for MSP, Aquaculture, Transport, Navigational routes, Harbours, Pipelines, telecommunication cables, Coastal defence, Marine tourism and recreation, Coastal industries, Military defence.
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Not detailed, the methodology presented in this study is illustrated by a fictive planning scenario.
	Temporal Scope	Up to and including 2017
	Geographical Scope	Nordic countries
	Status (ongoing, fully implemented)	Complete
	Methods used	Conceptual modelling
Qualitative assessment	**Informative summary**	The aim of this study is to describe and communicate a proposal for a new tool for assessing ecosystem services in marine spatial planning in the Nordic countries. The tool is based on a stepwise methodology on how to include ecosystem services assessment in maritime spatial planning processes by providing improved knowledge in all sustainability dimensions; ecological, economic and social desirability. This simple and transparent methodology is also intended to be used in the stakeholder participation, to raise awareness, to create understanding and acceptance, and to help reaching an agreement in the case of conflict regarding the use of marine space
	Main aspects and contributions to our study	The study clearly shows that making use of the proposed methodology enables and facilitates the incorporation of and accounting for ecosystem services in the planning process. However, in order to further facilitate ecosystem services analysis in marine spatial planning, and other applied contexts, there is a need for further adaptation and development of the indicators used for evaluation of changes in the provision and quality of ecosystem services. The report recommends that future studies should focus on improving the alignment of indicators used to evaluate ecosystem services, and indicators applied in MSFD and BSAP (HELCOM). Optimally, the same indicators should be used to evaluate the impacts on GES from environmental pressures originating from maritime activities and ecosystem services at the same time.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Karyn Morrissey
	Title	The Economic Dimensions of MSP and their Implications for Maritime Spatial Planning in Ireland
	Source/journal	Presentation to The Social & Economic Dimensions of Maritime Spatial Planning Conference, Dublin Institute of Technology, 2016
	Impact Factor	n/a
	Year	2016
Classification	**Functional classification**	Economic environment
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Conference presentation of review and analyses of the economic dimensions of MSP in an Irish context
	Thematic	Landscape review and computational modelling
	Sectors involved	Shipping, tourism, dredging, oil & gas, carbon capture & storage, off-shore wind, wave & tidal, fishing aquaculture and marine tourism
	Number and profile of stakeholders involved (e.g. private, public, organisation)	n/a
	Temporal Scope	Up to and including 2016
	Geographical Scope	Irish
	Status (ongoing, fully implemented)	-
	Methods used	Review and spatial microsimulation analysis
Qualitative assessment	**Informative summary**	The presentation provides an outline on the role and potential of marine resources in a global context. It considers the Irish marine economy and potential growth areas, based on EU and Global studies, also in the context of the marine and environmental policy framework in Ireland.
	Main aspects and contributions to our study	The presentation concluded the following: • MSP aided acceleration economic growth will be sustainable and that is invaluable. • Marine economy could be a driver for development/regeneration in peripheral areas and regions. • A MSP framework encourages development through: - Enhanced coordination and simplified decision processes; - Enhanced legal certainty for all stakeholders in the maritime arena, Enhanced cross border cooperation; - Enhanced coherence with other planning systems. Help to ensure investment 'certainty'.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Policy Research Corporation
	Title	Study on the economic effects of Maritime Spatial Planning
	Source/journal	Study carried out on behalf of the European Commission, Directorate-General for Maritime Affairs and Fisheries, MARE.E.1 'Maritime Policy Baltic and North Sea', European Commission
	Impact Factor	
	Year	2011
Classification	**Functional classification**	Transaction costs
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Legal and socio-economic studies in the field of the Integrated Maritime Policy for the European Union
	Thematic	Qualitative and quantitative approach
	Sectors involved	Shipping, commercial fishing, recreational fishing, aquaculture, off-shore wind energy, wave energy, tidal energy, oil and gas exploration, carbon capture and storage, sand and gravel extraction, dredging, marine tourism, cables and pipelines
	Number and profile of stakeholders involved (e.g. private, public, organisation)	-
	Temporal Scope	Pre 2011
	Geographical Scope	European
	Status (ongoing, fully implemented)	Complete
	Methods used	Scenario analyses
Qualitative assessment	**Informative summary**	The study aimed to establish whether and on which scale economic effects for maritime stakeholders in the European Union would occur due to Maritime Spatial Planning. It was found that if the process is managed properly the economic effects are fourfold: • enhanced coordination and simplified decision processes; • enhanced legal certainty for all stakeholders in the maritime arena; • enhanced cross border cooperation; • enhanced coherence with other planning systems. Furthermore, it was noted that several additional non-economic effects were likely to result from MSP, such as support for management in realising a good environmental status in the coasts and seas. The study concluded that Maritime Spatial Planning can have a significant and substantial positive economic effect on Europe's maritime economy. Since the methods used in this study are generic and limited to a macro scale, effects on a regional or project scale have not been taken into account. Hence, the values presented should be interpreted as the minimum effect Maritime Spatial Planning will have. Maritime Spatial Planning should therefore be seen as one of the steps forward to improving the competitive position of European Member States.
	Main aspects and contributions to our study	The economic effects were subsequently studied in relation to dominant economic paradigms. This resulted in a clear and non-ambiguous set of three main economic effects of Maritime Spatial Planning. • Firstly, coordination efficiency for governments is likely to result due to improved and integrated decision making. • Secondly, proper Maritime Spatial Planning leads to reduced transaction costs for maritime activities (economic terminology for search, legal, administrative and opportunity costs) operating in the maritime arena. • Thirdly, societies benefit from the enhanced certainty resulting in an improved investment climate. The effects found were mostly not eligible for macro scale quantification, which was one of the initial objectives of this study. Hence, as economic effects of Maritime Spatial Planning should be considered as future benefits, results were calculated by using future scenarios on the evolvement of maritime industries and government programmes.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Roger Tym & Partners and Oxford Consultants for Social Inclusion (OCSI)
	Title	Maximising the socio-economic benefits of marine planning for English coastal communities
	Source/journal	Roger Tym & Partners and Oxford Consultants for Social Inclusion (OCSI), Marine Management Organisation (MMO)
	Impact Factor	
	Year	2011
Classification	**Functional classification**	Transaction costs
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	Report considering how to maximise the socio-economic benefits of the marine planning process for Marine Management Organisation (UK)
	Thematic	Qualitative review and data tool
	Sectors involved	Defence, energy production and infrastructure, ports and shipping, marine aggregates, marine dredging and disposal, telecommunications cabling, fisheries, aquaculture, surface water management and waste water treatment and disposal, and tourism and recreation and Marine Protected Areas.
	Number and profile of stakeholders involved (e.g. private, public, organisation)	n/a
	Temporal Scope	Review of status up to and including 2011
	Geographical Scope	England
	Status (ongoing, fully implemented)	Complete
	Methods used	Typology maps,
Qualitative assessment	**Informative summary**	The report provides marine planners with: • a background analysis of the socio-economic processes under way in coastal communities; • an understanding of the socio-economic impacts of marine activities in coastal communities; • an analysis of on-the-ground socio-economic conditions in coastal communities, and practical suggestions about how the marine planning process can maximise its positive socio-economic impact.
	Main aspects and contributions to our study	The report outlines a framework for thinking about the socio-economic processes at work in coastal communities processes, emphasising the role of economic competitiveness as the primary explanation of subsequent socio-economic success. This framework is used to examine the marine activities listed in the UK's Marine Policy Statement and consider the future for each marine activity, and examine how each marine activity might raise labour utilisation rates and labour productivity. To maximise socio-economic benefits, marine planners need a good understanding of the nature of the coastal communities and in this case typologies were developed for coastal communities in England.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Ehler, Charles, and Fanny Douvere
	Title	Marine Spatial Planning: A Step-by-Step Approach toward Ecosystem-based Management
	Source/journal	Intergovernmental Oceanographic Commission and Man and the Biosphere Programme. IOC Manual and Guides No. 53, ICAM Dossier No. 6. Paris: UNESCO. 2009 (English)
	Impact Factor	
	Year	2009
Classification	**Functional classification**	Public policy
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Guide for professionals responsible for the planning and management of marine areas and their resources.
	Thematic	Methodology
	Sectors involved	• Commercial fishing – various types • Offshore aquaculture/mariculture • Recreational activities – fishing, sailing, boating, personal watercraft, scuba diving/snorkeling, wildlife watching • Marine transportation • Port and harbour operations • Port and harbour dredging • Dredged material disposal • Offshore airports • Offshore industrial production facilities • Offshore liquefied natural gas (LNG) terminals • Offshore oil and gas exploration • Cables, pipelines, transmission lines • Sand and gravel mining • Offshore renewable energy: wind farms, wave parks, tidal, currents • Ocean desalination plants • Carbon sequestration sites • Military operations • Strictly protected marine reserves • Multiple use marine parks • Cultural and historic conservation
	Number and profile of stakeholders involved (e.g. private, public, organisation)	n/a
	Temporal Scope	Current at time of production 2009
	Geographical Scope	International
	Status (ongoing, fully implemented)	Complete
	Methods used	
Qualitative assessment	**Informative summary**	The guide, intended for marine or environmental management professionals, provides a comprehensive overview of MSP. It outlines a step-by-step approach on how to initiate and apply MSP to achieve desired goals and objectives for marine areas. These are: • Identifying need and establishing authority • Obtaining financial support • Organising the process through pre-planning • Organising stakeholder participation • Defining and analysing existing conditions • Defining and analysing future conditions • Preparing and approving the spatial management plan • Implementing and enforcing the spatial management plan • Monitoring and evaluating performance • Adapting the marine spatial management process
	Main aspects and contributions to our study	Most professionals responsible for the planning and management of marine areas and their resources usually have scientific or technical training in areas such as ecology, biology, oceanography or engineering. Few have been trained as professional planners and managers. Many new marine managers "learn on the job"—a sometimes effective, but often expensive, way to do business. This guide attempts to fill this gap by using a step-by-step approach for developing and implementing MSP. It provides an understanding of the different tasks, skills and expertise you need to develop and sustain your efforts. It also discusses issues such as obtaining financial resources or organising stakeholders that are important, often neglected, steps of the MSP process.

