Marine Management Organisation

# The provision of guidance for marine licensing staff to support the implementation of marine planning policies for socio-economics, tourism and seascape

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## MMO Project No: 1078


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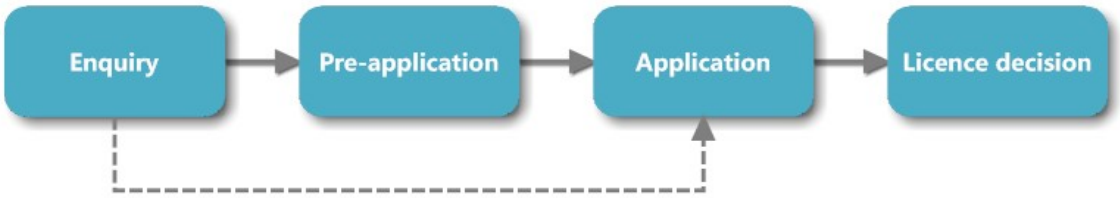
# 1. Introduction

## 1.1 Background to the study

The Marine Policy Statement (MPS), published in March 2011, set the direction for marine licensing[1]. According to the MPS, marine licensing would sit at the core of the new marine planning system. This was followed by a new licensing system introduced on the 6 April 2011. The new licensing system is aimed at providing support to the applicant from an early stage, including providing an opinion on the scope of the licence at the pre-application stage. The different stages of the marine licensing process are depicted in Figure 1.

**Figure 1: High-level schematic showing the main stages in the marine licence application process.**




The MMO is responsible for most marine licensing in English inshore and offshore waters and for marine licensing in Welsh and Northern Irish offshore waters. Section 66 of the Marine and Coastal Access Act 2009 lists the types of activity that are licensable. Common marine activities include: burial at sea, cables, construction (including renewables), deposit and use of explosives, dredging (including aggregate dredging), disposal of dredged material, disposal of fish and shellfish waste, divers, pipelines removal. There are also a number of exempted activities. Exempted activities are listed in the Marine Licensing (Exempted Activities) Order 2011 (as amended). In most cases the exemptions have important conditions attached to them.

This project is expected to assist marine licensing officers to make determinations on licence applications, in line with agreed objectives within the MPS, and thus support the implementation of marine planning. The specific areas where further guidance is needed are socio-economic assessment, the assessment of tourism impacts and the assessment of impacts on landscape and seascape character. The aim of this project is to develop three desk notes.

[1] A marine licence is required for activities involving the deposit or removal of a substance or object in the UK marine area, however, in some cases a marine licence will also be required for activities outside UK water.

## 1.2 Structure of this report

This report is organised as follows:

- Section 2 presents background information on the policy context for the study, including relevant legislation and guidance.
- Section 3 summarises the findings of a literature review on socio-economic analysis and its applicability to marine licensing.
- Section 4 summarises the findings of a literature review on tourism and recreation impact assessment and its applicability to marine licensing.
- Section 5 summarises the findings of a literature review on landscape and seascape character assessment and its applicability to marine licensing.

Note that a summary of each document reviewed for the purposes of this study is presented in Annex 2 (annotated bibliography).

# 2. Policy, Legislation and Guidance

## 2.1 Overview

Although there is no specific regulatory requirement for an applicant, or the MMO, to conduct a Socio-Economic Impact Assessment (SEIA), in issuing a licence the MMO will have to consider a number of issues in line with the principles of the MPS (see Table 1) and sustainable development, namely:

- Achieving a sustainable marine economy
- Ensuring a strong, healthy and just society
- Living within environmental limits
- Promoting good governance
- Using sound science responsibly.

There are, however, other regulatory requirements that could feed into an SEIA or where an SEIA will be of use, with these depending on the type and scale of the project being considered [2]. Applications for a marine licence will be subject to an assessment under the Water Framework Directive (WFD) and may be subject to a Habitats Regulations Assessment (HRA) or an Environmental Impact Assessment (EIA). Socio-economic information collected to meet the regulatory requirements of the Marine Strategy Framework Directive (MSFD) and the European Commission's proposed Maritime Spatial Planning Directive (MSPD) can feed into an SEIA. These requirements are briefly explained below.

**Table 1: Marine Policy Statement (MPS).**

| Economic, social and environmental considerations |
| --- |
| The marine planning authority should ensure, through integration with the terrestrial planning authority and engagement with coastal communities, that marine planning contributes to securing sustainable economic growth both in regeneration areas and areas that already benefit from strong local economies. Through well placed and well designed development, Marine Plans should promote economic growth and sustain local jobs. Examples of this could include local infrastructure development, or optimising the potential of environmental resources through eco-tourism and recreational use. These considerations must be integrated with social considerations on equality, community cohesion, wellbeing and health, as well as implications for the marine environment.<br><br>The marine plan authority should give consideration to the social and economic benefits that the enhancement of marine ecosystems can provide, including to coastal communities. |

[2] In addition, other consents may also be required for specific projects, e.g. renewables, under the other pieces of legislation: Electricity Act 1989 (e.g. for energy generation); Town & Country Planning Act 1990 (e.g. for relevant onshore works); Coast Protection Act 1949 (e.g. for potential interference with navigation); and Marine and Coastal Access Act 2009 (e.g. for deposit or removal of substances and articles in the sea). The linkages of an SEIA with these are considered to be less relevant however.

| Economic, social and environmental considerations |
| --- |
| The marine plan authority, through integration of Marine Plans with terrestrial planning and engagement with local communities, should contribute to vibrant coastal communities, particularly in remote areas, which will include consideration of cultural heritage, seascape and local environmental quality. |
| Source: HM Government (2011a) |

## 2.2 Relationship with Water Framework Directive (WFD)

The Water Framework Directive (Council Directive 2000/60/EC) aims to protect and enhance water bodies within Europe and covers all estuarine and coastal waters out to 1 nautical mile (although, in England, chemical status is monitored out to 12 nautical miles). It is implemented in England and Wales through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003.

Water bodies must be of either good ecological status or good ecological potential by 2015. To this end, River Basin Management Plans (RBMPs) are to be produced setting out environmental objectives for water bodies and the programmes of measures to meet these objectives. The Environment Agency (EA) are the competent authority for producing these RBMPs.

When considering an application for a marine licence or harbour order, the MMO must give consideration to RBMPs in order to avoid giving consent to a proposal that is likely to cause a deterioration in status (Table 2). The MMO will always consult with the EA where an application could affect the status of a water body, however, there are some exemptions[3] where it may be possible to grant a licence despite a possible deterioration in water quality status. Exemptions can be warranted on the basis of overriding public interest or benefits to human health, safety or sustainable development (when these outweigh the benefits in achieving the WFD objective). An SEIA could be expected in these cases to show how the socio-economic benefits of the project are greater than the environmental risks.

**Table 2: Water Framework Directive (WFD).**

| Overview of WFD related considerations |
| --- |
| This assessment is a multi-stage process. The main steps are:<br><br>1. Screening: this stage only applies to pre-existing activities, such as dredging and disposal activities that were started or ongoing before 1 January 2009.<br>a. If a proposal is screened and a determination is made that it will not cause a deterioration in status, it need not be considered further under the WFD.<br>b. If this determination cannot be made the proposal will go on to the scoping stage.<br><br>2. Scoping: Scoping is a stage that applies to all new applications for marine licences and harbour orders. This is the stage at which a determination is |

[3] Article 4 of the WFD.

**Overview of WFD related considerations**

made about what needs to be assessed in order to establish whether the proposal will have an effect on status. At this stage the water bodies that could be affected and the current status and objectives for those water bodies will be identified.

3. Assessment: any application for a marine licence or harbour order should include an assessment of whether the proposal will undermine the objectives for the relevant water body. It is the applicant's responsibility to undertake this assessment. Where a proposal is subject to an environmental impact assessment, the assessment under the WFD may be included as a section within the environmental statement.

   The ecological impacts of the proposal should be considered against the status and objectives of the water body that can be found in the Environment Agency's website. The applicant should also consider whether there could be an effect on chemical status. The assessment should conclude with an overall predicted impact on the ecological and chemical status objectives.

   a. Where the predicted impact is that the status of the water body will not deteriorate, the MMO will consider the marine licence or harbour order application.
   b. Where the predicted impact is that the status of the water body will deteriorate, mitigation measures must be proposed and assessed. Where appropriate mitigation measures cannot be identified, the MMO will consider if an exemption applies.

Source: MMO (2014a)

## 2.4 Relationship with Habitats Regulation Assesment (HRA)

The Habitats and Birds Directives are partly implemented in the UK by the Conservation of Habitats and Species Regulation and the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007.

Any plan or project likely to have a significant effect on a European site[4] must be considered under the Habitat Regulation Assessment (HRA) process. An HRA can be prepared by the MMO and/or other competent authority. Table 3 describes the process for preparing an HRA.

Different desk notes are available to the MMO officers on the HRA process (WP13 series). These cover an overview of the process, templates for the assessment of likely significant effect and determining imperative reasons of overriding public interest (IROPI), among others. An SEIA can inform the development of an IROPI

[4] European sites are those designated under either as special areas of conservation (SACs) under the Habitats Directive (Directive 92/43/EEC) or special protection areas (SPAs) under the Wild Birds Directive (Directive2009/147/EC). Together, the network of SACs and SPAs in Europe is known as Natura 2000.

test (Test 2) in order to convey and compare the socio-economic benefits and costs of the project.

**Table 3: Habitat Regulation Assessment (HRA).**

| **Overview of HRA process** |
|---|
| HRA is a process that identifies and assesses the implications of a plan or project for the protected features of European conservation sites. It is a multi-stage process. The main steps are:<br><br>1. Screening: This involves establishing whether an HRA is needed on the basis of effect and management.<br>2. Test of likely significant effect: this considers whether the plan or project, either alone or in-combination with other plans or projects, is likely to have a significant effect on the interest features of a site in light of the site's conservation objectives.<br>3. Appropriate assessment: This is a detailed assessment during which consultation can take place and mitigation is also considered. A licence will also be granted if there is no adverse effect on the integrity of the site.<br><br>In some cases, where a likely significant adverse effect cannot be ruled out, there is a fourth stage. This is related to compensating for the effect and imperative reasons of overriding public interest (IROPI). Guidance is available from UK government setting out the procedures under stage 4, which consists of a number of tests:<br><br>• Test 1: alternative solutions test. This is to determine whether there are any other feasible ways to deliver the overall objective of the plan or project which will be less damaging to the integrity of the European site(s) affected.<br>• Test 2: IROPI test. If it can be established that there are no feasible alternative solutions, the competent authority must next be able to show that there are "imperative reasons of overriding public interest" which, in essence, entails an assessment of:<br>  • Benefits in terms of human health, public safety, or beneficial consequences of primary importance to the environment for Special Areas of Conservation (SACs). Other imperative reasons of overriding public interest can only be considered having obtained and had regard to the opinion of the European Commission.<br>  • Social or economic benefit in all other cases and in addition to those of human health, public safety, or beneficial consequences of primary importance to the environment.<br>• Test 3: compensatory measures. If harm to one site is to be allowed (because there are no alternatives and IROPI can be shown) the Habitats Directive requires that all necessary compensatory measures are taken to ensure the overall coherence of the network of European sites as a whole is protected. If no compensatory measures can be undertaken (or it is evident that the applicant is not prepared to apply compensatory measures), no authorisation shall be granted. |
| Source: Defra (2012) |

## 2.5 Relationship with Environmental Impact Assesment (EIA)

The Marine Works (Environmental Impact Assessment) (Amendment) Regulations 2011 require EIAs to be carried out prior to the granting of consent for certain regulated activities in UK waters and UK controlled waters[5], where this is required to comply with Council Directive 85/337/EC (the "Environmental Impact Assessment Directive" or "EIA Directive").

Responsibility for carrying out an EIA lies with the applicant but, before a licence can be granted, the MMO must ensure that applications are subject to EIA where necessary (Table 4).

**Table 4: Environmental Impact Assessment (EIA).**

| Overview of Environmental Impact Assessment process (EIA) |
|---|
| Whether or not an EIA is required with respect to a particular project will depend on its type, scale, location and potential impact on the environment, including in particular any protected habitats. The Marine Works (Environmental Impact Assessment) (Amendment) Regulations 2011 refer to Annex I and Annex II of the European Council Directive on EIA (Directive 85/337/EEC, as amended).<br><br>Annex I provides a list of projects or activities for which an EIA is mandatory. Relevant to marine licensing, are trading ports and piers which can take vessels over 1350 tonnes.<br><br>Items listed under Annex II of EC Directive 97/11/EC may require an EIA if it is concluded that the project will exceed certain limits or thresholds. These projects include:<br>• Reclamation of land from the sea<br>• Extraction of minerals by dredging<br>• Installations for the production of electricity<br>• Wind farms<br>• Shipyards<br>• Port and harbour installations not listed in Annex I<br>• Coastal work to combat erosion, for example, dykes, moles and jetties.<br><br>There are three broad stages to the procedure:<br>• Screening: deciding whether an EIA is required<br>• Scoping: deciding the impacts that are to be considered<br>• Environmental Statement (ES) review and submission.<br><br>The ES must give details of the project and identify, describe and assess the direct and indirect effects of the project on:<br>• Human beings, fauna and flora<br>• Soil, water, air, climate and landscape |

[5] "UK controlled waters" means any part of the sea within the seaward limits of an area designated under (a) section 1(7) of the Continental Shelf Act 1964(20); or (b) the Fishery Limits Act 1976(21). "UK waters" means any part of the sea within the seaward limits of United Kingdom territorial waters for the purposes of the Territorial Sea Act 1987(22).

| Overview of Environmental Impact Assessment process (EIA) |
|---|
| • Material assets and cultural heritage<br>• The interaction between two or more of the above factors. |
| Sources: MMO (2011b) and MMO (2014b) |

Information from an SEIA can be used in an EIA to help with the assessment of socio-economic impacts. A number of Environmental Statements (ES) have been reviewed under this project. Generally, industry will follow UK Guidance (the Green Book) and other policy documents (different National Policy Statements) to assess the impacts in the absence of other specific guidance on socio-economic impacts. The impacts more frequently assessed include job creation and impacts on the local economy based on spend (Gross Value Added (GVA)[6] and multiplier analysis). Impacts on recreation and tourism are also considered but the assessment is generally qualitative in nature.

Further guidance on EIA for terrestrial impacts has been published and provided (Parsons Brinkerhoff, 2012). This includes guidance on the scope and methods to be used within an EIA covering rail, road, air quality, noise, landscape and visual and cultural heritage. When a project requiring an EIA has any such impacts, socio-economic impacts can arise. The potential socio-economic impacts linked to the different terrestrial impacts are set out in Table 5.

**Table 5: Potential socio-economic impacts linked to different terrestrial impacts.**

| Impact Category | Socio-Economic Impacts |
|---|---|
| Rail impacts | Traffic delays<br>Safety risk<br>Amenity impacts |
| Road impacts | |
| Air quality impacts | Human health<br>Amenity impacts |
| Noise impacts | |
| Landscape and visual impacts | Recreation and tourism<br>Amenity impacts |
| Cultural heritage impacts | |

## 2.3 Relationship with Marine Strategy Framework Directive (MSFD)

The MSFD (Directive 2008/56/EC), transposed into domestic law through the Marine Strategy Regulations 2010, establishes a framework for community action in the field of marine environmental policy. Within this framework, Member States (MS) must take measures to maintain or achieve 'good environmental status' in the marine environment by 2020. For that purpose, marine strategies will be developed and implemented in order to protect and preserve the marine environment, prevent its deterioration, or where practicable, restore marine ecosystems, and prevent and

[6] GVA is the difference between the value of inputs used in the production of goods and services and the value of the output that is created.

reduce inputs that have a significant adverse impact. The need to meet 'good environmental status' will also guide marine licensing decisions.

Article 8.1 of the MSFD requires MS to carry out an initial assessment of their marine waters, by July 2012, with this including an economic and social analysis of the use of those waters and of the cost of degradation of the marine environment. In the UK, economic analysis has been interpreted in the context of the UK's 'Green book'(HM Treasury, 2007) as requiring analysis of the human activities that use the marine environment. In this content, analysis will cover both market and non-market costs and benefits (Eftec and Enveco, 2010[7]). The social analysis is assumed to supplement the economic analysis by putting more emphasis on:

- Employment impacts, including at local and regional as well as national level
- The distribution of economic impacts amongst different groups in society.

The Directive also requires MS to give due consideration to sustainable development and, in particular, to the social and economic impacts of the measures envisaged to achieve 'good environmental status' [Art 13(3)]. There is also the possibility for exemptions on the basis of disproportional costs and/or overriding public interest.

Information gathered for the purposes of meeting the requirements of the MSFD can feed into an SEIA. On the other hand, the Directive integrates economics into marine management and policy decisions, which would include licensing.

In March 2013 the Commission proposed legislation to create a common framework for maritime spatial planning and integrated coastal management[8]. The aim of the action is for MS to establish a process or processes that cover the full cycle of problem identification, information collection, planning, decision-making. To this end, MS shall organise the collection of the best available data and the exchange of information necessary for maritime spatial plans, including social and economic data (Article 10).