Identification	**Author**	OECD
	Title	Marine Protected Areas Economics, Management and Effective Policy Mixes
	Source/journal	OECD Publishing
	Impact Factor	n/a
	Year	2017
Classification	**Functional classification**	Related topicsImplementation
	Sequential classification	
	Type (descriptive, theoretic.-method., applied)	Book chapter
	Thematic	Qualitative review
	Sectors involved	Not detailed
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Not detailed
	Temporal Scope	Review of recent work at time of publication (2017)
	Geographical Scope	Global
	Status (ongoing, fully implemented)	Complete
	Methods used	Policy Evaluation Framework
Qualitative assessment	**Informative summary**	Chapter 5 on 'effective Policy Mixes for Marine Biodiversity, highlights the need for effective policy mix to address the multiple and sometimes cumulative pressures on marine biodiversity. It provides a framework for designing and evaluating policy mixes a study of five government approved marine spatial plans in the US, Australia, Norway and Belgium demonstrated that marine spatial planning resulted in multiple net benefits (Box. 5.4)
	Main aspects and contributions to our study	MSP was shown to increase environmental protection. Each of the marine spatial plans delivered on average USD 60 million in new economic value. Socially, MSP increased broad stakeholder engagement, this in turn builds trust leading to a more sustainable use of marine resources.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Ida Reuterswärd
	Title	Valuation of Ecosystem Services in Ecosystem-Based Marine Spatial Planning in the Baltic Sea Region: Why, When and How?
	Source/journal	Master's Thesis, The International Institute for Industrial Environmental Economics (IIIEE)
	Impact Factor	n/a
	Year	2015
Classification	**Functional classification**	Related topics
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Thesis
	Thematic	Qualitative review and analysis
	Sectors involved	n/a
	Number and profile of stakeholders involved (e.g. private, public, organisation)	n/a
	Temporal Scope	Review of recent work at time of publication (2015)
	Geographical Scope	Baltic Sea
	Status (ongoing, fully implemented)	Complete
	Methods used	Analyses of valuation methods
Qualitative assessment	**Informative summary**	This thesis investigates why, when and how valuation of ecosystem services could be integrated into the marine spatial planning process in the Baltic Sea Region. It suggests that ecosystem-based marine spatial planning and valuation of ecosystem services could be seen as mutually supportive; the marine spatial planning decision-making process would benefit from valuation and valuation of ecosystem services would benefit from having a policy framework to impact decision-making. Following a template for marine spatial planning, this study suggests that evaluation of ecosystem services could be relevant to consider at all stages of the planning process, and that the process could benefit from a pragmatic approach, including exploring qualitative, quantitative, as well as, monetary valuation. The thesis further argues that a broad and multi-disciplinary stakeholder learning process is necessary to integrate valuation of ecosystem services in marine spatial planning, strengthening the understanding of the link between resource systems and governance systems, and indeed, the link between the economy and the environment.
	Main aspects and contributions to our study	This thesis concludes that valuation of ecosystem services has a role to play at every step of the process, and that, using a pragmatic approach to valuation of ecosystem services, a variety of valuation methods could be considered, may they be qualitative, quantitative or monetary. The study raises the question of how to translate the Marine Strategy Framework Directive (MSFD) descriptors and indicators and the economic and social analysis into the language of mapping and assessment of ecosystem services, taking the work of Mapping and Assessment of Ecosystem Services (MAES) and The Economics of Ecosystems and Biodiversity (TEEB) into consideration. Secondly, on how to translate this work into the spatial dimension of marine spatial planning, taking into consideration how planning will influence the programme of measures of the MSFD as well as how valuation of ecosystem services could contribute to the evaluation of progress, taking action towards achieving good environmental status.
	Any reference source to economic data	
	Comments	

Identification	**Author**	Waitt Institute
	Title	Economic Valuation of Curaçao's Marine Resources
	Source/journal	Grey literature
	Impact Factor	n/a
	Year	2016
Classification	**Functional classification**	Economic environment
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Method
	Thematic	Methods to quantify the ocean economy
	Sectors involved	Fisheries, marine tourism and recreation
	Number and profile of stakeholders involved (e.g. private, public, organisation)	n.a.
	Temporal Scope	n.a.
	Geographical Scope	Curaçao
	Status (ongoing, fully implemented)	N.a.
	Methods used	Several for valuation of fisheries; for tourism they used the WRI Tourism and Recreation Valuation Too (own tool)
Qualitative assessment	**Informative summary**	Ocean zoning can yield economic benefits across a variety of sectors such as fisheries, marine tourism and recreation, shipping, emerging ocean uses.
	Main aspects and contributions to our study	While not linking the ocean economy to MSP, the study offers method to calculate their impact on fisheries and tourism.
	Any reference source to economic data	
	Comments	To be noted that the methods are proposed for Curaçao. In Europe and the US, with more statistical data available, they might not necessarily be useful.

Identification	**Author**	Norwegian Ministry of Climate and Environment
	Title	Update of the integrated management plan for the Norwegian Sea
	Source/journal	Grey literature
	Impact Factor	n/a
	Year	2017
Classification	**Functional classification**	Public policy
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Descriptive
	Thematic	Benefits and impacts
	Sectors involved	Seafood; Oil extraction; Shipping
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Public administration
	Temporal Scope	Regular update and revision up to 2050 proposed
	Geographical Scope	Norwegian Sea
	Status (ongoing, fully implemented)	Fully implemented plan
	Methods used	Several for valuation of fisheries; for tourism they used the WRI Tourism and Recreation Valuation Too (own tool)
Qualitative assessment	**Informative summary**	Plan describes: Env status Economic value of sectors impact/pressures Measures in place for environment
	Main aspects and contributions to our study	Added value and employment for the 3 sectors reported Ref. ecosystem services
	Any reference source to economic data	See table 5.1 p.55 2014 data Statistics Norway
	Comments	To be noted that the methods are proposed for Curaçao. In Europe and the US, with more statistical data available, they might not necessarily be useful.

Identification	**Author**	Marine Scotland
	Title	SCOTLAND'S NATIONAL MARINE PLAN Final Business and Regulatory Impact Assessment
	Source/journal	Grey literature
	Impact Factor	n/a
	Year	2014
Classification	**Functional classification**	Public policy
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	Descriptive
	Thematic	Benefits and impacts
	Sectors involved	Fisheries, aquaculture, oil extraction, shipping
	Number and profile of stakeholders involved (e.g. private, public, organisation)	124 consulted, with 22 replies. Individuals, academic, business professionals, public authorities
	Temporal Scope	-
	Geographical Scope	Scotland
	Status (ongoing, fully implemented)	Ongoing plan
	Methods used	Stakeholder consultation
Qualitative assessment	**Informative summary**	The report outlines the rationale for government intervention. No real method is used.
	Main aspects and contributions to our study	Recognised potential for greater participation in: planning; reduced conflict; more efficient use of marine space; and reductions in planning risk and uncertainty.
	Any reference source to economic data	

Identification	**Author**	Welsh Government
	Title	Marine Planning: understanding the benefits and opportunities
	Source/journal	Grey literature
	Impact Factor	n/a
	Year	2017
Classification	**Functional classification**	Public policy
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	Descriptive
	Thematic	Benefits and impacts
	Sectors involved	Mainly MPAs and Tourism
	Number and profile of stakeholders involved (e.g. private, public, organisation)	-
	Temporal Scope	-
	Geographical Scope	Wales
	Status (ongoing, fully implemented)	Ongoing plan
	Methods used	No methods used
Qualitative assessment	**Informative summary**	The report outlines the rationale for government intervention. No real method is used.
	Main aspects and contributions to our study	None.
	Any reference source to economic data	

Identification	**Author**	Maria Adelaide de Oliveira Ferreira
	Title	Evaluating Performance of Portuguese Marine Spatial Planning
	Source/journal	Grey literature
	Impact Factor	n/a
	Year	2016
Classification	**Functional classification**	Economic environment
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Theoretical
	Thematic	Method to evaluate MSP
	Sectors involved	None specifically
	Number and profile of stakeholders involved (e.g. private, public, organisation)	-
	Temporal Scope	-
	Geographical Scope	Portugal
	Status (ongoing, fully implemented)	No plan. This is a theoretical framework.
	Methods used	No methods used
Qualitative assessment	**Informative summary**	This PhD thesis offers mainly a theoretical framework to evaluate the effects of MSP. The economic evaluation is very limited and no real methods are used.
	Main aspects and contributions to our study	None.
	Any reference source to economic data	

Identification	**Author**	Norwegian Ministry of the Environment
	Title	Integrated Management of the Marine Environment of the North Sea and Skagerrak (Management Plan)
	Source/journal	Grey literature
	Impact Factor	n/a
	Year	2013
Classification	**Functional classification**	Public policy
	Sequential classification	Elaboration
	Type (descriptive, theoretic.-method., applied)	Descriptive
	Thematic	Spatial management
	Sectors involved	Mostly environment
	Number and profile of stakeholders involved (e.g. private, public, organisation)	-
	Temporal Scope	-
	Geographical Scope	North Sea and Skagerrak
	Status (ongoing, fully implemented)	Implemented management plan
	Methods used	No methods used
Qualitative assessment	**Informative summary**	The purpose of this management plan is to provide a framework for the sustainable use of natural resources and ecosystem ser vices derived from the North Sea and Skagerrak and at the same time maintain the structure, functioning, productivity and diversity of the area’s ecosystems. The management plan is thus a tool for both facilitating value creation and maintaining the high environmental value of the area.
	Main aspects and contributions to our study	The study mostly focuses on the importance of management from the environmental point of view. The economic impact is mentioned frequently but never quantified.
	Any reference source to economic data	

Identification	**Author**	Norwegian Ministry of the Environment
	Title	Update of the integrated management plan for the Barents Sea – Lofoten area including an update of the delimitation of the marginal ice zone
	Source/journal	Grey literature
	Impact Factor	n/a
	Year	2015
Classification	**Functional classification**	Public policy
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Descriptive
	Thematic	Spatial management
	Sectors involved	Fisheries, maritime transport, petroleum resources
	Number and profile of stakeholders involved (e.g. private, public, organisation)	-
	Temporal Scope	-
	Geographical Scope	Barents Sea – Lofoten
	Status (ongoing, fully implemented)	Implemented management plan
	Methods used	No methods used
Qualitative assessment	**Informative summary**	The purpose of this management plan is to provide a framework for the sustainable use of natural resources and ecosystem ser vices derived from the North Sea and Skagerrak and at the same time maintain the structure, functioning, productivity and diversity of the area's ecosystems. The management plan is thus a tool for both facilitating value creation and maintaining the high environmental value of the area.
	Main aspects and contributions to our study	The study mostly focuses on the importance of management from the environmental point of view. The economic impact is mentioned frequently but never quantified.
	Any reference source to economic data	