[7] Eftec and Enveco (2010): OSPAR Regional Economic and Social Assessment for the Marine Strategy Framework Directive – Final Report for Defra, November 2010, available at: http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=17287&FromSearch=Y&Publisher=1&SearchText=me5103&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description

[8] European Commission (2013): Proposal for a Directive of the European Parliament and of the Council establishing a framework for maritime spatial planning and integrated coastal management, Brussels, 12.3.2013, available at: http://ec.europa.eu/maritimeaffairs/policy/maritime_spatial_planning/index_en.htm

# 3. Socio-Economic Impact Assessment (SEIA)

## 3.1 What is SEIA?

The term 'socio-economic impact assessment' is open to a wide range of interpretations and has been defined in many different ways. For example, Turner *et al*. (2010) discuss the different approaches and definitions for socio-economic assessment in a marine strategy context, highlighting the differences between financial and economic analysis (where the latter reflects the welfare gains and losses from any policy or project). The Australian Government's Socio-Economic Impact Assessment Toolkit (Australian Government Bureau of Rural Sciences, 2005) notes that SEIA is a "*useful tool to help understand the potential range of impacts of a proposed change*." In other policy contexts, such as the chemical sector, the European Chemicals Agency (ECHA) defines an SEIA "as *an approach to analysing all relevant impacts (i.e. both negative and positive changes) of one scenario against another* where *relevant impacts include: human health, environmental, economic, social and wider economic impacts"* (ECHA, 2008).

There is thus a common set of aspects highlighted across the literature:

- SEIA is often referred to as a systematic approach, tool or process
- It is used to assess the potential impacts of a proposed plan, policy, project or development
- In theory, it should be used to analyse all relevant social and economic impacts (i.e. both positive and negative, direct and indirect, current and future, geographically-dependent and distributional)
- It relies on the use of both quantitative and qualitative data
- It should inform the design and decision-making process with the overall aim of minimising adverse impacts and maximising benefits.

## 3.2 Type of impacts considered under an SEIA

Although there is general agreement as to the types of impacts that should be included in an SEIA, our literature review has indicated that there is considerable disparity between studies in terms of the range of impacts (and depth of impacts) actually considered. The following impacts are generally considered to be relevant:

- Social impacts: any direct or indirect effects on workers, consumers and the general public (e.g. impacts on employment (including displacement), levels of income, working conditions, job satisfaction, education, social security, social inclusion and equality, access to services (e.g. emergency services, transport, health and education), quality of life, health and safety, education, recreation and culture).

- Economic impacts: any direct effects on businesses and public authorities (e.g. impacts on operating costs, capital expenditure, turnover and profit, expenditure on innovation and research, investment flows), or wider impacts on the economy (e.g. spillover effects in the supply chain, impacts on trade, competition, economic growth, inflation and taxes).

In relation to the above, two MMO projects are particularly relevant, namely: MMO 1060 (MMO 2014c), which aims to provide evidence on social impacts and interactions within and between sectors detailed in the MPS and MMO 1061 (MMO 2014d), which provides a method and data to monitor the social outcomes of marine plans.

## 3.3 Overview of process

It should be noted that there are significant similarities between the stages in an SEIA and the stages of an EIA or HRA (as described in Section 2), although sources differ slightly as to what should be included within each stage of the assessment. A recent study by Dickie *et al*. (2011) for the Marine Aggregate Levy Sustainability Fund (MALSF) sets out a framework to account for the socio-economic impacts of marine dredging. This framework includes the following generic stages:

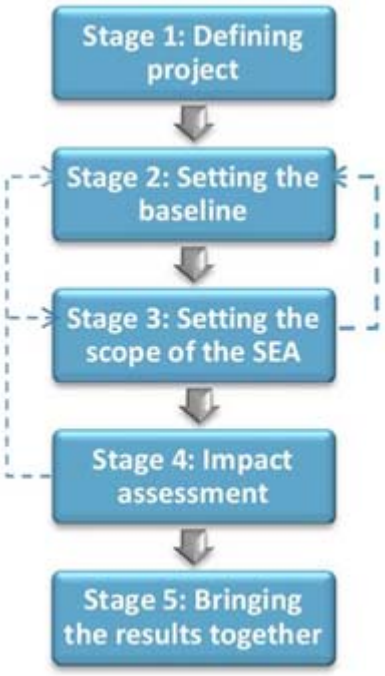
1. Define baseline
2. Identify management options
3. Define and measure impacts
4. Identify human population
5. Value
6. Calculate impacts and values over time
7. Sensitivity analysis
8. Account for non-monetised impacts
9. Reporting.

We have encapsulated the nine stages above in the following (in line with existing processes under the regulatory requirements set out in Section 2):

- Stage 1: Defining project aims - this will include the definition of the project, timeline for delivery, any other regulatory requirements, mitigation measures if any.
- Stage 2: Setting the baseline - this includes describing the socio-economic baseline (similar to the processes currently undertaken in EIAs), in terms of other marine uses and trends and existing/planned management measures and their effectiveness.
- Stage 3: Setting the scope of the SEIA and planning for data collection - setting out the main types of impacts (also referred to in cases as impact screening); work also includes planning the strategy for data collection and analysis in the next stage of work.
- Stage 4: Impact assessment - the analysis will require collection of data gathering information on the impacts associated with the project, e.g. changes in costs and benefits, environmental and social impacts, and assessment of these in qualitative and/or quantitative forms. Again this is likely to involve input from stakeholders.
- Stage 5: Bringing the results together - this stage includes the comparative analysis of the costs and benefits, accounting for additionality, identifying key uncertainties and undertaking sensitivity analysis or adopting more sophisticated approaches to managing uncertainty as appropriate.

Figure 2 sets out the different stages.

**Figure 2: General framework for SEIA.**




It needs to be noted that both Stage 2 and 3 can be quite iterative in nature. Indeed, one will feed into the other. Similarly the impact assessment stage (Stage 4) may reveal information needs that were not considered in the scoping phase and may help to redefine the baseline.

## 3.4 Stage 1: Defining the project

Any application should have information about the project. This stage may just include the information contained in the project summary, as given in the MMO public register, namely:

- Project type
- Applicant details
- Background to the project (aims and objectives)
- Programme of works (stages and timings)
- Other regulatory requirements (EIA or HRA)
- Any previous consents and applications relating to the application.

This basic information will be crucial for the next stages of the SEIA, e.g. the programme of works will help to set out the timescale for discounting; if there were any other regulatory requirements this may help to identify relevant documentation setting out specific impacts (such as water quality or habitats).

## 3.5 Stage 2: Setting the baseline

Setting the baseline is a critical stage in any impact assessment and involves deciding upon the geographical and temporal boundaries of the assessment and noting the groups of stakeholders that could potentially be affected. There are some licensing activities whose impacts may be more noticeable over a wider area and, in some cases, benefits may accrue at a national level, while costs are more localized. A study by MMO (2011a) sets out the geographical scale of impacts for projects falling under different marine activities. This suggests that for licences in specific use categories, such as defence, energy production and telecommunications, the study area may be larger than the nearby local authorities as outlined in Table 6 (adapted from MMO 2011a). This is normally related to the scale of the project too (larger projects, namely band 3[9], will have impacts across larger areas than band 1 or 2 projects). There is also a temporal dimension. Some impacts may have a long term character affecting future generations, while others are more immediate.

**Table 6: Scale of impact catchment area by activity.**

| Activity | National | Local impacts |
|---|---|---|
| Defence | ☑☑ | ☑ |
| Energy production and infrastructure | ☑☑ | ☑ |
| Ports and shipping (including marine dredging and disposal) | ☑ | ☑☑ |
| Marine aggregates | ☒ | ☑ |
| Telecommunications cabling | ☑☑ | ☒ |
| Fisheries | ☒ | ☑☑ |
| Aquaculture | ☒ | ☑☑ |
| Surface water management and waste water treatment and disposal | ☒ | ☑ |
| Tourism and recreation | ☒ | ☑☑ |
| Note to keys:<br>☒: Low impacts<br>☑: Moderate impacts<br>☑☑: High impacts | | |

As part of this stage of work, it will also be important to provide a description of other marine users for the study area, both now and potentially in the future. The ESs

[9] https://www.gov.uk/government/publications/marine-licensing-fees/marine-licensing-fees

reviewed include a description of the socio-economic baseline that covers the following:

- Population and demographics (including proportion of children, working age and pension age residents and dependency ratio[10])
- Industrial structure and employment (including definition of key industry sectors, business births and deaths, level of employment and education and skills of the workforce)
- Transport and infrastructure, including key ports, rail network, road network, etc.
- Quality of life (measured as Index of Multiple Deprivation)
- Tourism (including type of uses; number of visitors, attractions, blue flag beaches, etc.)

Last but not least, this stage should include information on relevant strategic policies and plans in order to assess the trends in the absence of development and/or to assess how the licensable activity may contribute to the overall objectives of such policies and plans.

Most of the information above will be available from the Office for National Statistics (ONS). A concurrent study (MMO, 2014e) which seeks to explore the potential for using ONS data for marine planning is also relevant in this regard. Other policies and plans should also be available but may require more time for data collection. Currently, ESs use data at local authority level and compare these against national average data to describe the study site. Where possible, this should also be the case for an SEIA, as this may help with the licence determination (e.g. sites with unemployment above average levels where a project will increase the number of Full Time Equivalent jobs (FTEs)).

## 3.6 Stage 3: Scoping phase

The aim of the scoping phase is to set the boundaries of the analysis in terms of the impacts to be counted. In essence, an SEIA should seek to:

- Assess the benefits and costs generated by a particular activity (direct impacts)
- Assess how other activities and/or marine uses may be impacted by the licensable activity, both in terms of benefits and costs (indirect and induced effects).

Section 3 of the MPS sets out impacts from different marine activities and provides a good starting point for broadly setting out the types of impacts that could be expected for different licensable activities in the different sectors. The section also includes impacts on other sectors (through impacts on the environment).

[10] The dependency ratio is a measure of the balance between the working age population and the rest of the population. A dependency ratio of one means that for every working age resident there is an equal number of children and people of retirement age. A lower dependency ratio means a greater relative working age population.

### 3.6.1 Marine activities and socio-economic impacts (direct impacts)

The following table (Table 3) illustrates the economic and social impacts that could be expected from various marine licensable activities. This is based on expert knowledge and section 3 of the MPS. It is pertinent to note that the type and scale of socio-economic impacts to consider in an SEIA will vary *inter alia* according to the type of project, the specific technologies deployed and the baseline situation so this table should be used as a guide only.

**Table 7: Marine activities and impacts.**

| Licensable Activity | Economic Impacts | Social Impacts |
|---|---|---|
| Berthing pontoons<br>Slipways and small jetties | • Capital costs<br>• Maintenance costs<br>• Revenues from sales | • Employment<br>• Recreation and tourism |
| Outfalls | • Capital costs<br>• Maintenance costs<br>• Property prices | • Public health |
| Coast protection works | | • Employment<br>• Recreation and tourism<br>• Protection of particular groups |
| New quay walls | | |
| Works on tidal river banks | | |
| Beach recharge | | |
| Maintenance dredging | • Operating costs<br>• Revenues from sales | |
| Offshore renewables<br>Port development | • Operating costs<br>• Capital costs<br>• Revenues from sales<br>• Competitiveness, trade and investment flows<br>• Innovation and research<br>• Administrative burdens related to monitoring (attached to management)[11] | • Employment and labour markets<br>• Energy security<br>• Recreation and tourism<br>• Impact on consumers (through prices and/or availability of products and services) |

More recently, there has been a trend to link socio-economic impacts with specific impacts on the environment through the ecosystem services approach.
One of the most widely cited definitions of 'ecosystem services' is that of the Millennium Ecosystem Assessment, which describes ecosystem services as 'the benefits that people obtain from ecosystems'. According to this definition, ecosystem services can be classified into: supporting services (e.g. nutrient cycling, soil formation, primary production), regulating services (e.g. climate regulation, flood regulation, water purification), provisioning services (e.g. food, fresh water), and cultural services (e.g. aesthetic, spiritual, recreational and other non-material benefits).

[11] Note that there will also be MMO fees and charges but these represent a transfer and should not be part of an SEA.

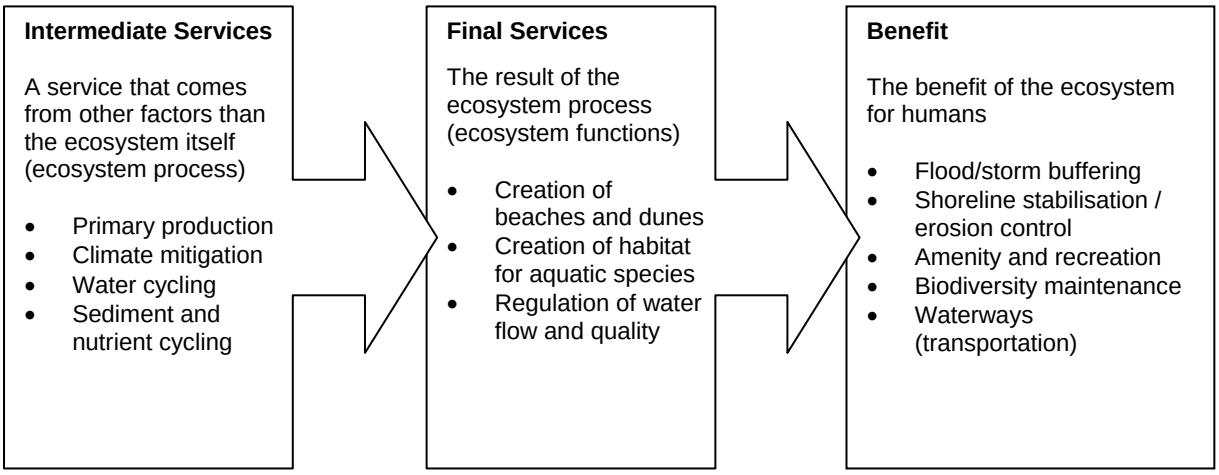
Table 8 sets out the type of ecosystem goods and services provided by the marine environment.

**Table 8: Classification of ecosystem goods and services provided by the marine environment (UK NEA, 2011).**

| Category | Good/Service |
|---|---|
| Provisioning services | Aquaculture: provides genetic resources for aquaculture |
| | Blue biotechnology: provides industrial inputs such as biocatalysts, natural medicines |
| | Food provision: extraction of marine organisms for human consumption |
| | Wild species diversity |
| Regulating services | Climate regulation: balance and maintenance of the chemical composition of the atmosphere and oceans by marine living organisms |
| | Flood, storm and coastal protection: dampening of environmental disturbances by biogenic structures |
| | Waste breakdown and detoxification: removal of pollutants through storage, dilution, transformation and burial |
| Cultural services | Education, research and development opportunities: contributes to improved knowledge |
| | Health goods (physical and mental): involvement in activities |
| | Heritage goods: aesthetics and inspirational properties |
| | Cognitive values: cognitive development, including education and research resulting from marine ecosystems |
| | Leisure and recreation: refreshment and stimulation of the human body and mind through the engagement with the marine environment |
| Supporting services | Nutrient cycling: storage, cycling and maintenance of availability of nutrients by marine ecosystems |
| | Biologically mediated habitat: habitat provided by marine organisms (e.g. coral reefs) |

Turner *et al.* (2010) provide a conceptual framework for ecosystem services which separates between ecosystem processes and functions in intermediate and final services. This approach seeks to provide a transparent method for identifying the aspects of ecosystem services which are of direct relevance to economic valuation, and critically, to avoid the problem of double-counting. A final service is one which influences human wellbeing directly. Importantly, a final service is often but not always the same as a benefit. For example, recreation is a benefit to the recreational angler, but the final ecosystem service is the provision of the fish population. Figure 3 depicts the relationship between the different levels of services.

**Figure 3: Example of relationship among representative intermediate services, final services and benefits.**




Source: Adapted from Luisetti *et al*. (2010)

One of the advantages of the Ecosystem Approach (EsA) for the purposes of licensing is that it could link information provided in an EIA and/or HRA, including mitigation measures, with specific final services and benefits that could be incorporated in an SEIA. Moreover, the proposal for a revised EIA Directive includes consideration of impacts on ecosystems services (European Commission, 2012[12]), although the revised Directive has yet to be adopted. The MMO has recently commissioned a study to develop a practical framework for outlining the integration of the EsA into marine planning in England (MMO 1048). This framework could be equally applicable to the licensing system. The UK NEA follow-on report will also be published in June 2014 with new and relevant information.

### 3.6.2 Impacts from the licensable activity on other sectors (indirect impacts)

When scoping the impacts, the interactions among the sectors should be considered. There are a number of documents that describe the potential for conflict among the different marine sectors (see for example European Commission (2010a), Dickie *et al.* (2011), RPA et al., (2013)).

An SEIA will have to consider the impacts on other uses in the study location. Table 9: Conflicts among marine users, presents the findings from the literature setting out the potential for conflict among the sectors. The table is based on information from European Commission (2010a) for the purposes of marine planning and data collected for the methodology on tourism and recreation benefits assessment for Defra (RPA *et al.*, 2013). Due to the very different nature of some of the activities under the same category, the table should be read with caution.