Identification	**Author**	Blæsbjerg, M., Pawlak, J.F., Sørensen, T.K. and Vestergaard, O.
	Title	Marine Spatial Planning in the Nordic Region Principles, Perspectives and Opportunities
	Source/journal	Grey literature
	Impact Factor	n/a
	Year	2009
Classification	**Functional classification**	Public policy
	Sequential classification	Preparation
	Type (descriptive, theoretic.-method., applied)	Descriptive
	Thematic	Key success factors
	Sectors involved	Fisheries; Aquaculture; Shipping; Wind energy; Oil & gas; aggregates
	Number and profile of stakeholders involved (e.g. private, public, organisation)	-
	Temporal Scope	-
	Geographical Scope	Nordic Sea Region
	Status (ongoing, fully implemented)	No specific plan. Just a framework
	Methods used	No methods used
Qualitative assessment	**Informative summary**	Reporting on status of planning for various sectors, need to common principles and urging enhanced co-operation
	Main aspects and contributions to our study	Not immediately useful for the study. Like many other reports, only a theoretical framework is described, mostly referring to qualitative aspects of MSP. However, it contains a number of case studies that could further inform this study.
	Any reference source to economic data	

Identification	**Author**	Great Barrier Reef Marine Park Authority
	Title	Strategic Assessment Report
	Source/journal	Grey literature
	Impact Factor	n/a
	Year	2014
Classification	**Functional classification**	Related topics
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied
	Thematic	Key success factors
	Sectors involved	Agriculture, aquaculture, resource extraction, port activities, tourism, fisheries (commercial and recreational), shipping.
	Number and profile of stakeholders involved (e.g. private, public, organisation)	395 people from all sectors of society.
	Temporal Scope	2012
	Geographical Scope	Great Marine Barrier Reef
	Status (ongoing, fully implemented)	Fully implemented plan
	Methods used	No methods used
Qualitative assessment	**Informative summary**	It is an impressive 684-page strategic assessment, which mostly takes into account environmental issues.
	Main aspects and contributions to our study	The report includes an economic quantification of the sectors dependent on the Great Barrier Reef Marine Park, but does not establish a link between the park and the performance of the sectors.
	Any reference source to economic data	

Identification	**Author**	Great Barrier Reef Marine Park Authority
	Title	Economic impact of re-zoning
	Source/journal	Grey literature
	Impact Factor	n/a
	Year	2003
Classification	**Type (descriptive, theoretic.-method., applied)**	Applied
	Functional classification	Economic environment
	Sequential classification	Implementation
	Thematic	Key success factors
	Sectors involved	Tourism; Fisheries – recreational and commercial fishing
	Number and profile of stakeholders involved (e.g. private, public, organisation)	-
	Temporal Scope	-
	Geographical Scope	Great Marine Barrier Reef
	Status (ongoing, fully implemented)	Fully implemented plan
	Methods used	Willingness to Pay; tourist expenditure.
Qualitative assessment	**Informative summary**	3rd assessment of value. Australia-wide economic contribution of 5.4 billion, 53,800 jobs.
	Main aspects and contributions to our study	Gives economic contribution in regional and national terms. Highlights revenue streams for park management. Unfortunately, most benefit accrue from non-market and environmental services.
	Any reference source to economic data	

Identification	**Author**	Great Barrier Reef Marine Park Authority
	Title	Managing for a resilient GBRMP
	Source/journal	Grey literature
	Impact Factor	n/a
	Year	2017
Classification	**Functional classification**	Transaction costs
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Descriptive
	Thematic	Key success factors
	Sectors involved	Tourism; Fisheries – recreational and commercial fishing
	Number and profile of stakeholders involved (e.g. private, public, organisation)	-
	Temporal Scope	Vision until 2050
	Geographical Scope	Great Marine Barrier Reef
	Status (ongoing, fully implemented)	Fully implemented plan
	Methods used	Willingness to Pay; tourist expenditure.
Qualitative assessment	**Informative summary**	Assesses impact of displacing fishing effort. Gives strong case for re-zoning due to positive impact on tourism & environmental benefits
	Main aspects and contributions to our study	Shows trade-offs considered by GBRMPA
	Any reference source to economic data	

Identification	**Author**	Day J.
	Title	Marine Spatial Planning (MSP) – one of the fundamental tools to help achieve effective marine conservation in the Great Barrier Reef.
	Source/journal	Grey literature
	Impact Factor	n/a
	Year	2015
Classification	**Functional classification**	Public policy
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Descriptive
	Thematic	Lessons for successful MSP
	Sectors involved	Shipping, boating, diving, many types of tourism, most forms of commercial fishing and recreational fishing, aquaculture, developmental works including dredging and spoil disposal, and military training
	Number and profile of stakeholders involved (e.g. private, public, organisation)	-
	Temporal Scope	1970-2015
	Geographical Scope	Great Marine Barrier Reef
	Status (ongoing, fully implemented)	Fully implemented plan
	Methods used	Willingness to Pay; tourist expenditure.
Qualitative assessment	**Informative summary**	Describes timeline for different management approaches since 1970's
	Main aspects and contributions to our study	Mentions a 'Net Benefit policy in preparation
	Any reference source to economic data	

Identification	**Author**	Scottish Coastal Forum
	Title	Report of The Scottish Coastal Forum's National Marine Plan Review Workshop held on behalf of Marine Scotland on 29 September 2017
	Source/journal	Grey literature
	Impact Factor	n/a
	Year	2018
Classification	**Functional classification**	Public policy
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Descriptive
	Thematic	Lessons for successful MSP
	Sectors involved	Energy (wind and marine), dredging, pipelines and cables, shipping, oil and gas, fisheris, aquaculture.
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Several: from business professional to public bodies.
	Temporal Scope	2015-2018
	Geographical Scope	Out to 12nm in Scotland
	Status (ongoing, fully implemented)	Fully implemented plan
	Methods used	Review of data, information and feedback
Qualitative assessment	**Informative summary**	Plan is being used positively in decision making used as a reference point & to look favourably on applications
	Main aspects and contributions to our study	Useful stakeholder opinion on benefits and limits of the marine plan. Data are not available for marine renewables and cables sectors.
	Any reference source to economic data	Marine Scotland.

Identification	**Author**	Marine Scotland
	Title	Scotlands Marine Economy: Economic Statistics
	Source/journal	Grey literature
	Impact Factor	n/a
	Year	2018
Classification	**Functional classification**	Economic, environment
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied
	Thematic	Economic data
	Sectors involved	Fishing; Aquaculture; Tourism; Passenger; transport; Freight; Shipbuilding
	Number and profile of stakeholders involved (e.g. private, public, organisation)	None.
	Temporal Scope	2016
	Geographical Scope	Scotland
	Status (ongoing, fully implemented)	n.a.
	Methods used	Mostly collection of statistical data. Own method to estimate coastal tourism, which closely resemble the one developed by Cogea et. al in 2017.
Qualitative assessment	**Informative summary**	The report provides economic data on the Scottish marine industries.
	Main aspects and contributions to our study	While there is no link with MSP, the source is useful for carrying out the case studies.
	Any reference source to economic data	Spreadsheets https://www2.gov.scot/Topics/marine/Publications/TopicSheets/tslist/economy

Identification	**Author**	PEMSEA (4 publications)
	Title	1. Blue Economy for Business In East Asia Towards An Integrated Understanding Of Blue Economy 2. Coastal Tourism in Danang, Vietnam: Promoting a Win-Win Situation for Achieving Conservation, Economic, and Social Goals 3. State of the Coasts of Masan Bay 4. State of the Coasts of Bataan Province
	Source/journal	Grey literature
	Impact Factor	n/a
	Year	1. 2015 2. 2016 3. 2012 4. 2017
Classification	**Functional classification**	Economic environment
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Applied methods
	Thematic	Economic data
	Sectors involved	Fisheries and Aquaculture; Ports, Shipping and Marine Transport; Tourism, Resorts and Coastal Development; Oil and Gas; Coastal Manufacturing; Seabed Mining; Renewable Energy; Marine Biotechnology; and Marine Technology and Environmental Services.
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Multiple
	Temporal Scope	1995 - 2010
	Geographical Scope	All eastern Asia countries, with a focus on Vietnam, South Korea, and Philippines
	Status (ongoing, fully implemented)	Ongoing
	Methods used	None.
Qualitative assessment	**Informative summary**	Supporting capacity building – could be useful comparison with concepts developed in Europe. Zoning plan helped address governance issues and management concerns and promoted a participatory and multidisciplinary approach for strategies and plans Benefits include: Improved standard of living among coastal communities Increased investments in Tourism, increased revenue for the city, more job opportunities for the people Reduced dependence of communities on coastal and marine resources Increased appreciation of the benefits of a clean environment
	Main aspects and contributions to our study	The most interesting case study is the one on Vietnam, where it is stated that a zoning plan provided economic benefits. However, it is a 10-page report with no methods.

Identification	**Author**	White, AT
	Title	Ocean Governance Initiatives in the East Asian Seas—Lessons and Recommendations
	Source/journal	Grey literature
	Impact Factor	n/a
	Year	2016
Classification	**Functional classification**	Public policy
	Sequential classification	Implementation
	Type (descriptive, theoretic.-method., applied)	Descriptive
	Thematic	Review of governance initiatives, with recommendations.
	Sectors involved	None specifically
	Number and profile of stakeholders involved (e.g. private, public, organisation)	Policy makers and other public authorities
	Temporal Scope	n.a.
	Geographical Scope	All East Asia
	Status (ongoing, fully implemented)	Ongoing
	Methods used	None.
Qualitative assessment	**Informative summary**	The review contributes to a deeper understanding of ocean governance initiatives, their governance mechanisms and operating frameworks in the East Asian seas.
	Main aspects and contributions to our study	Not particularly useful to our study. It is mostly a qualitative review.

Annex II - Agenda and organisation of the Final Workshop

Agenda

The Closing Workshop took place at Hotel Bloom in Brussels on 29 October 2019 and was attended by 38 participants.

The Final Agenda was as follows:

WORKSHOP – Study on the Economic Impact of Maritime Spatial Planning

PEER-REVIEW WORKSHOP IN THE FRAMEWORK OF EUROPEAN COMMISSION DG MARITIME AFFAIRS AND FISHERIES WORK ON MARITIME SPATIAL PLANNING

Final Agenda

Registration @ Hotel Bloom (8h00 – 9h00)

First session (9h00 – 10h30)

- Opening word by DG MARE

- Presentation of the study by the Consortium

- Setting the scene – 10'
- Study Task 1, Task 2 and Task 3: Literature review and analysis – 15'
- Study Task 4: Case studies – 65'
  - Introduction
  - Case study 1 – Belgium
  - Case study 2 – Germany (Baltic Sea)
  - Case study 3 – Scotland
  - Case study 4 – Norway (North Sea and Skagerrak)
  - Case study 5 – Rhode Island

Coffee break (10h30 – 11h00)

Second session (chaired by Chairperson) (11h00 – 12h30)

Presentation by each of the experts of the results of their review of the draft Final Study. This session will be chaired, and managed, by the Chairperson.

Lunch break (12h30 – 13h30)

Third session – World Café format (13h30 – 15h00)

- Thematic tables bringing together a mix of experts and stakeholders. Example of "theme tables" are: methodology, case studies, sectors, etc. Participants should "rotate" at least twice.
- Reports from the tables.

Coffee break (15h00 – 15h30)

Closing/wrap up plenary sessions (chaired by Chairperson) – conclusions and way forward (15h30 – 17h00)

- Summary of the meeting discussions.
- Recap of the identified gaps, shortcomings and missing information to be considered.
- Key recommendations and follow-up actions (way forward).

Closing word by DG MARE

Closing drink (17h00 – 18h00)

COGEA CETMAR POSEIDON Universida de Vigo seascape

Session 1 (9.30h-10.30h)

Opening word from DG MARE

Juan Ronco from DG MARE welcomed everyone to Brussels. He thanked the Consortium for the work on the study.

He said that this study is in fact already the second study on the economic impact of Maritime Spatial Planning (MSP). The first study (in 2010) was more of a forward-looking and prospective study, while the current study focuses on actual impact and aims to provide quantitative evidence. In addition, he remarked that another purpose of this study is to also provide Member States with evidence and best practices, so that they can use the knowledge generated through the study to inform their spatial plans.

EASME (David Sanmiguel) and DG MARE (Juan Ronco) added that they were looking forward to the workshop, as external peer-review is an important step towards a successful conclusion of the project.

Juan Ronco closed his opening speech by noting that not all the remarks from the experts and the stakeholders can be taken into account before the end of the Study. It is expected that some comments will be incorporated into the Final Report, while some others – which would entail a massive revision of the work done – will highlight gaps and future research avenues.

He also highlighted that a new study on MSP and ecosystem-based management and ecosystems services would start soon. While the current Study focuses on directly economic benefits, the new study will deal with environmental benefits, in particular from ecosystems services. As both types of benefits generate economic value, the two studies will complement each other.

Presentation of the Study by the Consortium

Setting the scene and Study Task 1, Task 2 and Task 3: Literature review and analysis - 15'

Alessandro Pititto presented an overview of the outcomes of Study Tasks 1, 2 and 3. He highlighted that up until now there are not many studies that attempted at measuring the economic impact of MSP in the same way as this Study. As such, this study tried opening up new frontiers and bringing to light the challenges associated with the economic valuation of MSP.