[12] European Commission (2012): Proposal for a Directive of the European Parliament and of the Council amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. http://ec.europa.eu/environment/eia/pdf/COM-2012-628.pdf

**Table 9: Conflicts among marine users (data from EC (2010a) and RPA (2013)).**

| | Ports and shipping | Renewable energy | | Oil and gas | CCS | Commercial fisheries | Aqua-culture | Marine aggregates | Dredging and disposal | Tourism and recreation | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Offshore wind | Wave and tidal | | | | | | | Informal recreation, water sports (See table 21) | Cruise tourism |
| **Ports and shipping** | | | | | | | | | | | |
| **Renewable energy** | ☑☑[1,2] | | | | | | | | | | |
| ***Offshore wind*** | ☑☑[1,2] | | | | | | | | | | |
| ***Wave and tidal*** | ☑☑[1,2] | ☑?[1] | | | | | | | | | |
| **Oil and gas** | ☑[1] | ☑☑[1] | ☑☑[1] | | | | | | | | |
| **CCS** | ☑[1] | ☑[1] | ☑☑[1] | ☒[1] | | | | | | | |
| **Commercial fisheries** | ☒[1] | ☑☑[1,2] | ☑☑[1,2] | ☒[1,2] | ☑[1] | | | | | | |
| **Aquaculture** | ☑[1] | ☑?[1] | ☑☑[1] | ☑☑[1] | ☑[1] | ☑☑[1] | | | | | |
| **Marine aggregates** | ☑[2] | ☑☑[2] | ☑☑[2] | ☒[2] | ☑[2] | ☑☑[2] | ☑☑[2] | | | | |
| **Dredging and disposal** | ☑[1] | ☑[1] | ☑☑[1] | ☒[1] | ☑[1] | ☑☑[1] | ☑☑[1] | ☒[2] | | | |
| **Tourism and recreation** | (See Table 19: Potential conflict between different marine users and tourism and recreation activities) | | | | | | | | | | |
| ***Cruise tourism*** | ☒[1] | ☑☑[1] | ☑☑[1] | ☑[1] | ☑[1] | ☒[1] | ☑☑[1] | ☒[1] | ☑[1] | ☑ (☑)[1,2] | |
| | Note to keys:<br>☒: No / limited conflict<br>☑: Potential / moderate conflict<br>☑☑: Potential for greater levels of conflict/severe conflict<br>?: Potential synergies apply | | | | | | | | | | |

| | |
|---|---|
| | Sources:<br>1: European Commission (2010a)<br>2: RPA et al (2013) NB: from a table in an early version of the report but not included in the final document. In turn based on:<br><br>European Commission (2008): Roadmap for maritime spatial planning: Achieving common principles in the EU, Brussels.<br>Harte M J, Campbell H V and Webster J (2010): Looking for safe harbour in a crowded sea: Coastal space use conflict and marine renewable energy development, available at: http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/17332/Harte_Conflict_final.pdf?sequence=6<br>RSPB (2004): Potential Benefits of Marine Spatial Planning to Economic Activity in the UK, available at: www.rspb.org.uk/Images/MSPUK_tcm9-132923.pdf |

The MMO Project 1010 (MMO, 2013a) also reviews the potential for co-location among different marine users which may be of more relevance to the licensing process as it allows a distinction between the construction and operational phase. The report has a matrix methodology for use in considering physical compatibility. It also proposes a conceptual framework to assess the socio-economic implications of co-location. The matrices are high-level generic screening tools and not deterministic tools and should only be used as a basis for further detailed empirical analysis. Moreover, additional stakeholder validation is required to support the final matrices. The study has been followed up by the MMO project 1049 (MMO, 2014f) which sought to scope a more flexible approach to consideration of the costs and benefits of co-existence to help deliver effective decisions relating to co-location of sectors/activities. The project scoped a tiered approach to co-existence assessment incorporating physical, environmental, social and economic variables and discussed information requirements to drive such assessments. In addition, a project by the MMO investigates the social interactions between the sectors and could be used in future reference (MMO, 2014c). The ecosystem services approach described above can also help to identify which other sectors may be affected (when another sector depends on intermediate services as an input).

Any other sector affected by the licence where these impacts are likely to be significant should be carried forward to the next stage.

## 3.7 Stage 4: Impact assessment

This section provides an overview of the various assessment tools employed during SEIA, as well as the various methods used for quantifying impacts.

### 3.7.1 Assessment tools

A number of socio-economic assessment tools can be employed to bring information on costs and benefits together to allow an overall licence determination to be made. The main assessment tools likely to be used in undertaking an SEIA are:

- Cost-Effectiveness Analysis (CEA)
- Cost-Benefit Analysis (CBA)
- Multi-Criteria Analysis (MCA)
- Input-Output Analysis (I-O).

A brief overview of these approaches is provided in Table 10 below (see Turner *et al.* (2010) for further information). Additional detail on CBA and CEA can also be found in Pearce *et al.* (2006).

**Table 10: Assessment tools commonly applied during SEIA.**

| Assessment tool | Description |
|---|---|
| Cost-effectiveness analysis | Is widely used (but not restricted to) determining the least cost means of achieving pre-set targets or goals. CEA can be aimed to identify the least cost option among a set of alternative options that all achieve the targets. In more complicated cases, CEA is used to identify combinations of measures that will achieve the specified target. |

| Assessment tool | Description |
|---|---|
| Cost-benefit analysis | Involves identifying and quantifying, in monetary terms where possible, as many of the costs and benefits of a project as possible, including items for which the market does not provide a satisfactory measure of economic value. The aim of CBA is to determine whether the proposed project would deliver a net gain or loss in economic welfare to society as a whole. A project is deemed to be efficient if total benefits exceed total costs. |
| Multi-criteria analysis | MCA is a framework which allows decision-makers to evaluate and rank a range of different project options according to a set of well-defined evaluation criteria. Weights are assigned to each criterion, and then projects are scored according to how well they perform against the weighted criteria. Weighted scores are then summed, and can be used to rank options. MCA should be viewed as a framework for analysis, rather than as a straight alternative to appraisal methodologies such as cost-benefit analysis. In fact, MCA can integrate the results of CBA and other appraisal techniques to allow decision-makers to choose the most appropriate course of action. MCA covers a wide range of related, but differing techniques (examples include: multi-criteria decision analysis, multi-attribute utility theory, the analytic hierarchy process, and fuzzy set theory). |
| Input-output analysis | The fundamental idea underpinning input-output methods is that sectors in an economy are linked through the demand for material inputs and the sales of intermediate output. It is these links or interdependencies that give rise to multiplier effects across the economy when there is a change in economic activity. In a marine context, for example, output from the metals industry (steel) becomes input to the energy industry (offshore wind turbines), but also generates economic output in other sectors of the economy (e.g. in transport, manufacturing and so on). Input-output analysis aims to quantify these linkages between different sectors to provide an estimate of the total (i.e. direct, indirect and induced) effects of an activity on the economy. Typical economic impact measures in input-output include:<br>• Output (sales/gross revenue)<br>• Value added (the payments to local primary inputs of production)<br>• Household income (wages and salaries, earnings or income)<br>• Employment (number of persons employed). |
| Sources: ECHA (2008), Turner *et al.* (2010), Australian Government Bureau of Rural Sciences (2005) | |

The choice between the four approaches described in Table 10 is determined by the nature of the proposal under scrutiny, the aim of the SEIA and the availability of

quantitative impact data. Although CEA is normally used in the assessment of policies and plans, in the context of licensing its use may be limited. MCA would be the most appropriate assessment tool in cases where monetary valuation is not possible or appropriate (Turner *et al.,* 2010) but the key issue relates to the assignment of weights to specific impact criterion in order to reach a decision. An applicant is unlikely to conduct a MCA.

In a full SEIA, the assessment process might also include the use of input-output analysis. Where the project is likely to generate a number of secondary regional effects (e.g. in terms of employment or value-added), then input-output analysis could potentially be employed to model these effects. The results of an input-output analysis can then stand alone or be fed back into a CBA (Turner *et al.,* 2010). The limitations are that it will not include specific impact categories important for SEIA, particularly social impacts such as tourism and recreation, amenity impacts, public health, impacts on specific groups, access to services, etc. Currently, most EIAs use a combination of Input-Output (I-O) analysis (to examine employment effects) and CBA, but with limited quantification.

### 3.7.2 Common approaches to quantifying impacts

Some impact categories are subject to quantification and monetisation more easily than others. The following table (Table 11) sets out possible approaches to evaluation. ABPmer and RPA (2012a) investigate these further for wave and tidal developments (Table 12 and Table 13). The MMO has also commissioned a study to develop a method and data to monitor the social outcomes of marine plans outlining a suite of potential indicators which may help with the quantification of social impacts in the future (MMO, 2014d).

**Table 11: Assessment method by category of impacts.**

| Impact | Qualitative | Quantitative | Monetary |
|---|---|---|---|
| **Economic** | | | |
| Operating and capital costs | | | ☑ |
| Competitiveness, trade and investment | ☑ | ☑ | ☑ |
| Innovation and research | | ☑ | ☑ |
| Administrative burdens related to monitoring | | ☑ | ☑ |
| **Social** | | | |
| Employment and labour markets | ☑ | ☑ | |
| Social inclusion and protection of particular groups | ☑ | | |
| Public health | ☑ | ☑ | ☑ |
| Crime, terrorism and security | ☑ | | |
| Individuals, private and family life | ☑ | | |
| Governance | ☑ | | |
| Access to social protection, health and educational systems | ☑ | | |
| Culture | ☑ | | |
| Recreation | ☑ | ☑ | ☑ |

Approaches to quantification and valuation in socio-economic analysis can range from approaches based on market data (such as the *market price approach, replacement cost approach, damage avoidance cost approach, defensive expenditure costs, production function approach* and *cost-of-illness method*) to non-market approaches (including revealed preference methods such as *hedonic pricing* and *travel cost* and stated preference methods, such as *contingent valuation and choice experiments*). There are also methods that rely on existing valuation estimates (e.g. *benefits transfer method*). Benefit Transfer (BT) methods are acceptable provided that a number of conditions apply, namely, similar policy context, population demographics, etc. (for more guidance refer to Defra's guidance on BT (Eftec, 2010)). BT was the preferred approach of the RPA's methodology on tourism and recreational impact assessment. An overview of the approaches is given in Table 14.

An SEIA may also use an ecosystem service approach and combine it with the different methods, presented in Table 14, to quantify the impacts. Some of these will fit better to some of the ecosystem services than others. Figure 4 sets out how the different methods are best suited to the ecosystem services provided by the marine environment

**Table 12: Suggested approaches to assessing potential benefits.**

| Benefit | Potential Socio-Economic Consequence | How Socio-Economic Impact could be Assessed |
|---|---|---|
| Supply chain | Increased employment and GVA | Estimated number of jobs created/sustained and estimated increase in GVA from expenditure (value and location) |
| Carbon emissions avoided | Carbon savings | Gross carbon savings compared to a standard baseline |
| Improvements to existing infrastructure, facilities and services e.g. airport facilities, flights, port facilities, hotel facilities | Increased employment and GVA, increased investor confidence, increased potential for economic growth | Qualitative identification of relevant benefits |
| Benefits to other marine users and interests e.g. increased hotel occupancy, improved facilities for marine users | Increased employment and GVA, increased investor confidence, increased potential for economic growth | Only consider where supporting actions being implemented |
| Social benefits | Increased employment, education and skills, quality of life | Jobs created/sustained (see supply chain above); qualitative assessment of changes in education/skills and quality of life |
| Increased knowledge as a result of research and development in wave and tidal technologies and from environmental surveys | Increased investor confidence; increased potential for economic growth and export opportunities | Qualitative description of benefits |
| Supply chain development/clustering increasing the UK's ability to service future domestic and international demand | Increased investor confidence; clustering significantly increases potential for economic growth and export opportunities | Qualitative description of benefits |
| Improvements to energy security | Increased domestic supply and economic resilience | Qualitative description of benefits |

**Table 13: Suggested approaches to assessing potential negative impacts.**

| Sector / Interest | Potential Impact | Potential Socio-Economic Consequence | How Socio-Economic Impact could be Assessed |
|---|---|---|---|
| Commercial Fisheries | Loss of or displacement from traditional fishing grounds | Reduction in landings | Quantify potential displacement effect in terms of fish landings |
| | Disturbance of mobile species and disruption or damage to habitats, nursery and spawning grounds | Reduction in landings/Catch per Unit Effort (CPUE) | Assessment of species and habitats within EIA/HRA procedures |
| | Obstruction of navigation routes | Increased steaming times for vessels | Assessment of number of vessels affected and scale of deviation |
| | Fouling of fishing gear on cables or seabed infrastructure | Loss of fishing gear | Assessment of potential frequency of fouling events |
| | Consequential impacts to fish processors | Loss of profit for fish processors | Assessment of significance of any reduction in landings to fish producers |
| Commercial Shipping | Obstruction of transiting vessel/ ferry routes; Increased steaming distances/time | Increased costs; increased insurance costs | Assess potential additional steaming distances/times |
| | Reduced turnaround times | Increased costs | Site specific consideration with operator |
| | Displacement of anchorage areas | Increased costs | Assess potential additional steaming/time costs for alternative anchorages |
| Ports and Harbours | Obstruction of existing navigation routes | Loss of customers and revenue; increased costs associated with maintaining alternative routes | Discussions with individual port authority |
| | Reduced development opportunities | Loss of customers and revenue (long-term); increased costs associated with development | Discussions with individual port authority |
| | Loss or reduced use of dredge | Increased costs of disposal | Discussions with individual port |

| Sector / Interest | Potential Impact | Potential Socio-Economic Consequence | How Socio-Economic Impact could be Assessed |
|---|---|---|---|
| | material disposal sites | | authority |
| Tourism (including ecotourism, archaeological heritage) | Impacts to landscape or seascape | Reduction in tourism income | Assess significance of changes through Landscape Visual Impact Assessment (LVIA); consultation with stakeholders |
| | Changes to the local character of an area | Reduction in tourism income | Assess significance of changes through LVIA; consultation with stakeholders |
| | Disturbance or injury to coastal or marine wildlife | Reduction in income for ecotourism businesses | Assessment of impacts to sensitive receptors e.g. marine mammals; consultation with stakeholders |
| | Disturbance or damage to heritage assets | Reduction in visitor attraction income; reduction in wider tourism income | Assessment of consequences for visitor attraction income; consultation with stakeholders |
| | Disruption to site access | Reduction in attraction income | Assessment within traffic impact assessment; consultation with affected parties |
| Recreational Boating | Alterations to informal cruising routes | Increased fuel costs for motorised vessels; possible relocation of vessels leading to loss of revenues for supply chain | Assess potential additional fuel costs; consultation with stakeholders |
| | Deterrent to investment in marinas/supply chain | Reduced investment | Consultation with recreational boating sector |
| Water Sports (including recreational angling, surfing, windsurfing, kayaking and | Impacts to seascape/setting | Loss of revenue for supply chains | Assessment of visual impact within EIA/HRA process; assessment of potential displacement in consultation with stakeholders |
| | Displacement or obstruction of water sports activity | Loss of revenue for supply chains | Assessment of potential displacement in consultation with |

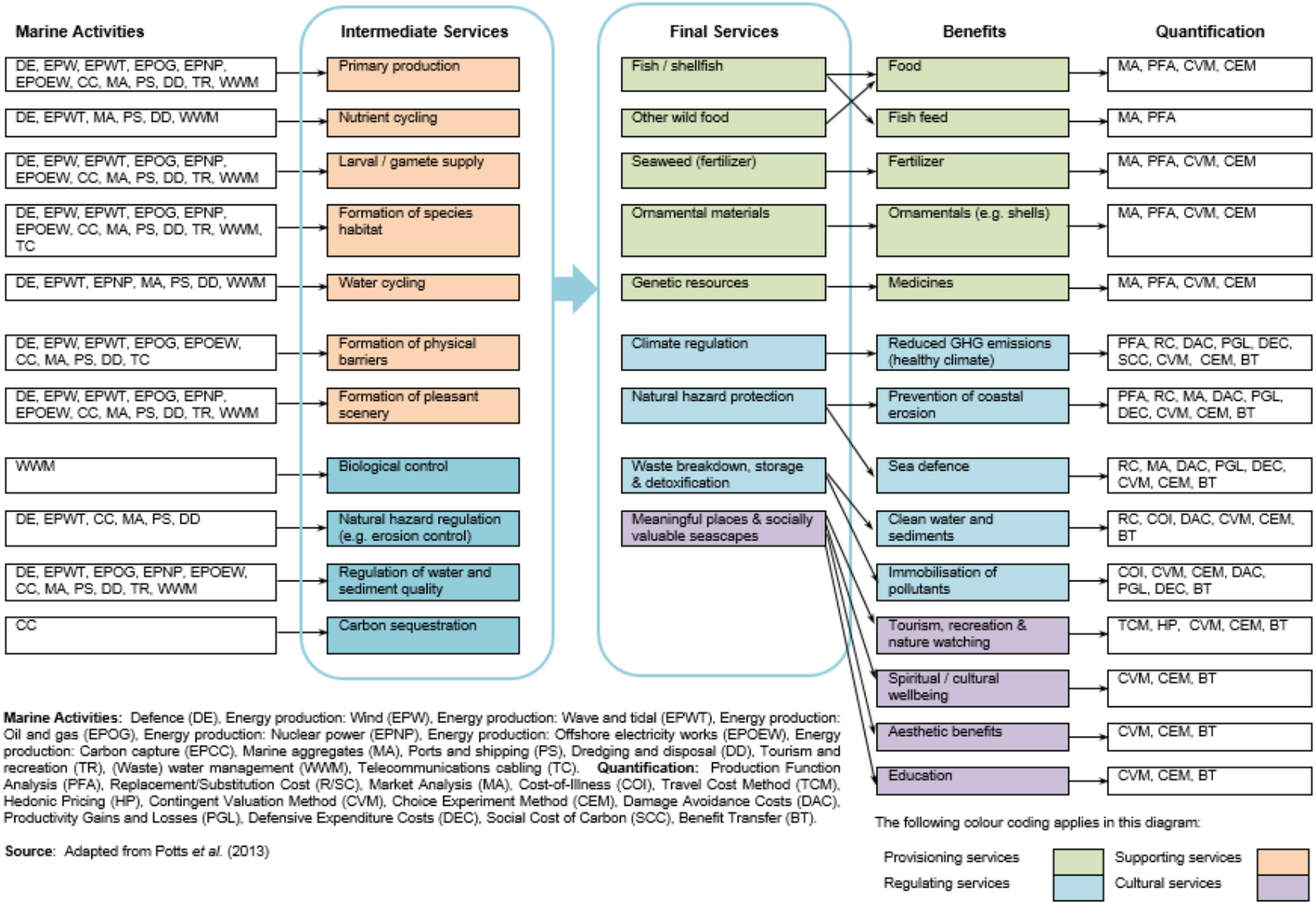
| Sector / Interest | Potential Impact | Potential Socio-Economic Consequence | How Socio-Economic Impact could be Assessed |
|---|---|---|---|
| diving) | | | stakeholders |
| | Collision risk for humans or vessels | Loss of revenue for supply chains | Assessment of potential displacement in consultation with stakeholders |
| | Impacts to wave quality (surfing) | Loss of revenue for supply chain | Assessment of potential displacement in consultation with stakeholders |
| | Impacts to fish resources (angling) | Loss of revenue for supply chain | Assessment of fish species within EIA/HRA process |
| Cables and Pipelines | Competition for space | Increased costs associated with new cable or pipeline laying operations; | Consultation with asset owners/operators |
| | Increased difficulty of access | Increased maintenance costs for cable and pipeline owners; loss of revenue for asset owners; loss of revenue for dependent businesses/customers | Consultation with asset owners/operators |
| Social Impacts | Local employment | Reduction in employment opportunities | Based on any negative impacts to other sectors |
| | Infrastructure | Pressure on existing infrastructure | Potential demand in relation to capacity (health services, schools) |
| | Housing availability | Pressure on housing availability leading to increased housing prices | Potential housing demand in relation to capacity |
| | Quality of life | Reduction in welfare | Quality of life Indicators |
| | Landscape/seascape | Reduction in visitor attraction income; reduction in wider tourism income | Assessment of landscape/seascape within EIA process |
| Source: ABPmer and RPA (2012a) | | | |