Study Task 4: Case studies

- Introduction: José Luis Santiago explained the methodology used in Task 4 and the challenges associated with it.
- Case studies presentation:
    - Germany (Baltic Sea), by José Luis Santiago
    - Belgium, by Marijn Rabaut
    - Scotland, by Rod Cappell
    - Rhode Island, by Rod Cappell
    - Norway (North Sea and Skagerrak), by Alessandro Pititto

Session 2 (11.00-12.30)

The session started with a Tour de Table, where each participant introduced themselves to the rest of the group.

Discussion on comments from the peer-review group

Dr Morrissey introduced the peer-review process and outlined its key findings. The introductory presentation is attached to the Minutes.

She explained that she asked each of the experts/reviewers to look at one case study (CS) or at the methodology, so that each section of the report was read by two reviewers. She further highlighted that she saw this study as an interesting starting point, as a call to economists to develop further analysis. She welcomed this very interesting first attempt in developing this highly needed framework.

The Chairperson then presented her findings with regard to the case-study report (which was overall well-written). She advised including a SWOT analysis for each CS, as well as a description on why the plan was developed in the first place.

Karyn Morrissey opened the floor for discussions. Below, the major points of the reviewers are listed in a bullet point list.

Jacek Zaucha:

- He recognised that the interaction between MSP and the economy is a complex issue, and that overall the consortium did a good job.
- He would like to find more consistency with regard to the previous studies such as DG MARE's Blue Economy report.
- He recommended that it would be good to comment why certain NACE codes were included in the analysis, while others were not.
- He added that rather than looking at the impact of MSP on the economy, the Study look at the contribution of MSP to the blue economy. A roadmap on how to progress the framework in the future should be added, as more approaches are necessary.
- Because each plan is different, the rationale behind its design should be clearly stated (e.g. Norway for ecological reasons mainly).
- Explain different mechanisms of impact for each sector so as to understand the differences.
- What are the costs and benefits of multiuse? This could have been mentioned in the report.

Alessandro Pititto commented that most of the authors of the Study also happened to author another study on maritime economic data, which served as a basis for the Blue Economy Report. For this reason, unless otherwise specified, there is perfect consistency between this Study and the Blue Economy Report. He added this would be made clearer in the Final Report.

Liam Carr:

- With regard to the methods, besides a SWOT analysis he suggested developing additional qualitative elements: e.g by using local news reports, journalistic outputs, other voices that may not have been heard in the interviews.

Hakan Eggert:

- MSP was designed for the offshore windmill sector. He commented to add to all CS a description of what were the main drivers for the plan.
- The costs of increased bureaucracy should also be taken into account.

José Luis Santiago from the Consortium highlighted that the consortium tried to take into account the costs borne by public administration to design, set up and manage a spatial plan. However, only in few cases it was possible to obtain some data. Either planning authorities are not aware of all the costs associated to the MSP process, or in some countries several agencies and institutions are involved, thus making an exact quantification quite difficult.

Raúl Prellezo:

- It Is clear that market analyses such as Economic Impact analyses have limitations as compared to Economic Welfare Analyses, but it is also understandable why in the context of this study this has been used.
- When presenting the counterfactual scenarios, there is a strong assumption that MSP has been the only policy / factor having had an impact on the blue economy.
- The view of stakeholders on the impact of MSP could have been further developed.

Paris Sansoglou:

- Going back to the difficulty of quantifying costs for the public administration, he told that he was looking at cost of public versus private dredging, and found it was impossible to assess this fully, because when the public sector is involved, costs are usually spread across different institutions / administrations.
- Ecosystem services form a bridge between public and private goods; between ecosystem, economic and social sectors. Environmental and social aspects are not well considered – the challenge is how do we factor the value of these in effectively.

Catherine Angell-Hansen:

- Norway: MSP was purely based on sustainability perspectives (impact of oil production).
- A holistic approach to the research question is necessary (e.g. Rhode Island was inclusive process). Other elements, which are equally as important, should be analysed besides the economic ones.

- The aquaculture industry was not captured – the explanation for this is of course that benefits are far more local as compared to the national (the big master-planning MSP that is more petrochemical focused).
- MSP is in itself does not generate economic benefits. The matter is broader than simply looking at the economy.
- MSP is a way of being more inclusive in the process and this should be highlighted.

Olivier Thébaud:

- Be careful with economic impacts, some analyses show that an oil spill can have positive economic impacts. Obviously, from the ecological side the impacts are negative. This is an example to show that a narrow focus on economic return can be misleading. The study focuses on some aspects that are important.
- He would not use the term Cost-Benefit analysis as the method used for the study does not cover certain aspects such as social welfare and non-market benefits that are part of cost-benefit analysis. Olivier noted that it might be difficult to obtain precise figures, and added that in France they are still struggling to get the data.
- Describe how MSP can create an impact and then see what this may be. Use case studies to show the sequence/process and from this help to inform the economic outputs. This might also help inform future work.
- The assumptions used in the hypothetical scenarios should be made more explicit. They could also be strengthened, e.g. by only looking at the economy related to coastal areas.
- The input-output analysis could be used to determine whether e.g. MSP benefits emerging sectors more.

Stephen Jay:

- Even though it is a small sample, the plans analysed are hugely diverse, some contrasting one another. Therefore, it is difficult to understand how the same methodology can be applied to all of them.
- Another study should be to look at this diversity of MSP to develop a typology to inform future assessment.
- In theory, one should expect that planning authorities are already carrying out assessments for themselves. For example, in the UK they are working on output and outcome indicators. MSP authorities should be doing this themselves. This should be built into MSP processes themselves.
- Implementation of plans has not been looked at sufficiently.

Phoebe Koundouri:

- More time, more resources and more analytical effort are needed to do social cost-benefit analysis to estimate welfare effects of MSP.
- Ecosystem services and social issues are not dealt with, and this should be clearly highlighted in the introduction to the study.
- Mention whether EC guidelines have been followed and if not, why not.

- Space is an issue that has not been dealt with, multi-use of marine space should be considered in the scenarios. How do you manage marine space is an important issue; it can have a big positive economic effect.
- How do you deal with uncertainty in the future (risks)? At this point, climate change could be more relevant here, so more attention should be paid to it. It could be taken into consideration in the other MSP study on ecosystem services.
- It is not possible to assess MSP over a 10-year time horizon, as its effects are long-term.

Ian Davies:

- If the project is to have a wide impact, it has to be understood by non-economists.
- There is a need for increased consistency between case studies. E.g. in Scotland the offshore oil and gas sector is the largest industry, and services are included while production is excluded. In Norway things were treated slightly differently for this sector.
- The main drivers in the oil and gas industry have nothing to do with MSP. They have a global dimension.
- For Scotland, the data suggest negative effects, while positive effects are mentioned in the report by stakeholders. E.g. tourist sector is highly supportive of MSP, yet analysis suggest declines in hospitality services (while the sector is booming at the moment).
- The fishery sector claims high losses due to MSP (e.g. access to scallop grounds). The wind farms had not yet been constructed in 2016, so they cannot have had an impact on fishing industry.