**Table 14: Common approaches to quantifying impacts.**

| Approach | Description |
|---|---|
| Benefits Transfer (BT) | The BT method is used to estimate economic values for ecosystem services by transferring available information from studies already completed in another location and/or context. This approach is particularly useful in situations when there are time and budget constraints but certain conditions should apply.<br>*For further information, refer to: Schuhmann (2012), King and Mazzotta (2000)* |
| Contingent Valuation Method (CVM) | CVM employs a questionnaire format where respondents are asked how much they would be Willing-to-Pay (WTP) or Willing-to-Accept (WTA) for a specified gain or loss of a given good or service. For example, the public might be asked to value a hypothetical environmental improvement, such as increased biodiversity at a coastal site.<br>*For further information, refer to: Turner* et al. *(2010), Alban* et al*. (2008), Schuhmann (2012)* |
| Cost-of-Illness (COI) | The aim of the COI approach is to value human health impacts through estimates of medical expenditures as well as estimates of earnings lost due to morbidity and “premature" death. For example, the COI approach could be used to estimate loss of earnings due to illness caused by poor bathing water quality.<br>*For further information, refer to: Turner* et al. *(2010)* |
| Damage Avoidance Costs | This approach uses either the value of property protected, or the cost of actions taken to avoid damages, as a measure of the benefits provided by an ecosystem. For example, if a pier provides protection to coastal areas from storm damage, the benefits may be estimated as the damages avoided or by the avoided expenditures by coastal residents to protect their properties.<br>*For further information, refer to: King and Mazzotta (2000), Van Beukering* et al. *(2007), Schuhmann (2012)* |
| Defensive Expenditure Costs | This estimates what people are observed to spend to protect themselves against a potential or actual negative externality. For example, using this measure we could estimate the cost of noise pollution by observing the expenditure of individuals living close to a port on double-glazing.<br>*For further information, refer to: King and Mazzotta (2000)* |
| Hedonic Pricing (HP) | The HP is most commonly applied to variations in housing prices. It can be used to estimate economic benefits or costs associated with environmental quality, including air pollution, water pollution, or noise and environmental amenities, such as aesthetic views or proximity to recreational sites.<br>*For further information, refer to: Turner* et al. *(2010), Van Beukering* et al. *(2007), Schuhmann (2012)* |
| Market Analysis | This approach uses data on market prices for ecosystem goods that are traded in local and/or international markets (e.g. the market price for products such as fish and shellfish). Prices may need to be adjusted to account for government subsidies or taxes in order to obtain real or so-called shadow prices. |

| Approach | Description |
|---|---|
| | *For further information, refer to: Turner* et al. *(2010), Schuhmann (2012)* |
| Production Function Analysis | The production function method estimates the value of a non-marketed ecosystem product or service by assessing its contribution as an input into the production process of a commercially marketed good. This method is different from the net factor income method in that it estimates a functional relationship between inputs and output, i.e. shows how output changes with changes in input. The net factor income method, on the other hand, takes the quantities of outputs and inputs as given.<br>*For further information, refer to: Van Beukering* et al. *(2007), Schuhmann (2012)* |
| Productivity Gains and Losses | Estimates the change in net return from marketed goods: a form of (dose-response) market analysis. For example, improvements in water quality leading to reduced purification requirements following shellfish harvesting and, in turn, higher net returns.<br>*For further information, refer to: Atkins* et al. *(2010)* |
| Replacement/ Substitution Cost | The replacement cost method estimates the value of ecosystem services as the cost of replacing them with alternative man-made goods and services. For example, the flood protection services of dredging could be valued as the costs of providing a coastal sea defence.<br>*For further information, refer to: King and Mazzotta (2000), Schuhmann (2012)* |
| Social Cost of Carbon | The UK government has agreed a set of carbon values to be used in policy appraisal and evaluation. The social cost of carbon signals what society should, in theory, be willing to pay now to avoid the future damage caused by incremental carbon emissions.<br>*For further information, refer to: DECC (2013), Price* et al. *(2007)* |
| Travel Cost Method | The basic assumption is that these costs of travel serve as a proxy for the recreational value of visiting a particular site (e.g. the costs borne by visitors to bird watching sites). Travel expenses include the actual travel costs (e.g. price of using public transport, petrol and maintenance for travel by private car, aeroplane ticket, time costs (e.g. foregone earnings), and admittance fees.<br>*For further information, refer to: Turner* et al. *(2010), Van Beukering* et al. *(2007), Schuhmann (2012)* |
| Sources: Atkins *et al.* (2010); DECC (2013); King and Mazzotta (2000); Price *et al.* (2007) Schuhmann (2012), Turner *et al.* (2010), Van Beukering *et al.* (2007) | |

**Figure 4: Linking marine activities to quantification through ecosystem services.**




**Marine Activities:** Defence (DE), Energy production: Wind (EPW), Energy production: Wave and tidal (EPWT), Energy production: Oil and gas (EPOG), Energy production: Nuclear power (EPNP), Energy production: Offshore electricity works (EPOEW), Energy production: Carbon capture (EPCC), Marine aggregates (MA), Ports and shipping (PS), Dredging and disposal (DD), Tourism and recreation (TR), (Waste) water management (WWM), Telecommunications cabling (TC). **Quantification:** Production Function Analysis (PFA), Replacement/Substitution Cost (R/SC), Market Analysis (MA), Cost-of-Illness (COI), Travel Cost Method (TCM), Hedonic Pricing (HP), Contingent Valuation Method (CVM), Choice Experiment Method (CEM), Damage Avoidance Costs (DAC), Productivity Gains and Losses (PGL), Defensive Expenditure Costs (DEC), Social Cost of Carbon (SCC), Benefit Transfer (BT).

**Source:** Adapted from Potts *et al.* (2013)

## 3.8 Stage 5: Summarising the results

### 3.8.1 Presenting the net impacts

In economic terms, only the net gains should be considered in an SEIA. The Green Book notes that the net benefit reflects the additionality of the option accounting for displacement, leakage and substitution, explained in Tables 15 and 16, in order to avoid double-counting. There is separate guidance by the UK government to account for additionality of interventions (UK Government, 2008). In addition, distributional analysis can feature in an SEIA to depict the winners and losers of a project or policy (with the possibility of allowing for cross-sectoral compensation).

**Table 15: Accounting for additionality key terms.**

| Approach | Description |
|---|---|
| Leakage effects | The number or proportion of outputs (occurring under the reference case and the intervention options) that benefit those outside of the intervention's target area or group. Impacts outside the target area or group should not be ignored, particularly those in other priority areas or groups. |
| Displacement | Displacement will measure the extent to which the benefits of a project are offset by reductions of output or employment or resources elsewhere. |
| Substitution effects | This effect arises where a firm substitutes one activity for a similar one (such as recruiting a jobless person while another employee loses a job) to take advantage of public sector assistance. Again these effects need to be deducted. |

**Table 16: Displacement ready reckoner.**

| Level | Description | Displacement |
|---|---|---|
| Low | There are expected to be some displacement effects, although only to a limited extent | 25% |
| Medium | About half of the activity would be displaced from an alternative location | 50% |
| High | A high level of displacement is expected to arise | 75% |
| Total displacement | All the new visits will be displaced | 100% |
| Source: UK Government (2008) | | |

Table 6 sets out the impact area for different licensing activities. This may be of help in order to assess leakage (for impact at national scale) and displacement (when impacts are both local and national). In addition, there are ready reckoners for displacement (Table 16) but they should be used with caution (i.e. they should only be used where better quality data is unavailable).

### 3.8.2 Discounting

In SEIA, 'discounting' is the most common method used to compare costs and benefits occurring at different times. Broadly speaking, individuals have a higher

'time preference' for the present than the future (i.e. people prefer to receive benefits sooner rather than later and defer any costs to a future point in time). The further away in time a cost or benefit occurs, the lower its present value becomes.

In SEIA, a 'discount rate' is used to convert future income (or expenditure) streams to their equivalent Present Value (PV). The UK Government recommends a 3.5% discount rate (decreasing to 3% after year 30). The Green Book has further guidance about discounting (including discount rates).

The Net Present Value (NPV) of an option is the net value today of the present value of all the benefits of that option minus the present value of all the costs. A positive NPV means that the socio-economic benefits outweigh the costs. It is pertinent to note that the NPV is not always the criterion on which final decisions should be made as, in some cases, it may not be possible to monetise all impacts. Discounting is only relevant if (ECHA, 2008):

- Some of the impacts have been monetised
- The timing of costs and benefits is known (within an acceptable level of uncertainty) or can be expressed in annual terms

The capital and operational and maintenance costs of a project can normally be discounted fairly easily, as the timing is normally known. For benefits, the timing is sometimes more difficult to establish and changes through ecosystem services may take longer to be noticeable. In this case, sensitivity analysis can be a useful tool to account for uncertainty surrounding the timing of benefits.

### 3.8.3 Adjusting for optimism bias

It has been demonstrated that there is a systematic tendency for project appraisers to be overly optimistic when carrying out SEIA. Many project parameters can be affected by the 'optimism bias'. For example, benefits are frequently overstated (e.g. employment and consumer demand), while timescales and costs (capital and operational) are understated.

To redress this tendency, Annex 4 of HM Treasury's Green Book recommends that appraisers make explicit, empirically based adjustments to the estimates of a project's costs, benefits, and duration. As discussed in the Green Book, it is recommended that these adjustments are based on data from past projects or similar projects elsewhere, and adjusted for the unique characteristics of the project in hand.

### 3.8.4 Sensitivity analysis

Sensitivity analysis is a "what-if" type of analysis used to determine the degree of uncertainty in an SEIA. It involves assessing the sensitivity of the outcomes of the analysis to changes in the input parameters. If a small change in a parameter results in relatively large changes in the outcomes, the outcomes are said to be sensitive to that parameter.

In most SEIAs, it is advisable to undertake a simple uncertainty analysis, such as sensitivity or scenario analysis, in order to gauge how uncertainties could alter the present value of costs and benefits (this is not relevant if costs and benefits can be

determined in annual terms) (ECHA, 2008). Sensitivity analysis should be undertaken (ECHA, 2008):

- Where costs and benefits occur beyond 30 years
- Where the timing of costs and benefits is very uncertain
- To take into account different investment perspectives through different discount rates

ESs reviewed for this study normally adopt a scenario analysis to test for sensitivity of outputs to different assumptions (e.g. to assess the potential GVA and employment arising as a result of the project based on different percentages of expenditure by project sub-phase and geography).

# 4. Tourism and Recreation Impact Assessment

## 4.1 What is a tourism and recreation impact assessment?

Tourism and recreation impact assessment is one of a number of tools that can be used to understand the consequences of licensable marine activities. As the name suggests, tourism and recreation impact assessment is an assessment of the costs, benefits and risks of a proposed activity on tourism and recreation. It can be used to weigh up various options and to inform the development of a plan, policy, project or development.

Currently, there are no specific guidelines or requirements, or indeed 'industry standards' for the assessment of recreation and tourism effects, neither set out by any other statutory or advisory guidance on the preparation of EIAs (although non-statutory guidance has been found on the impacts of renewable installations on surfing recreation (e.g. Surfers Against Sewage, 2009)).

## 4.2 Type of activities included

### 4.2.1 Tourism

The tourism sector is hard to define. The MMO (2013b) uses definitions for supply and demand side tourism as follows[13]:

- Demand side tourism is defined as: '*a movement of people to places outside their usual place of residence, pleasure being the usual motivation'.*
- Supply side tourism is defined as: *'provision to visitors of the goods and services that make up tourism expenditure'*.

RPA *et al.* (2013) reviewed the existing literature on tourism impact assessment, including the definition of key terms and the methodologies used in different contexts. Concerning the definition of tourism, the methodology was aligned with the UK Government's official definition: '*all activities of visitors including both "tourists (overnight visitors)" and "same-day visitors"*[14]. The methodology also differentiated between the tourism sector and the tourism-related sector which included those businesses that provide goods and services to visitors and not just tourists (including hotels, restaurants and shops).

### 4.2.1 Recreation

Recreation includes leisure activities undertaken for enjoyment when one is not working, but can include sport and consumptive activities. Many recreational activities are enjoyed by local residents. Tourists however will generally take part in recreational activities as well while visiting the area and this may even be the main reason for their visit. There are a number of recreational activities along the coasts and the number is continuously increasing. A list of activities is provided in Table 17

[13] Definitions within the report are taken from the ONS (2010): Measuring tourism locally. Guidance note 1: Definitions of tourism.
[14] In line with the definition provided by the World Tourism Organisation (WTO) and the OECD (see http://stats.oecd.org/glossary/detail.asp?ID=2725)

below. It is important to note that recreational activities can be divided into formal or informal activities (RPA *et al.,* 2013):

- Informal recreation comprises non-motorised activities which are easily accessible, require little or no previous experience and may include associated behaviour such as enjoyment of immediate surroundings and views, and relaxation or social discussion. The primary activities in this category are walking, bathing, rock-pooling and other beach recreation such as sand-castle building, picnicking and dog walking.
- In contrast, formal recreation require specialist equipment and/or dedicated purpose-built facilities, either in public or private ownership, for example, angling, snorkelling and diving, boating, canoeing, etc.

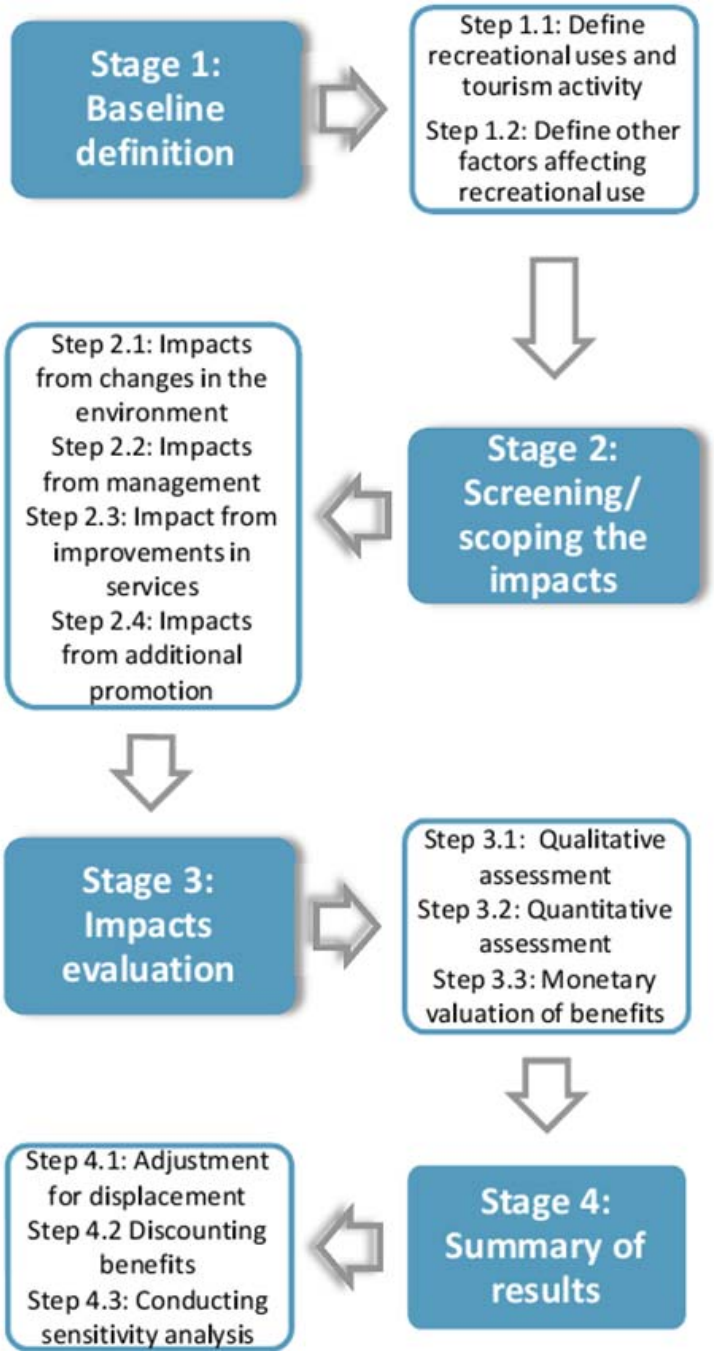
**Table 17: Recreational activities along the coasts and in the sea.**

| Leisure Activities | Sport Activities | Consumptive Activities |
|---|---|---|
| Beach games<br>Beach combing<br>Rock pooling<br>Painting<br>Kite flying<br>Fossil hunting<br>Naturism<br>Paddling<br>Swimming<br>Snorkelling<br>Motor cruising<br>Small power boating<br>Personal water craft<br>Wildlife tours<br>Charter vessels<br>Offshore power boat | Climbing<br>Beach volleyball<br>Beach football<br>Beach ultimate Frisbee<br>Power kiting<br>Kite buggying<br>Coasteering<br>SCUBA diving<br>Wind surfing<br>Surfing<br>Kite surfing<br>Boat boarding<br>Canoeing<br>Kayaking<br>Rowing<br>Paddle boarding<br>Water skiing<br>Wakeboarding<br>Dinghy and yacht sailing<br>Catamaran sailing<br>Racing | Bait collection<br>Wildfowling<br>Angling (from a boat or shore)<br>Crab lining |

## 4.3 Overview of process

The process of carrying out an assessment of tourism and recreational impacts is fairly similar to the process of carrying out an SEIA. Figure 5 replicates the different stages in the methodology, as given in RPA *et al.* (2013).

**Figure 5: Recreation and Tourism Impact Assessment (adapted from RPA *et al*., 2013).**




### 4.3.1 Stage 1: Setting the tourism and recreational baseline

Similar to the process of carrying out an SEIA, the first stage in carrying out a recreation and tourism impact assessment involves defining the baseline situation within the study area. There are a number of components that could be observed for setting out the tourism and recreational baseline, e.g. employment in the tourism sector, level of facilities and access, visitor numbers.

A number of reports commissioned by the MMO will also be helpful in setting out the baseline. The MMO's report Compilation of spatial data on marine recreation

activities (MMO, 2012) identified datasets with information on recreational activities and provided a catalogue of marine spatial data. Its follow-up study (MMO,1043) identified further datasets and gathered more evidence from stakeholders with a focus on the South Marine Plans. The MMO Project 1064 'Spatial trends in marine recreational activity' (MMO, 2014g), will expand upon the above to model areas of potential importance for marine recreation at an England scale and to review, develop and test participatory mapping tools and techniques which can be used to facilitate model validation and enhancement.

Information on the volume of tourism and recreation will be available from the Natural England's Monitor of Engagement with the Natural Environment (MENE) survey, ONS, Visit England, StakMap etc. For example surveys by Visit England, namely the GB Day Visit Survey and GB Tourism Survey, provide information on tourist volume, expenditure and overnight stays (MMO, 2013b). The ONS hold data on supply side tourism such as employment. In a study by the MMO and Marine Scotland (2012), a set of indicators were developed in relation to sustainable development and tourism, with details of their strengths and weaknesses and the relevant data sources available to measure them.

The coastal types developed for the MMO (MMO, 2011) may give an indication of the type of site for recreational and tourism impact assessment purposes. Indeed, tourism activities are more prominent for the silver seaside (A1) and the cosmopolitan coast (C1) which have employment in the tourism sector above the coastal average. Although the categories were not used for official purposes, they can inform the scoping phase. Impacts on tourism and recreation from licensable activities at A1 and C2 would appear to be likely.

RPA *et al.* (2013) also identified the following categories of coastal sites for tourism and recreational purposes:

1. Type 1: sites that are actively used for tourism and recreation and could be considered "honey pot sites". A honeypot is a particularly popular visitor attraction which attracts tourists (and sometimes locals) in large numbers[15].

2. Type 2: sites that are actively used for tourism and recreation but are not considered to be a honeypot and do not attract visitors in large numbers. These sites have fewer facilities but they are still important in terms of recreational activity.

3. Type 3: sites not actively used for tourism and recreation but with potential to develop activities. The potential may be realised through additional promotion and/or investment in facilities (e.g. provision of car parks, improved access).

4. Type 4: these sites are unlikely to be accessible by shore and subject to restrictions on recreation (no navigation area, no anchoring or mooring). These sites are more likely to relate to offshore sites where recreational activities do not currently take place.

[15] Tiscali Encyclopaedia 27 June 2009

Impacts on recreation and tourism from the designation of MPAs were more likely to arise for type 1 and 2. The typologies however were developed as a tool for the screening process (e.g. when a marine conservation zone and its catchment was considered to be a type 4 site, impacts were considered to be unlikely).

### 4.3.2 Stage 2: Scoping

The impacts of licensable marine activities on tourism and recreation are likely to be most significant at a local level, although it is possible that the presence of, for example, a wind farm may affect the perception of a site at a national scale.

The impact of marine activities on tourism and recreation can be both direct (e.g. construction of a port could lead to a greater number of tourists visiting an area) or indirect (e.g. through effects on the marine and coastal environment and in line with the ecosystem services approach). In general, information on the impacts of marine activities on tourism and recreation is relatively abundant and different sources show similar impacts from the different activities. Broad potential negative impacts of marine licensable activities on tourism and recreation may occur through:

- Loss of biodiversity
- Reduced water quality
- Reduced aesthetic appeal of the landscape
- Reduced availability or safety of a site for use

Broad potential positive impacts of marine licensable activities on tourism and recreation may occur through:

- The provision of facilities
- Increased biodiversity

Co-location is defined as two or more activities overlapping the same spatial footprint, for example increasing aquaculture may have benefits for recreation due to boat chartering to recreational anglers. The MMO (2013a) developed a co-location matrix which can be used to assess the potential social conflicts between different marine activities, see Table 18 (note that data were only available for recreation). The matrix is useful for gaining an overview of potential conflicts, social implications and benefits that could arise under different marine planning options. The matrix is based on the assumption that when physical compatibility is low, management is likely to be high, and conversely when compatibility is high low management should be required. This can then be linked to the level of monitoring costs under the economic impacts (or conversely social conflicts and socio-economic costs). The study notes that due to conflicting views between stakeholders the matrix should be used only as an illustration. It is worth noting that electricity production and distribution and telecommunications are highlighted as potential conflicting co-location activities with recreation, whilst there are potential benefits for the co-location of Marine Protected Areas (MPAs) and recreational services.

**Table 18: The impacts of co-location of marine activities on recreational services.**

| Activity | Co-location Impact on Recreational Services by Level of Intervention |
|---|---|
| Fisheries | Medium |
| Aquaculture | Medium |
| Metal ores extraction, other mining and quarrying | Medium |
| Electricity production and distribution | High |
| Tourism | - |
| Shipping | Medium |
| Telecommunications | High |
| Public administration and defence | Medium |
| Sewage and sanitary services | - |
| Recreational services | Medium |
| Marine Protected Area | Low |
| Surface water management | Med |

Key:
High = Co-location not possible without high levels of intervention
Medium = Co-location possible but would require medium levels of intervention
Low = Co-location possible with low levels of intervention
- = No data

Note: Information only covers recreational services and has been adapted from MMO (2013a).

It goes without saying that activities such as wreck and reef diving will not be as desirable to visitors in the vicinity of aggregate extraction sites. The same is true of angling and wildlife watching. Marine aggregates also supply the materials for beach replenishment which, in the long term, may balance out any initial disturbance experienced by coastal recreational users (Austen *et al.,* 2009). In Borth (Wales) a new flood defence scheme has been introduced which will protect 420 homes and businesses as well as the Cambrian Coast railway line. This scheme includes a rocky reef which, as well as providing coastal protection, will also improve the surfing within the area (Welsh Government, 2012).

RPA *et al.* (2013) also conducted a review of potential conflicts among marine users to help with the assessment of tourism and recreational impacts. Conflicts occur between activities such as shipping and aggregate dredging but also between those undertaking these activities and tourism and recreational in the marine environment. Table 19 below illustrates where conflicts may arise between marine users and recreation and tourism. Conflicts here range from those which are potentially very significant (e.g. between shipping and snorkelers) and those which are likely to be relatively minor (e.g. those between wildfowlers and marine aggregate dredging). Should the baseline identify these uses (from Stage 1), impacts may be likely. Marine activities identified as having potential for conflict with tourism and recreation are ports and shipping and marine aggregates (see examples in Table 19 and Table 20) though mitigation for these conflicts are well implemented and actual incidence

appears to be low. Diving, wildlife watching and sea angling are the tourism and recreation activities most likely to be affected by other marine users.

**Table 19: Potential conflict between different marine users and tourism and recreation activities.**

| Tourism and recreation activities | Ports and shipping | Renewable energy | Oil and gas | Commercial fisheries and aquaculture | Marine aggregates |
|---|---|---|---|---|---|
| Bathing, snorkelling | ☑☑ | ☒ | ☒ | ☑☑ | ☑☑ |
| Informal recreational activities onshore* | ☑☑ | ☒ | ☒ | ☒ | ☑ |
| Wildlife watching ** | ☑☑ | ☑☑ | ☑ | ☑☑ | ☑☑ |
| Recreational diving | ☑☑ | ☑☑ | ☑☑ | ☑☑ | ☑☑ |
| Recreational sea angling | ☑ | ☑ | ☑ | ☑☑ | ☑☑ |
| Recreational boating *** | ☑ | ☑ | ☑ | ☒ | ☑ |
| Board sports | ☒ | ☒ | ☒ | ☒ | ☑ |
| Kayaking | ☑ | ☑ | ☑ | ☒ | ☑ |
| Wildfowling | ☑ | ☒ | ☒ | ☒ | ☑ |

Note to keys:

☒: No / limited conflict

☑: Potential / moderate conflict

☑☑: Potential for greater levels of conflict

* Informal recreational activities onshore (walking, picnicking, etc.)

** Wildlife watching (bird watching and cetacean watching)

*** Recreational boating (sail and powerboat racing and cruising)

**Table 20: Marine aggregate dredging and recreational activities. Source: Tillin *et al*. (2011).**

| Examples of conflicts between marine aggregate dredging and recreational activities |
|---|
| Marine aggregate dredging affects a range of recreational activities, including angling, scuba diving and sailing.<br><br>**Angling**<br>Angling occasionally targets similar areas as marine aggregate dredging, such as in the Overfalls area (12 nautical miles south of the entrance to Chichester Harbour). This area of offshore gravel provides a niche environment important for species including bass and blonde ray. Once this issue was raised, the Crown Estate undertook not to licence extraction of marine aggregates from this area for a period of 21 years, pending designation of the Overfalls as an MCZ.<br><br>**Diving**<br>Marine dredging increases turbidity due to creation of sediment plumes, this decreases visibility and water quality which excludes divers.<br><br>**Sailing**<br>Sailing activities are unlikely to be significantly adversely impacted by marine aggregate extraction unless the dredging activity coincides with high concentrations of sailing vessels over peak periods of time, for example yacht races. Where there is the potential for conflict for water space it can usually be mitigated by good liaison and timing of movements and events to minimise disruption. |

Similar to the recent trend in SEIA, ecosystem services approaches have gained relevance in the assessment of recreational and tourism impacts. RPA *et al.* (2013) acknowledged the impacts of tourism and recreation through changes in the environment. Table 21 identifies the linkages between ecosystem services and recreational activities. As the table shows, genetic and ornamental resources together with water purification are the services that deliver the greatest benefits for recreational activities.

**Table 21: The benefits provided by ecosystem services for recreational activities.**

| Activity | Food[1] | Genetic resources[2] | Ornamental resources | Water purification |
|---|---|---|---|---|
| Bathing, snorkelling | | ☑ | ☑ | ☑ |
| Informal recreational activities (including bathing) | ☑ | ☑ | ☑ | ☑ |
| Wildlife watching | | ☑ | | |
| Recreational diving | | ☑ | ☑ | ☑ |
| Recreational sea angling | | ☑ | | |

| Activity | Food[1] | Genetic resources[2] | Ornamental resources | Water purification |
|---|---|---|---|---|
| Recreational boating | | | ☑ | ☑ |
| Board sports | | | | ☑ |
| Kayaking | | | ☑ | ☑ |
| Wildfowling | | ☑ | | |

**Key:**
☑ - positive impact

Notes: Only those ecosystem services identified in the literature as having an impact on recreational activities are presented.
1: Food refers to provisioning services, e.g. "fine food" may attract visitors to a site
2: Genetic resources include aspects such as biodiversity, also under provisioning services
3: Ornamental sources include aspects such as landscape and visual amenity (provisioning services with impacts on cultural functions)
4: Water purification refers to regulating services
Sources: Natural England (2011); VisitBritain (no date)

Table 22 highlights the impacts of marine licensable activities on those ecosystem services which are identified as providing benefits for recreational activities (from Table 21). Marine licensable activities which have a detrimental impact on the four ecosystem services considered are: marine aggregates, telecommunications and cabling, fisheries and surface water management and waste water treatment and disposal. The activities providing the greatest positive impacts for ecosystem services are: aquaculture, energy generation and infrastructure, and ports and shipping.

**Table 22: The impacts of marine licensable activities on those ecosystem services which provide benefits for recreational activities.**

| Marine licensable activities | Food | Genetic resources | Ornamental resources | Water purification |
|---|---|---|---|---|
| Defence | ☑ | ☒ | | ☒ |
| Energy production and infrastructure | ☒☑ | ☒☑ | ☒☑ | |
| Ports and shipping (including marine dredging and disposal) | ☒☑ | ☑ | ☑ | ☒☑ |
| Marine aggregates | ☒ | ☒ | ☒ | ☒ |
| Telecommunications cabling | ☒ | ☒ | ☒ | ☒ |
| Fisheries | ☒ | ☒ | ☒ | ☒ |

| Marine licensable activities | Food | Genetic resources | Ornamental resources | Water purification |
|---|---|---|---|---|
| Aquaculture | ☑ | ☒☑ | ☒☑ | ☒☑ |
| Surface water management and waste water treatment and disposal | ☒ | ☒ | ☒ | ☒ |
| Key:<br>☑ - positive impact<br>☒ - negative impact<br><br>Sources:<br>Boehlert and Gill (2010); Austen *et al.* (2009); The Scottish Government (2013); Worm *et al.* (2006); Cranford *et al*.(2012); and GWI (2013). | | | | |

The literature also includes the impacts that recreation and tourism can have on the environment. This is because the relationship between tourism/recreation and the environment is a two-way process. While the quality and nature of the environment will have a strong bearing on the types of tourism/recreational activities undertaken in an area, tourism/recreation can also have a significant impact on the environment (both positively and negatively).

## 4.4 Stage 3: Impact assessment

In terms of the types of impacts that should be included within a tourism and recreation impact assessment, the following should be considered:

- The effects of the proposed marine activities on the types of tourist/recreational activities undertaken in the area (also through impacts on landscape and visual amenity – Section 5).
- The effects of the proposed marine activities on the number of visitors to the area (also including aspect of landscape and visual amenity).
- The effects of the proposed marine activities on direct and indirect employment within the tourism/recreation sector (including any change in the number of seasonal jobs, which could potentially lead to economic instability) and any multiplier effects on the economy.
- The effects of the proposed marine activities on recreation/tourism expenditure and any multiplier effects on the economy.
- The effects of the proposed marine activities on the potential for displacement of local recreational users by visitors, causing overcrowding and conflict.
- The effects of the proposed marine activities on the interaction of tourists and local communities.
- The effects of the proposed marine activities on community stability and local ways of life, where this has an indirect impact on tourism and recreation.

### 4.4.1 Assessment tools

Similar to the SEIA, the tools can span from qualitative to quantitative and monetary assessment (e.g. CBA). The licensable activities will have to be linked to specific impacts on the recreational activities (both on level and quality), e.g. creation of offshore renewable with loss of wildlife viewing boat trips and/or dredging activities with loss of diving opportunities. However, evidence on this is difficult to gather.

A study by the MMO (2013d), focusing on social impacts of tourism and recreation, concluded that the social impacts of tourism can be difficult to define and quantify and that it can have both positive and negative effects to individuals and local communities. The MMO project 1060 provides a body of evidence on social impacts as an assessment of interactions within and between sectors, including an analysis of how benefits and costs are distributed between sectors and geographically.