Chairperson: it is difficult to account for the social aspects ('humans are a nightmare'). Interviews were not conceived only to validate the data, but also to show perceptions on the ground (i.e. triangulation). In a perfect world these things would add up. On-the-ground experience is a very important part of the study, and should be drawn out more for non-social scientists, in the report.

Steven Degraer:

- It may be important to have a sort of a disclaimer: what is that the report does, and what it does NOT do. E.g. aspects that cannot be tackled (because of lack of time or because data do not allow to). Non-market values have not been included, very important to have this straightforward in a sort of disclaimer.
- There is a risk of overinterpretation/overinterpolation of results, due to small sample size: when collecting data, one should establish correlations. When reading the report, it became clear that it was difficult to distinguish results from analysis.
- He appreciated the objectification of the data and how they are translated into interpretation. Statistical analysis is important and could objectify some results/outputs/interpretations.

Chairperson: this study did not try to assess correlations. It should be made clear that the team does not try establish causal effects or correlations, they were just looking for trends in the analysis. It should perhaps be made clearer in the report

Steven Degraer: then there should be no speculation in the report, because sometimes speculation on causal-effects was included.

Catarina Frazão Santos:

- Some terminology could be more clearly explained especially when it appears for the first time. Non-economist should be able to read the report easily.
- Structure of methodology: some aspects were not identified – it would be nice to have a connection (e.g. it would be nice to know who the stakeholders were) with the case studies.
- It would be nice to have a clear identification of the assumptions.

Fabio Ballini:

- The Scotland case is solid. At the same time, there are some inconsistencies between stakeholders' opinions and the data. This should be highlighted in the report.
- A SWOT analysis could help to quickly highlight the results for each case study and will feed into the conclusions/recommendations.
- A cost-effectiveness analysis might be performed.
- It is difficult to understanding some aspects of the scenario analysis, such as what is the rationale for selection and what are the assumptions.
- Figures and table should be commented and / or better explained. Regression analysis does not seem to be a feasible option, because the time period is very short. The final report should stress that the time period analysed is very short.

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- Another study is to provide policy makers with guidance on how to do MSP in relation to Ecosystem Based Approach (cf. Seperate EBA study).
- A further study to analyse tools to monitor MSP (compliance with directive and good governance) will be carried out in 2020
- Importance of consistency in presentation of the results. Results should be presented in a way that helps policy makers.

Session 3 (13.30h-15.00h)

Session 3 was an open discussion in mixed groups (i.e. expert, stakeholders, EU Staff). Discussions were organised in a 'World Café Format'. The world café format consists of thematic tables bringing together a mix of experts and stakeholders. Participants should "rotate" at least twice. Approximately 1 hour for table discussions (i.e. max 20-25 minutes per rotation) and 20-30 minutes plenary discussion.

There was one 'table chair' for each table. The table chair made sure to steer the conversations to distil at least the following information: (i) key findings / highlights from discussion (ii) gaps or shortcomings in the study; (iii) best practices, and (iv) key recommendations (way forward).

Table 1 - Costs and their reduction

Key findings / highlights from the discussion

- Public and private sector costs are possible to estimate, even though not routinely reported.
- Public costs might be easier to estimate as direct MSP 'project' costs and participation of government workers from other departments.
- Stakeholder costs of participation and costs resulting from the plan are more complex. The former can be estimated in similar way in relation to time inputs, but the implications are very different for each stakeholder.
- Trade Association are good participants as it is their job, but requires organisation and need convincing that it is worthwhile.
- Direct private sector involvement is important, but it can result in higher costs for the operators involved. Larger organisations such as offshore wind

developers recognise the need and potential benefits from participating all through the process.

- Contingent Valuation methods for valuing costs have their limits as some concepts are difficult to understand, as well as the timeframes involved (e.g. sediments contribution to ecosystem services).
- Ultimately, we are trying to see whether MSP is value for money.
- Numerous reasons why it should be the public sector managing and paying for MSP rather than private sector: it is a responsibility of the government to ensure good environmental status; reports from independent sources are trusted more than reports by the developer; developments take longer if permitting is conditional on further studies; if developer pays, ultimately the public incurs the cost through higher bills; how do you get future or emerging sectors or new entrants to pay?
- Government needs effective planning to get the economic development it wants – and in reality the cost in terms of civil servants time is minimal compared to the benefits expected from that development going ahead.
- Get higher predictability & greater project certainty with plans that are more definite in outcomes (compare the Netherlands' vs Scotland's approaches to wind licensing areas).
- Other clear examples of cost reduction when this is done – e.g. wind sector in Rhode Island.
- Can have a policy of cost-recovery, which could be tied to licensing or the estimated benefits to companies.

Best practices from other work/studies

- There are several examples of how to estimate and value time (EU MS citizen response to tax requirements, Disability Free Life estimation of time and value, Green accounting approaches – but still get issues of combining different methods of estimation).
- Scotland is a project-based MSP process in Marine Scotland so a budget is evident – costs of participation of other gov agencies is not taken into account as not part of the budget, but could be estimated.
- Co-design by Swedish regional authorities engaged with stakeholders at an appropriate level resulting in effective involvement of industry stakeholders as saw it as relevant.
- Industry such as wind energy has long term planning with 2050 targets so need to be involved from the start.

Gaps and shortcomings

- Cost information is lacking generally.
- Climate change should form part of the ecosystem services work – insurance companies should be involved as they have estimated costs of sea level rise etc.
- Then a follow on should be the cost of mitigation measures needed.

Key recommendations

- Take value for money into account for all stakeholders.
- Distinguish different stages in the plan.
- Explore how government can relieve costs.
- Co-design generates much more trust and longevity of the plan than if only government-driven (where the next government might dismiss it).
- It is important to be appropriate in terms of timeline assessed and the review timing.
- Need private sector involvement at an early stage as have real-world experience of costs (otherwise risk getting bad planning), but must be clear on timing and extent of inputs required of them.

Table 2 - Competition between uses

Key findings / highlights from the discussion

- Prioritising depends on the context (e.g. historical rights). First step would be to have all people at the table showing their position and interest.
- Compensatory mechanism applies. Acceptance fishery that windfarms are in the plan.
- Costs are exaggerated by fishermen.
- Subsidies can be there for some years, but cannot be for years. Should be a plan for it.
- There has been a historical right where fishermen never paid something (they're not used to it?).
- Maybe not a good way to look at MSP in terms of winners and losers. MSP accommodates for it by definition. What would have happened without MSP: should be way to look instead of comparing between sectors.
- It is also a political question; politicians are the final decision makers and they make the decisions. Even after stakeholder consultation.
- Second option is multiuse to minimise conflicts.
- Distribution of benefits will be in sectors that will be based in urban areas. Coastal communities might not be benefitted, as the main benefits will become evident at national level while costs will be felt at local level.
- One idea could be to have a series of plans for different (sub)regions, rather than one big plan.
- How flexible does MSP need to be to accommodate new sectors? (e.g. blue biotechnology) Hence, we need to be pragmatic.
- Avoid using the word established sectors. It tries to strengthen certain sectors in debate, as though they were given precedence.