Most of the ESs reviewed to date include consideration of tourism and recreational impacts but these are limited to a description of the current employment levels in the tourism sector and a qualitative description of impacts (on the quality of the experience). Employment and GVA can be used as possible indicators of recreational value. Tourist direct expenditure can be used to estimate value, for example Visit England (2012) contains estimates on expenditure by region. In terms of the impacts, the ESs reviewed include aspects such as:

- Magnitude of effect (see example in Table 23); description of the areas affected that may be enjoyed by day visitors and tourists (including duration).
- Vulnerability of day visitors and tourists, related to the ability to change access and location (related to displacement effects) without any significant detriment to their enjoyment or the incurring of any significant cost.
- Significance of impact, qualitatively and based on the above.

**Table 23: Definitions of terms relating to the magnitude of an impact upon socio-economics.**

| Magnitude | Definition |
|---|---|
| No change | No change from baseline conditions or observable impact in either direction |
| Negligible | Very slight change from baseline conditions |
| Low | Minor shift away from baseline which would be noticeable in terms of absolute and/or percentage change in baseline conditions. |
| Medium | Proposals would cause a moderate change in baseline conditions which is noticeable in terms of absolute and/or percentage change |
| High | Proposals would cause a large change to baseline conditions in terms of absolute or percentage change |
| Source: RPS (2013) | |

It is generally considered best practice to define the impacts in qualitative terms first. For impacts that are regarded to be medium to high, quantification could be attempted.

### 4.4.2 Approaches to quantifying tourism and recreational impacts

There are two main difficulties to assess the impacts on tourism and recreation. First, there are extremely sparse literature on how to model impacts on tourism and recreational use volume from changes in environmental conditions and facilities. A study by Barry *et al.*(2011) suggested an increase in frequency of visitation of 19% for the provision of improved access (i.e. a coastal trail) to a range of beach users including water sports participants in Silverstrand, close to Galway, Ireland (in RPA *et al*., 2013). Generally however assumptions may need to apply.

On the other hand, there is the risk of double-counting when adding tourism and recreational benefits together (when recreational benefits are based on expenditure other than travel costs). When adding tourism and recreational benefits, recreational benefits should only include consumer surplus, i.e. the difference between the price that consumers pay and the price that they are willing to pay. The difficulty here is that very few studies report on consumer surplus. These are summarised in Table 24 below.

**Table 24: Consumer surplus (2012 £) for specific recreational activities as reported in the literature[16].**

| Recreational activity | Notes | Values from different studies | | |
|---|---|---|---|---|
| Informal/ water sports recreation | This may include a range of informal and formal recreational users (upper and medium bound could apply to sites where there are more recreational opportunities, e.g. long beach with coastal trail, bathing/swimming, rock-pooling and lower bound to sites where access is more limited and smaller beaches). Lower bound is for sites where alternatives are available. | £25.88[1] per trip | £13.83[1] per trip | £2.68[2] per trip |
| Recreational sea anglers[3] | These values are from the Drew Report and reflect the consumer surplus of two different models[4], The values are across all anglers in the sample. | £105.26 per angling day | £87.11 per angling day | £68.96 Per angling day |

[16] Prices updated by CPI for recreation and culture category, available at: http://www.cso.ie/px/pxeirestat/Statire/SelectVarVal/saveselections.asp

| Recreational activity | Notes | Values from different studies | | |
|---|---|---|---|---|
| Seal watching[5] | This value is likely to underestimate the consumer surplus and reflects the willingness to pay (WTP) for seeing seals in the wild. A slightly smaller value was reported for seeing the seals in a sanctuary. | £9.98 per trip | | |
| Sources:<br>1: Barry L et al (2011): Improving the recreational value of Ireland's coastal resources: A contingent behavioural application, Marine Policy 35 (2011) 764–771,<br>2: King O (1995): Estimating the value of marine resources: a marine recreation case, Ocean and Coastal Management. Vol. 27, No. 1-2<br>3: Drew Associates (2004): Research into the Economic Contribution of Sea Angling<br>4: The basic model was based on travel costs from home to shore fishing site or boat embarkation point. The extended model added car parking charges, plus charter boat or own boat costs per trip.<br>5: Bosetti, V. and D. Pearce (2003), 'A study of environmental conflict: the economic value of Grey Seals in southwest England', Biodiversity and Conservation, Vol. 12, pp. 2361-2392.<br><br>Source: RPA, Bright Angel Coastal Consultants, Ichthys Marine, RSS Marine Ltd (2013): Value of Marine Protected Areas on recreation and tourism services, Methodology report for Defra, July 2013, Loddon, Norfolk, UK. | | | | |

More generally, recreational benefits are calculated using expenditure, travel and other expenditure based approaches. Table 25 presents values for different types of recreational activities using various approaches. Annex 2 presents additional values as reviewed in RPA *et al*. (2013).

**Table 25: Values of various marine recreational activities and the methods used.**

| Recreational activity | Valuation Method | Value |
|---|---|---|
| Willingness to pay to avoid dog mess/litter on the beach | Choice experiment method | £6-£11 per household per year Total for England and Wales = £144 million per year |
| Willingness of recreational sea anglers to pay for increased catch | Choice experiment method | £14 per person per year |
| Mean cost of diving | Estimated expenditure | £71±44 per trip |
| Mean cost of Kayaking | Estimated expenditure | £27±24 per trip |
| Mean cost of a wildlife viewing boat trip | Estimated expenditure | £44±27per trip |
| Mean cost of a sea bird watching day out | Estimated expenditure | £28±30 per day out |
| Estimated expenditure in Lyme Bay by: | | |

| | | |
|---|---|---|
| Sea anglers | Estimated expenditure | £13.7 million per year |
| Dive clubs | Estimated expenditure | £1 million per year |
| Boat charters | Estimated expenditure | £3.5 million per year (turnover) |
| Note: Figures are a summary of values given from a range of studies within MMO (2013c) | | |

Generally, monetisation of recreational and tourism impacts is rather limited (as seen in the ES reviewed) and will be subject to significant uncertainties. Consultation is likely to help to reduce such uncertainties, however, as with all impact assessments, the quality and robustness of the final output can only be as reliable as the data (e.g. survey information) on which the assessment relies.

## 4.5 Stage 4: Summarising the results

As for the SEIA, this stage will involve accounting for displacement, discounting and sensitivity analysis.

# 5. Seascape and Landscape Assessment

## 5.1 What is a seascape and landscape impact assessment?

The importance of the coast and seascapes as part of the marine environment has increasingly been acknowledged, not least due to the growing pressures being placed on them by new forms of development, including off-shore wind farms, tidal energy schemes and coastal defences.

The definition of landscape from the European Landscape Convention (ELC)[17] states that "*landscape is defined as an area as perceived people, whose character are the result of the action of natural and/or human factors*." This encompassing definition of landscape includes both land and water areas and applies to marine areas (coastal waters and the territorial sea).

The UK MPS[18] states that in the context of the document "*seascape should be taken as meaning landscapes with views of the coast or seas, and coasts and the adjacent marine environment with cultural, historical and archaeological links with each other*."

In addition, according to Guidance on Landscape Visual Impact Assessment (GLVIA)[19], seascape includes the meeting point of land and sea but also encompasses areas beyond the low water mark and so includes both areas near to the shore and the open sea. Therefore, any assessment of the landscape and visual effects of change to the marine and coastal environments should carefully consider the relationship between land and sea in coastal areas.

Therefore, landscape and seascape assessment is a tool to:

- Identify and assess the existing seascape and landscape character within a defined study area as well as people's views that may be influenced by a proposed development
- Design potential mitigation measures to avoid, reduce and compensate for any potential effects. Mitigation measures should be defined from the earliest stages of a proposed development design
- Determine the significance of, and the effects of, change as a result of a proposed development in relation to the landscape and seascape and on people's views and visual amenity.

In summary:

- Seascape assessment is a sub-section of the wider commonly used term 'landscape assessment'
- Landscape and seascape assessment is used as a starting point to assess the potential impacts and effects of a proposed project or development

[17] European Landscape Convention (ELC), ETS No. 176, Explanatory Report
[18] UK Marine Policy Statement (MPS), HM Government, Northern Ireland Executive, Scottish Government, Welsh Assembly Government, March 2011
[19] *Guidelines for Landscape and Visual Impact Assessment (GLVIA)*, Third Edition, Landscape institute and Institute of Environmental management and Assessment, 2013

- Landscape and seascape assessment is used to inform mitigation measures to help minimise the effects of proposed development
- The proposed development can create both ‘positive’ and negative’ effects
- Landscape and seascape assessment is based on guidelines for the approach and methodology, which vary depending on project location. The professional undertaking the landscape and seascape assessment must be aware of the relevant guidance and different data sources associated with different geographic locations within the UK
- Landscape and seascape assessment is based on previously published assessments at a national, regional and local scale, as well as site specific observations, by an experienced professional
- Landscape and seascape assessment informs the site selection, development design and decision making process
- Landscape and seascape assessments overall aim is to inform good design and to minimise potential adverse impacts while maximising benefits to the overall environment.

## 5.2 Type of impact considered within a landscape and seascape assessment

The following impacts are generally considered within a landscape and seascape assessment:

- Direct impacts on landscape elements as a result of the proposed development. For example, this could involve removal of vegetation or built elements as a result of cable connections
- Indirect impacts on landscape and seascape character as a result of a proposed development. For example the indirect impacts on the coastline and marine environment as a result of an off-shore wind farm development
- Indirect impacts on people (visual amenity receptors) and their views. For example the change to views from a coastal path as a result of coastal protection works.

## 5.3 Overview of landscape and seascape assessment process

Landscape and seascape assessment can be carried out:

- As part of an EIA
- As part of a Strategic Environmental Assessment (SEA)
- As a contribution to an ‘appraisal’ of a proposed development.

All landscape and seascape assessments follow the same broad principles, approach and process; however the landscape and seascape assessment should be appropriate and proportional to the scale of the proposed development and the nature of the likely impacts and effects.

This is acknowledged by the MPS which outlines that “*the effects of activities and developments in the marine and coastal area on the landscape, including seascape, will vary on a case-by-case basis according to the type of activity, its location and its setting*.”

It is important to note however, that seascape and landscape assessment interrelates between other topics. This is illustrated in Figure 6.

**Figure 6: Interrelationship of landscape and seascape assessment with other topics (adapted from Guidance for Landscape Impact Assessment http://www.landscapeinstitute.co.uk/knowledge/GLVIA.php )**


For example, a landscape and seascape assessment may also inform the assessment of the direct effects on heritage features, such as shipwrecks or the indirect effects on their setting, such as Registered Parks and Gardens and Conservation Areas. However, it is expected that a separate heritage assessment would be carried out by an experienced professional.

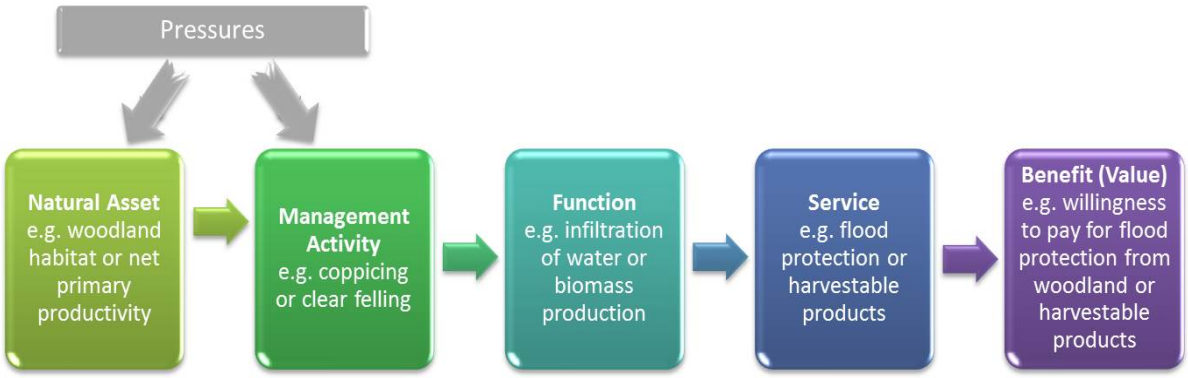
The connections with other topics can also be identified through 'ecosystem' services, most notably through the recent Natural England descriptions of national landscape character areas[20] and the MMO[21] guidance which also help to identify cross-topic 'value.'

[20] Natural England national character areas
http://www.naturalengland.org.uk/publications/nca/searchpage.aspx

The EsA is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. It "*provides a framework for looking at whole ecosystems in decision making and for valuing the ecosystem services they provide, to ensure that society can maintain a healthy and resilient natural environment now and for future generations*.[22]"

The process of the EsA is summarised in Figure 7. However, as outlined in GLVIA, the use in landscape and seascape assessment is limited, although it is in active discussion and will probably become more widely used in the future.

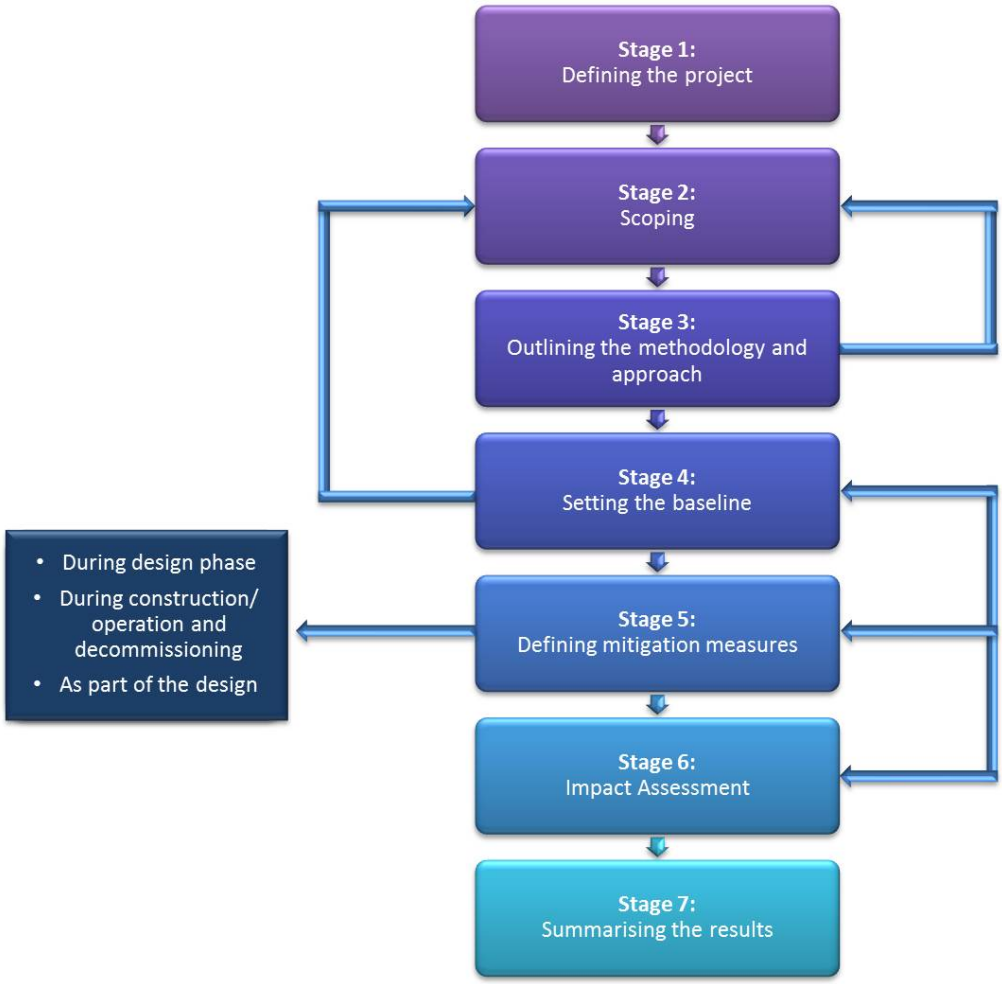
**Figure 7: Ecosystems services cascade.**




The process for undertaking a landscape and seascape assessment is described in more detail below and also illustrated in Figure 8.

[21] MMO 1048: Practical Framework for Outlining the Integration of the Ecosystem Approach into Marine Planning in England
[22] DEFRA Ecosystem Services: Guidance for policy and decision makers on using an ecosystems approach and valuing ecosystem services https://www.gov.uk/ecosystems-services

**Figure 8: Process of landscape and seascape assessment.**




**Stage 1: Defining the project**
The proposed development project should be described and defined in sufficient detail to ensure that the potential effects can be clearly identified.

**Stage 2: Scoping**
The aim of the scoping stage is to set the boundaries of the assessment, with reference to the type and scale of the development to be assessed, its location and context as well as its potential impacts.

One of the first requirements of the scoping stage is determining whether a landscape and seascape assessment is required. Only projects which have the potential to affect the existing landscape and seascape will need an accompanying assessment. Such projects, with reference to potential licensable activities, could include:

- Berthing pontoons
- Slipways and small jetties
- Outfalls
- Coast protection works

- New quay walls
- Works on tidal river banks
- Renewable projects, such as wind energy and wave and tidal
- Port, marina or harbour works
- Pipeline/cable works, particularly where they join the land

However, it is important to note that activities which involve construction activities of an otherwise underwater development, such as pipeline removal, may require a landscape and seascape assessment to assess the albeit temporary effects, as well as more 'obvious' proposed developments which could affect the landscape and seascape, such as wind farms.

The scoping process should:

- Determine whether a landscape and seascape assessment is required
- Consider the extent of the study area
- Identify sources of information. There is no common source of data relevant to landscape and seascape assessment. Sources and detail of information vary in different geographical areas within the UK
- Define the extent and the appropriate level of detail for the baseline studies
- Identify the main 'receptors' to be considered
- Outline methods to be used in determining impacts and effects
- Identify potential impacts and effects, including cumulative.

Section 3 of the MPS sets out impacts from different marine activities and provides a good starting point for broadly setting out the types of impacts that could be expected for different licensable activities in the different sectors. The section also includes impacts on other sectors (through impacts on the environment).

**Stage 3: Outlining the methodology and approach**

The landscape and seascape assessment should follow national guidance associated with landscape and visual impact assessment[23] as well as specific guidance associated with landscape and seascape assessment[24]. In addition, the MMO report[25] provides guidance on the scope and methods for reviewing future assessments on impacts on the terrestrial environment – although the advice on landscape and visual impact assessment is minimal.

A clearly defined methodology and approach should be defined, appropriate and proportional to the scale of the proposed development and the nature of the likely impacts and effects.

[23] *Guidelines for Landscape and Visual Impact Assessment (GLVIA)*, Third Edition, Landscape institute and Institute of Environmental management and Assessment, 2013
*Landscape Character Assessment,* The Countryside Agency, April 2002
*Topic Paper No. 6: Techniques and Criteria for Judging Capacity and Sensitivity*, The Countryside Agency, 2004
[24] *Guide to Best Practice in Seascape Assessment*, Maritime Ireland/Wales INTERREG 1994-1999, March 2001, Countryside Council for Wales, Brady Shipman Martin, University College Dublin
*An approach to Seascape Character Assessment* (NECR105), Natural England, October 2012
[25] *Environmental Impact Assessment (EIA): Guidance Note on Terrestrial Impacts*, Marine Management Organisation (MMO), April 2012

Clearly defined terms should be used and described to define sensitivity, impacts and effects, with their provenance ascertained, with reference to GLVIA and the relevant national guidance.

The study area should also be defined. The study area should include the proposed development site and the extent of the wider landscape and seascape around it, in which the proposed development may influence. Other tools such as computer generated Zones of Theoretical Visibility (ZTVs) could also be used to define the potential influence of the proposed development.

The study area should be described and be appropriate to the scale of the proposed development. Agreement on the scale of the assessment including the extent of the study area should be agreed with MMO and could be related to the scale of the project (potentially larger projects will have impacts across larger areas).

The ESs reviewed have covered a diverse range of study areas, conforming to the relevant guidance appropriate to their geographical location as well as project specific. For example, wind farm related projects generally follow Scottish Natural Heritage guidance[26] on setting the scope of the assessment and the extent of study area, in the absence of any similar national guidance in England, Wales or Northern Ireland.

**Stage 4: Setting the baseline**

This existing landscape and seascape character within a defined and agreed study area should be described. The description of the existing situation provides a baseline upon which the potential impacts (whether direct or indirect) of a proposed development project on the landscape and seascape can be ascertained.

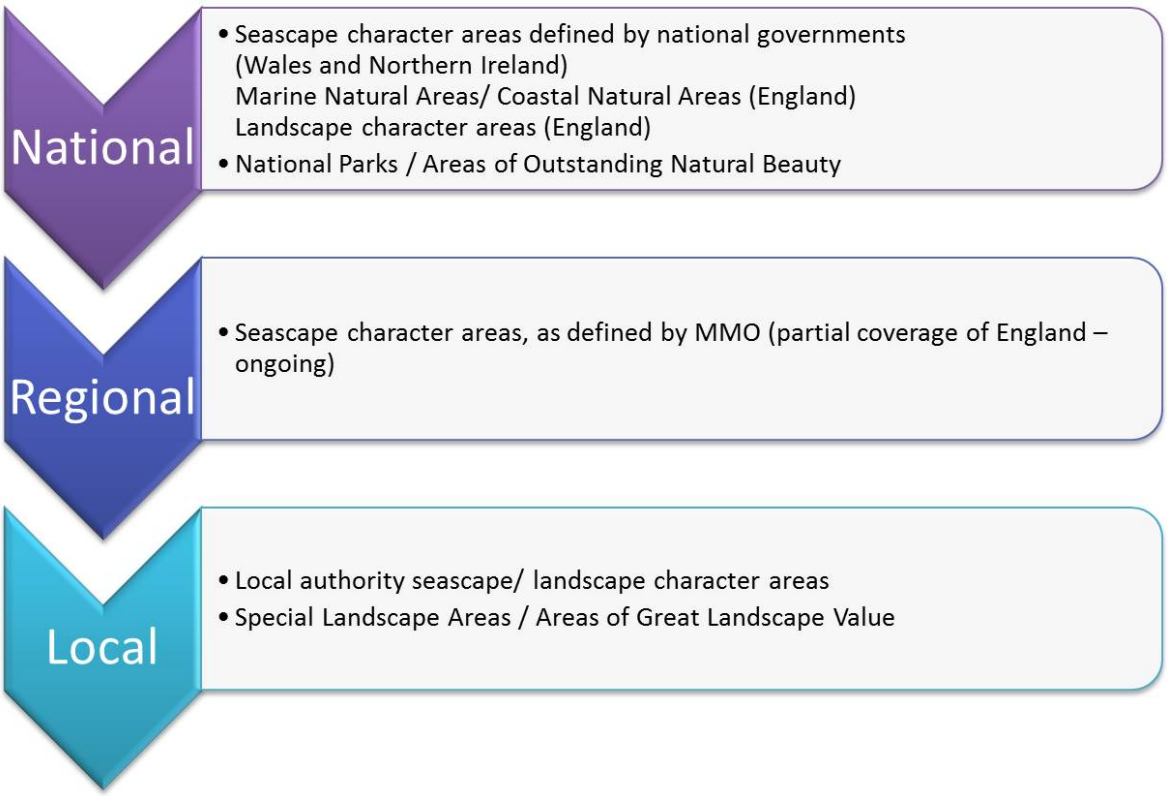
With reference to MPS, "*in considering the impact of an activity or development on seascape, the marine plan authority should take into account existing character and quality, how highly it is valued and its capacity to accommodate change specific to any development. Landscape Character Assessment methodology may be an aid to this process*."

Reference should be made to previously published landscape and seascape assessments to define the key baseline characteristics, including reference to landscape relevant designations, at a national, regional and local level. MPS recommends "*for any development proposed within or relatively close to nationally designated areas the marine plan authority should have regard to the specific statutory purposes of the designated areas."*

A summary of potential baseline information is outlined in Figure 9.

[26] *Visual Representation of Windfarms: Good Practice Guidance*, Scottish Natural Heritage, March 2006

**Figure 9: Hierarchy of baseline information.**




The baseline for a landscape and seascape assessment should include:

- Description of the national landscape and /or seascape character areas, as defined by England, Wales and Northern Ireland[27]. This information provides a setting for the proposed project development and for the more detailed assessment of landscape and seascape character. Marine Natural Areas[28] and Coastal Natural Areas[29] may also be referenced and support the baseline assessment, depending on the location and type of the proposed development.
- Regional seascape character areas, where available[30];

[27] Natural England national character area
http://www.naturalengland.org.uk/publications/nca/searchpage.aspx
Welsh seascapes and their sensitivity to offshore development, Countryside Council for Wales
http://www.ccgc.gov.uk/landscape--wildlife/protecting-our-landscape/seascapes/seascape-assessment-of-wales.aspx
*Northern Ireland Regional Seascape Character Assessment*, Research and Development Series No 14/01, ISSN 1751-7796, Northern Ireland Environment Agency, Department of Environment, 2014
[28] Natural England marine natural areas
http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/englands/marinenaturalareas.aspx
[29] Natural England coastal natural areas
http://www.naturalareas.naturalengland.org.uk/Science/natural/NA_search.asp
[30] *Seascape Characterisation around the English Coast (Marine Plan Areas 3 and 4 and Part of Area 6 Pilot Study*, (NECR106), Natural England, October 2012
*Seascape character area assessment East Inshore and East Offshore Marine Plan Areas*, Marine Management Organisation, July 2012

- Local landscape/seascape character areas. Many local authorities have compiled their own landscape/seascape assessments to define local characteristics, based on a hierarchy of assessment at a regional and national scale.
- Landscape relevant designations to help determine sensitivity and should be assessed in combination with any previously published landscape and seascape assessments to define the existing situation. Examples of landscape relevant designations include National Parks and Areas of Outstanding Natural Beauty (AONB) as well as more local designations such as Special Landscape Areas and Areas of Great Landscape Value. This should also include information on relevant strategic policies and plans.
- Views from people (visual amenity receptors) within the study area that may be affected by the proposed project development could also be described. Examples of visual amenity receptors are identified below:
    - Residential properties including towns and villages as well as scattered houses and farms
    - Public rights of way, including national trails, recreational routes, national cycle routes, local public rights of way, bridleways and cycle routes;
    - Open access areas and Registered Common Land
    - Transport corridors including major and minor roads, navigable rivers and canals and railway lines
    - Other publicly accessible locations.

Information ascertained through site survey and consultation could also be included.

**Stage 5: Defining mitigation measures**
Mitigation measures should be proposed to prevent, reduce or compensate for any potential effects during key stages of the proposed development. This includes:

- Stage 5A – during the design phase - MPS recommends that "*the design of a development should be taken into account as an aid to mitigation."* Mitigation measures should be developed through the iterative design process, in combination with other topics. Mitigation measures should be embedded and integrated into the project design and could inform the location of the proposed development as well as the design.
- Stage 5B – during construction and operation (de-commissioning may also be a factor, for example with off-shore wind farms). Standard management practices for avoiding and reducing effects should be included.
- Stage 5C – As part of the design – designed to address any residual adverse effects, for example screening of the proposed development through planting, earthworks, etc.

**Stage 6: Impact assessment**
The potential impacts and effects of the proposed development project should be described.

The key difference between a landscape and seascape assessment for a proposed development that has been screened as an EIA development and a non-EIA development, is the determination of the 'significance' of effects which is required for an EIA development.

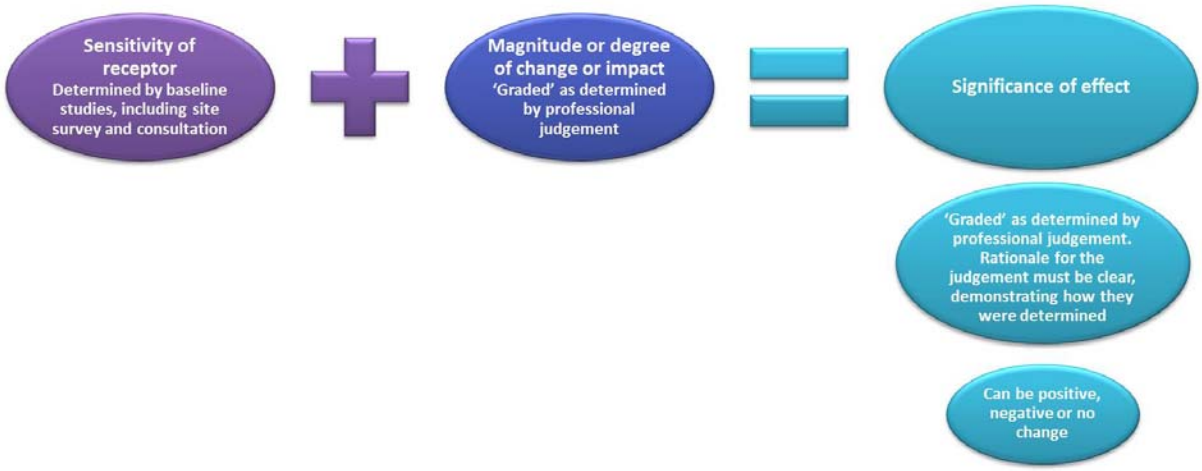
The impact of marine activities on landscape and seascape can be:

- Direct (e.g. construction of a port could lead to loss of landscape and seascape features)
- Indirect impacts(e.g. an off-shore wind farm could influence the setting of the wider landscape and seascape).

Most of the ESs reviewed to date include consideration of landscape and seascape but these are largely limited to wind farm proposals. The ESs reviewed follow GLVIA, the industry standard guidance and largely include consideration of the magnitude of impact balanced against the sensitivity of the receptor (assessed at the baseline stage) to determine the significance of effect.

This process is outlined in Figure 10.

**Figure 10: Determination of impacts and effects.**




There is no strict guidance on how sensitivity, impacts and effects are defined. They are based on the interpretation of the various guidance by the experienced professional undertaking the assessment but are usually based on a grading of sensitivity (such as high, medium, low) and magnitude of impact (high, medium, low or minor, moderate, major, etc.) to determine effect (neutral/no change, minor, moderate, major, etc.).

It is generally considered best practice to define these terms in the methodology – but overall the determination of impacts and effects of the proposed development are through the interpretation of the professional judgement.

**Stage 7: Summarising the results**

The same broad principles for presenting landscape and seascape assessments apply for all scales and types of development.

Landscape and seascape assessments can often be long and contain too much information – so the ‘point’ of the assessment can often be lost amidst ‘unnecessary’ information.

The landscape and seascape assessment should:

- Be proportionate to the scale of the proposed development.
- Be impartial and dispassionate.
- Present the information and reasoning in an accurate and balanced way.
- Contain appropriate illustrative material.
- Tables and matrices related to judgements should be used to support and to summarise narrative descriptive text rather than replace it.

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# Annex 1. Recreational and Tourism Values

**Table A1. 1: Summary of valuation studies and methods.**

| Study | Location | Activity | Method of Valuation | Change Valued | Value |
|---|---|---|---|---|---|
| Bosetti and Pearce (2003): A study of environmental conflict: the economic value of grey seals in South West England | South West England | Seal watching | Non-market based: Contingent valuation | None: baseline value | Willingness to Pay (WTP) to visit seal sanctuary = £8.48 (for those at seal sanctuary - casting back to before they visited) and £9.75 for those on the boat trips. Willingness to pay to see seals in the wild = £12.49 for those at the sanctuary and £6.75 for those on seal trip. Mean WTP for seeing seals at a seal sanctuary = £8.13 and for seeing seals in the wild = £8.84 (all respondents) (2003 £) |
| Chae *et al*. (2012): Recreational benefits from a marine protected area: A travel cost analysis of Lundy. Tourism Management, Vol. 33, pp. 971-977. | Lundy (UK) | Recreational | Non-market based: Travel cost method | None: current baseline | Estimated mean consumer surplus for visiting Lundy was found to range from £359 to £574 per trip. |
| Davies *et al.* (2010): The Value of Tourism Expenditure related to the East of Scotland Bottlenose Dolphin Population | East of Scotland | Wildlife watching: Dolphins | Market based: Survey of visitors' expenditure and business surveys | None: baseline value | Total direct expenditures related to the bottlenose dolphin population are estimated to be at least £10.4 million (2009 £). Adjusting for additionality the total income from direct tourism expenditure in Scotland reliant solely on the east of Scotland bottlenose dolphin population is therefore considered to be at least £4 million, providing approximately 202 Full-time Equivalent (FTE) jobs. |

| Study | Location | Activity | Method of Valuation | Change Valued | Value |
|---|---|---|---|---|---|
| Drew Associates (2004): Research into the Economic Contribution of Sea Angling. Drew Associates Report prepared for Defra. | England and Wales | Angling | Non-market: Revealed preference (travel cost) and stated preference (contingent valuation and choice experiments) methods | Different size and variety of catch | Value estimates from the travel cost analysis ranged from approximately £26 to £110 per day per angler (depending on the type of activity). Values from the stated preference survey (contingent valuation) ranged from £38 per shore angler to £885 per private boat angler per year.<br>Anglers were WTP more for larger fish (£0.22 per 1% increase in size) and greater diversity of catch (£11.38 to catch different species from those usually caught). However, only shore anglers were willing to pay for more fish (£0.81 per extra fish caught). |
| Glasgow Caledonian University *et al*. (2009): Economic Impact of Recreational Sea Angling in Scotland. | Scotland | Angling | Market based: Business surveys | None: baseline value | Estimates that sea angling in Scotland supported 3,148 jobs (FTEs) and contributed £69,670,000 to household income (including wages, self-employment income, rents and profits) |
| Hoyt (1995): The Worldwide Value and Extent of Whale Watching | World Wide | Wildlife watching: Cetaceans | Market based: Business surveys | None: baseline value | In the UK total revenue was £192,000 in 1991 compared with £6,500,000 in 1994. |
| ICRT and The Yorkshire Wildlife Trust (2010): Economic Potential of Nature Tourism in Eastern Yorkshire, Final report to the Yorkshire Wildlife Trust | Eastern Yorkshire | Nature Tourism | Market based: Business surveys | None: baseline value of wildlife/ecotourism on the local economy | Currently generates between £9 and £10 million for the area's economy and supports somewhere in the region of 170 jobs. |
| IFAW (2009): Whale watching worldwide, tourism numbers, expenditures and expanding economic benefits | World Wide | Wildlife watching: Whale watching | Market based: Surveys of visitors' expenditure and business surveys | None: baseline value | UK: 76 operators, total expenditure = $21,439,003;<br>England: 8 operators, total expenditure = $589,076, average trip ticket price = $51pp;<br>Scotland: 51 operators, total expenditure = $18,243,202, average trip ticket price = $43pp;<br>Wales: 17 operators, total expenditure = $2,606,724, average trip ticket price = $47pp (2008 $) |