Best practices from other work / studies

- AIS data: which areas are used a lot? Used in MSPs. Result could be that ships need to take longer routes.
- Fisheries is a declining sector regardless of MSP. A positive impact of MSP might be hidden by the decline.

Gaps and/or shortcomings in the study, and to be considered

- Where has multiuse approach been taken into account? Which countries?

Key recommendations and way forward

- Drop the term ‘established sector’ or ‘traditional sector’, it gives some rights for having claims by some sectors that are not necessarily objective.

Table 3 - Economic impact and monitoring framework

Key findings / highlights from the discussion

- To distinguish between the 2 phases of a MSP process; the process of elaborating a plan and the plan itself.
- The complexity of measuring sustainability by combining different disciplines (including environmental, socioeconomic, and governance dimensions).
- Including management aspects (linked to the governance system) into the analysis.
- Improve the monitoring of the blue economy has a positive and direct impact on the monitoring of MSP effects.

Best practices from other work / studies

- Project MESMA (https://cordis.europa.eu/project/rcn/92591/factsheet/es) was seen as good practices to establish a monitoring framework: https://www.msp-platform.eu/practices/data-standards-and-infrastructure-monitoring-and-evaluation-smas.

Gaps and / or shortcomings in the study, and to be considered

- The lack of policy briefings and social values.
- The circular economy was not taken into account.
- A panel of experts to follow up the entire MSP process, from the design to the plan review.
- Use contingency techniques such as “willingness to pay/accept” to measure effects, including the non-market values.
- The economic effects related to the improvements in the environment and biological aspects of the marine area managed under a MSP.

Key recommendations and way forward

- Use the current monitoring process and programmes as a starting point, for instance the group on socioeconomic issues of the Marine Strategy Framework Directive (Working Group Programme of Measures, Economic and Social Analysis - WG POMESA).
- Reversing the burden of proof to the operators by linking permits and licenses to the obligation of providing data.
- Monitoring the MSP process and the plan effects independently.

- Linking the goals of the plan to measurable objectives that can be monitored by qualitative and quantitative indicators (include a panel of people to monitor all the process too).
- Carrying out more research to evaluate non-market assets, transaction costs or expected consequences of MSP (e.g. reduction of conflicts) and then, developing monitoring programmes according to the results of the research.
- Developing a stock exchange market of marine space and then collect economic data on the transactions.

Table 4 – Data Availability

Key findings / highlights from the discussion

- Firstly, we need to identify stakeholders and data: different stakeholders might need different data.
- Official data (both from Eurostat and from national statistical uses) are not necessarily useful for the blue economy.
- Data resolution is often not sufficient; e.g. we have data at national level, but we do not have data at local level.

Best practices from other work / studies

- Marine Scotland's portal is a best practice in terms of data (both economic and non-economic) availability on MSP.
- Observatories and initiatives such as EMODnet, EUMOFA and DG AGRI's observatories are best practices that could be replicated for MSP. Ideally, it would be a good idea to have all data (both economic and non-economic) related to MSP on a single platform. EMODnet Human Activities might be a good candidate.
- The Netherlands' Maritime Cluster have been monitoring the performance of their blue economy for quite some time. Lately, they have involved their national statistical institute in their exercise. This has enabled them to have access to disaggregated data (at individual company level) that would otherwise have been unavailable. This data can't be disseminated publicly of course, but it can be used for analysis.
- It has been mentioned that in Scotland they are estimating coastal tourism with data at the level of post codes.
- Copernicus Emergency Management System provides information for emergency response in relation to different types of disasters, including meteorological hazards, geophysical hazards, deliberate and accidental man-made disasters and other humanitarian disasters as well as prevention, preparedness, response and recovery activities. The Copernicus EMS is composed of an on-demand mapping component providing rapid maps for emergency response and risk & recovery maps for prevention and planning and of the early warning and monitoring component which includes systems for floods, droughts and forest fires. With all due differences, it might be nice to have a similar system in place for MSP. The system might show how the economy responds if certain changes to a plan are made.
- Other projects that might be seen as good practices are Pan Baltic Scope, SIMNORAT, AdriPlan, Ocean Metiss, SEANSE.

Gaps and / or shortcomings in the study, and to be considered

- The statistical classification of economic activities does not fully take the blue economy into account.
- Social impact and conflict resolution are not taken into consideration in the study.

Key recommendations and way forward

- Use other sources besides Eurostat.
- Use aggregated data at "micro-level" (see the Dutch approach).
- It would be nice to have a knowledge repository that could be used for quali-quantitative assessments. When data are not enough to measure the impact of MSP on the economy, expert judgment might come in handy.
- Economic data relevant to MSP might be incorporated into EMODnet Human Activities. Or in any case, a web platform is necessary.
- Incorporate ecosystem services and environmental benefits into the economic valuation of MSP.
- When companies apply for a permit / licence and they get it, they should be obliged to disclose certain data. This would make it easier to measure the performance of some economic activities, especially of emerging ones.
- One might look at licencing fees as a proxy for the value generated by certain economic activities.

Session 4 (15.30h-17.00)

This session aimed at summarising the meeting discussions. Moreover, during this session identified gaps, shortcomings and missing information were reviewed. Also, key recommendations and follow-up actions (i.e. the way forward) were summarised, to end with a closing speech by DG MARE and an invitation to a reception to celebrate the study and the workshop.

Summary of the discussion

We are happy with the very constructive suggestions and comments. We have to be aware that the Study Report is not to be considered as a scientific publication, even though there was a thorough peer-review. Given the timeframe, budget and available knowledge, we worked with the best available method.

The consortium will work on all comments and all reviewers will receive replies. It is clear, however, that not all comments in the report can be addressed.

We agree that environmental benefits and ecosystem services should be taken into account. However, this was beyond the scope of this project and will be addressed in another project soon.

Next steps: we will write up detailed Workshop minutes and above all, we will edit the final report based on the valuable expert input we have received. We will include a chapter on limitations and assumptions, we will then see which comments to take on board.

Raising awareness on the (potential) benefits (and costs) of MSP will be very important, and this study might be a first step to this process.

Recap from the Chairperson

Thanks to all reviewers. Some of them will have gone out of their comfort zone (as this was not the same as a peer review of an academic process).

Thanks also all consortium partners for being open to the comments received, the very good support and organisation and the professionalism displayed.

She hopes DG MARE and EASME will publish this piece of work.

Closing word by DG MARE

The project provides interesting results and the workshop discussions were very interesting. As formally required in the contract, A report of this workshop will need to be provided as annex to the final report. Besides, it would be fair to make a reply to the reviewers.

As for the final report: we need to consider carefully which comments to consider, it is important not to make it too different from the draft Final Report to avoid confusion. Peer review comments are to be clearly indicated in the Workshop minutes and in the peer review document.

DG MARE explicitly thanks the stakeholders, experts/reviewers, the chairperson, the Seascape Belgium Team for the Workshop organisation and the Consortium for the project.

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