| Study | Location | Activity | Method of Valuation | Change Valued | Value |
|---|---|---|---|---|---|
| King O (1995): Estimating the value of marine resources: a marine recreation case, Ocean and Coastal Management. Vol. 27, No. 1-2, pp. 129-141. | Eastbourne | Recreational beach activity | Non-market: Contingent valuation | WTP for improved water and beach quality resulting from prevention of oil pollution. | Mean WTP was £2.02 per visit for residents, followed by £1.67 and £1.61 each for overnight and day visitors (sample average of £1.93). |
| Lawrence K S (2005): Assessing the value of recreational sea angling in South West England. Fisheries Management and Ecology, Volume 12, Issue 6, pages 369–375. | South West England | Angling | Non-market: Choice experiment | Change in value based on: average catch per day (favourite species), average catch per day (other species), size of fish, bag/rod limit, quality of the surrounding environment and cost per day. | Overall, increasing the size of individual fish would have a larger impact than increasing the catch per day, although this varies by species.<br>Willing to pay to increase their catch of the favourite species from nil to one fish per day = £13.56.<br><br>However, willingness to pay (WTP) decreased with each additional fish caught, depicting diminishing returns to scale scenario. Marginal WTP for additional fish, other than a favourite species, was less. Size of individual fish was also valued by anglers; WTP averaged at £13.27 per trip for a 50% increase in size.<br><br>Overall, anglers had a marginal preference for sites without rod/bag limits, but this result was statistically insignificant. Similarly, anglers would pay only a small amount for an improvement in environmental quality from satisfactory to excellent, and this was also statistically insignificant. |

| Study | Location | Activity | Method of Valuation | Change Valued | Value |
|---|---|---|---|---|---|
| McVittie A and Moran D (2010): Valuing the non-use benefits of marine conservation zones: An application to the UK Marine Bill. Ecological Economics, Vol. 70, pp. 413-424. | UK | Marine conservation | Non-market: Choice experiment | Choice experiment investigated monetary benefit that households' would derive from halting loss of marine biodiversity, from increasing marine biodiversity and for the provision of other environmental services relative to current trajectories of decline. | £69.50 per household per year (phpy) to halt the loss of marine biodiversity and £4 phpy to impose moderate restrictions on resource extraction in the proposed MCZs. |
| Parsons ECM *et al*. (2003): The value of conserving whales: the impacts of cetacean related tourism on the economy of rural West Scotland | West Scotland | Wildlife Watching: Cetaceans | Market-based: Surveys of visitors' expenditure and business surveys | None: baseline value | In the west Scotland region 59 FTE jobs and 1 part-time job was created as the direct result of cetacean-related tourism. The direct economic income from cetacean tourism activities was estimated to be £1.8 million per annum, tourist related spend in the region was £7.6 million and an additional £1.4 million as the result of extra nights spent in the region (2000 £). |
| Pett, M. (2006), Assessing the Value of Marine Protected Areas in the UK: A Contingent Valuation Study of Lundy Marine Nature Reserve, unpublished master's thesis, Imperial College, London. | Lundy UK | Recreational | Non-market: Contingent valuation survey | To fund conservation activities on the island | The mean additional WTP to fund conservation activities is estimated at £5.09. Respondents were WTP an additional £24 in tax per year for the creational of additional MNRs. |

| Study | Location | Activity | Method of Valuation | Change Valued | Value |
|---|---|---|---|---|---|
| Rayment *et al.* (2000): Valuing Norfolk's Coast. The Economic Benefits of Environmental and Wildlife Tourism | UK | Wildlife watching | Market-based: Survey of visitors' expenditure | None: baseline value | Average expenditure per person per day for bird and wildlife viewing = £16.89 (1999 £) |
| Rees SE *et al.* (2010): Is there a win-win scenario for marine nature conservation? A case study of Lyme Bay, England. | Lyme Bay | Diving, sea angling and wildlife watching | Market-based: Expenditure of visitors | None: baseline value | £1m expenditure by divers through trips and total turnover for recreation estimated at £18m |
| RSPB (2010): The Local Value of Seabirds; Estimating spending by visitors to RSPB coastal reserves and associated local economic impact attributable to seabirds. | UK | Wildlife Watching: Birds | Market: Survey of visitors' expenditure | None: baseline value | The cost attributable to seabirds per person per day was £3.17 to £9.42 for day-trippers and £5.22 and £16.53 for holiday makers. The projected number of jobs supported for 2009 was estimated from 3.3 to 21.55 for 4 sites. |

<table>
<tr><th>Study</th><th>Location</th><th>Activity</th><th>Method of Valuation</th><th>Change Valued</th><th>Value</th></tr>
<tr>
<td>Ruiz-Frau et al. (2013): Spatially explicit economic assessment of cultural ecosystem services: non-extractive recreational uses of the coastal environment related to marine biodiversity, Marine Policy 38 (2013) 90–98.</td>
<td>Wales</td>
<td>Various (diving, kayaking, wildlife watching)</td>
<td>Non-market and market based: It presents the results of a choice experiment aimed at understanding people’s preferences for MPAs in Wales in terms of level of marine biodiversity, presence of a MPA travel cost and time and other factors for different recreational activities. It also reports visitors’ expenditure (the average spend for each activity was calculated using information collected for the expenditure incurred on food and drink, accommodation, travel costs and the total duration of the activity visit)</td>
<td>None: current baseline</td>
<td>Diving trip: £71 ± 44 (95% C.I. £64, £78) per person per day (pppd).<br>Sea-kayaking: £27 ± 24 (95% C.I. £23, £32) pppd.<br>Wildlife viewing trip: £44 ± 27 (95% C.I. £39.7, £48.5) pppd.<br>Seabird watching day: £28 ± 30 (95% C.I. £22, £34) pppd.<br>The results of the CE are given below by activity (as % of respondents categorising it as “very important”).
<table>
<tr><th>Scuba Diving</th><th>Sea Kayaking</th><th>Wildlife watching boat trips</th><th>Seabird watching</th></tr>
<tr><td>Level of marine Biodiversity (53%)<br>Presence of a MPA (31%)<br>Presence of wrecks (24%)<br>Travel cost (21%)<br>Travel time (18%)</td><td>Weather conditions (59%)<br>Marine biodiversity (33%)<br>Travel time and costs (20%)</td><td>Viewing marine wildlife (74%)<br>Enjoyment of the scenery (60%)<br>Ability to see marine Mammals and particular Species of seabirds (high importance)</td><td>High abundance of seabirds (51%)<br>Presence of rare species (28%)<br>Presence of a MPAs (23% ‘Very important)<br>Travel time (21%)<br>Travel costs (12%)</td></tr>
</table>
</td>
</tr>
</table>

| Study | Location | Activity | Method of Valuation | Change Valued | Value |
|---|---|---|---|---|---|
| Warburton C (1999): Marine Wildlife Tourism and Whale-watching on the Island of Mull, West Scotland. Project commissioned by the Hebridean Whale and Dolphin Trust, Mull. | Island of Mull, West Scotland. | Wildlife watching: Whale watching | Market based: Surveys of visitors' expenditure and survey of businesses. | None: baseline value | An average of £16.67 was spent on whale and dolphin souvenirs. Marine wildlife tourism contributes £0.65 million to the economy of Mull with 21 people employed as a result (1999 £) |
| Charting Progress – Productive Seas – Section 3.6 – Leisure and Recreation (http://chartingprogress.defra.gov.uk/feeder/PSEG-feeder.pdf) | Whitsand Bay, Cornwall | Diving. | Market based: expenditure by divers | Benefits of constructing an artificial reef (increased expenditure as a result of sinking the HMS Scylla in 2004) | Additional expenditure from the first season of diving was estimated at £1.4 million. This was made up of:<br>•Direct spending of around £9,000<br>•Capital spending by clubs, centres and charter boats of £153,000<br>•Revenue spending by clubs, centres and charter boats of £276,000 including wage costs<br>•Diver spending in tourism related businesses of £938,000. |

# Annex 2. Annotated Bibliography

## Existing guidance and methodologies

### ABPmer and RPA (2012a): Socio-economic Baseline Review Methodology and Data Gap Analysis for Offshore Renewables in Scottish Waters

**Keywords**: Gross Value Added, Turnover, Replacement Cost, Avoidance Cost

This study provides a socio-economic baseline review and data gap analysis for offshore renewables in Scottish waters. For the purposes of the baseline review, the following categories of relevance to offshore wind, wave and tidal developments are identified (Section 2.1):

*Aquaculture (finfish and shellfish); Aviation; Carbon Capture and Storage; Coast Protection and Flood Defence; Commercial Fisheries (including salmon and sea trout); Energy Generation (and offshore renewables supply chains); Military Interests; Oil and Gas (including exploration, production, interconnectors, gas storage); Ports and Harbours; Power Interconnectors; Recreational Boating; Shipping; Social and Community (including population, income, index of deprivation, economic activity, community wellbeing, education and skills, health and housing); Telecom Cables; Tourism (including heritage assets); Waste Disposal (dredge material); and Water Sports.*

According to this report, the following information should be included in a baseline review:

- Distribution, level and intensity of marine uses and interests, including an indication of how they have changed over last decade
- Specific information identified as necessary from the scoping of interactions;
- Map of spatial distribution of existing activity
- Current and recent economic values and employment–using the most recent available data
- Future trends.

Sections 4 and 5 of the report provide a review of specific data gaps where the absence of suitable baseline data might significantly compromise the preparation of regional scale impact assessments for future sectoral plans for offshore wind or wave and tidal energy and provide suggestions on how to address these data gaps.

### ABP Mer and RPA (2012b): A Socioeconomic Methodology and Baseline for Pentland Firth and Orkney Waters Wave and Tidal Developments

**Keywords**: Gross Value Added, Gross Domestic Product, Full-time Equivalent, Input-Output, Net Present Value, Baseline, Displacement, Amenity, Spillover Benefit, Bottom-up, Top-down.

This report identifies the potential positive and negative socio-economic impacts from the Pentland Firth and Orkney Waters (PFOW) wave and tidal developments

projects and presents a common approach, with associated methodologies, that can be adopted by developers in carrying out a socio-economic impact assessment in a marine context. This includes assessments both in relation to individual projects and in terms of cumulative effects associated with other projects.

Sections 2 and 3 provide an overview of key benefits and disbenefits likely to arise from PFOW projects, together with key socio-economic impacts and suggestions on how these could be assessed. A summary of benefits/disbenefits and suggested approaches to impact assessment are provided in Table A2. 1 and Table A2. 2 below (based on Tables 2 and 3 from the report).

**Table A2. 1: Suggested Approaches to Assessing Potential Benefits.**

| Benefit | Potential Socio-Economic Consequence | How Socio-Economic Impact could be Assessed |
|---|---|---|
| Supply Chain | Increased employment and Gross Value Added (GVA) | Estimated number of jobs created/sustained and estimated increase in GVA from expenditure (value and location) |
| Carbon emissions avoided | Carbon savings | Gross carbon savings compared to a standard baseline |
| Improvements to existing infrastructure, facilities and services e.g. airport facilities, flights, port facilities, hotel facilities, etc. | Increased employment and GVA, increased investor confidence, increased potential for economic growth | Qualitative identification of relevant benefits |
| Benefits to other marine users and interests e.g. increased hotel occupancy, improved facilities for marine users | Increased employment and GVA; increased investor confidence, increased potential for economic growth | Only consider where supporting actions being implemented |
| Social benefits | Increased employment, education and skills, quality of life | Jobs created/sustained (see Supply chain above); qualitative assessment of changes in education/skills and quality of life |
| Increased knowledge as a result of research and development in wave and tidal technologies and from environmental surveys | Increased investor confidence; increased potential for economic growth and export opportunities | Qualitative description of benefits |

| Benefit | Potential Socio-Economic Consequence | How Socio-Economic Impact could be Assessed |
|---|---|---|
| Supply chain development/clustering increasing the UK's ability to service future domestic and international demand | Increased investor confidence; clustering significantly increases potential for economic growth and export opportunities | Qualitative description of benefits |
| Improvements to energy security | Increased domestic supply and economic resilience | Qualitative description of benefits |

**Table A2. 2: Suggested Approaches to Assessing Potential Negative Impacts.**

| Sector / Interest | Potential Impact | Potential Socio-Economic Consequence | How Socio-Economic Impact could be Assessed |
|---|---|---|---|
| Commercial Fisheries | Loss of or displacement from traditional fishing grounds | Reduction in landings | Quantify potential displacement effect in terms of fish landings |
| | Disturbance of mobile species and disruption or damage to habitats, nursery and spawning grounds | Reduction in landings/Catch per Unit Effort (CPUE) | Assessment of species and habitats within EIA/HRA procedures |
| | Obstruction of navigation routes | Increased steaming times for vessels | Assessment of number of vessels affected and scale of deviation |
| | Fouling of fishing gear on cables or seabed infrastructure | Loss of fishing gear | Assessment of potential frequency of fouling events |
| | Consequential impacts to fish processors | Loss of profit for fish processors | Assessment of significance of any reduction in landings to fish producers |
| Commercial Shipping | Obstruction of transiting vessel/ ferry routes; Increased steaming distances/time | Increased costs; increased insurance costs | Assess potential additional steaming distances/times |
| | Reduced turnaround times | Increased costs | Site specific consideration with operator |

| Sector / Interest | Potential Impact | Potential Socio-Economic Consequence | How Socio-Economic Impact could be Assessed |
|---|---|---|---|
| | Displacement of anchorage areas | Increased costs | Assess potential additional steaming/time costs for alternative anchorages |
| Ports and Harbours | Obstruction of existing navigation routes | Loss of customers and revenue; increased costs associated with maintaining alternative routes | Discussions with individual port authority |
| | Reduced development opportunities | Loss of customers and revenue (long-term); increased costs associated with development | Discussions with individual port authority |
| | Loss or reduced use of dredge material disposal sites | Increased costs of disposal | Discussions with individual port authority |
| Tourism (including ecotourism, archaeological heritage) | Impacts to landscape or seascape | Reduction in tourism income | Assess significance of changes through LVIA; consultation with stakeholders |
| | Changes to the local character of an area | Reduction in tourism income | Assess significance of changes through LVIA; consultation with stakeholders |
| | Disturbance or injury to coastal or marine wildlife | Reduction in income for ecotourism businesses | Assessment of impacts to sensitive receptors e.g. marine mammals; consultation with stakeholders |
| | Disturbance or damage to heritage assets | Reduction in visitor attraction income; reduction in wider tourism income | Assessment of consequences for visitor attraction income; consultation with stakeholders |
| | Disruption to site access | Reduction in attraction income | Assessment within traffic impact assessment; consultation with affected parties |

| Sector / Interest | Potential Impact | Potential Socio-Economic Consequence | How Socio-Economic Impact could be Assessed |
|---|---|---|---|
| Recreational Boating | Alterations to informal cruising routes | Increased fuel costs for motorised vessels; possible relocation of vessels leading to loss of revenues for supply chain | Assess potential additional fuel costs; consultation with stakeholders |
| | Deterrent to investment in marinas/supply chain | Reduced investment | Consultation with recreational boating sector |
| Water sports including recreational angling, surfing, windsurfing, kayaking and diving | Impacts to seascape/setting | Loss of revenue for supply chains | Assessment of visual impact within EIA/HRA process; assessment of potential displacement in consultation with stakeholders |
| | Displacement or obstruction of water sports activity | Loss of revenue for supply chains | Assessment of potential displacement in consultation with stakeholders |
| | Collision risk for humans or vessels | Loss of revenue for supply chains | Assessment of potential displacement in consultation with stakeholders |
| | Impacts to wave quality (surfing) | Loss of revenue for supply chain | Assessment of potential displacement in consultation with stakeholders |
| | Impacts to fish resources (angling) | Loss of revenue for supply chain | Assessment of fish species within EIA/HRA process |
| Cables and Pipelines | Competition for space | Increased costs associated with new cable or pipeline laying operations; | Consultation with asset owners/operators |

| Sector / Interest | Potential Impact | Potential Socio-Economic Consequence | How Socio-Economic Impact could be Assessed |
|---|---|---|---|
| | Increased difficulty of access | increased maintenance costs for cable and pipeline owners; loss of revenue for asset owners; loss of revenue for dependent businesses/ customers | Consultation with asset owners/operators |
| Social Impacts | Local employment | Reduction in employment opportunities | Based on any negative impacts to other sectors |
| | Infrastructure | Pressure on existing infrastructure | Potential demand in relation to capacity (health services, schools) |
| | Housing availability | Pressure on housing availability leading to increased housing prices | Potential housing demand in relation to capacity |
| | Quality of life | Reduction in welfare | Quality of life indicators |
| | Landscape/ seascape | Reduction in visitor attraction income; reduction in wider tourism income | Assessment of landscape/seascape within EIA process |

Annex B presents readily available existing baseline information for those sectors and interests scoped into the socio-economic assessment and a gap analysis for baseline information is provided in Section 4. Although much of the data provided in Annex B relates specifically to the PFOW region (or Scotland more generally), some data are transferable to other regions and many of the sources listed in this report would provide data and information on areas covered by the MMO.

### Atkins *et al*. (2010): Systemic Insights into the Management of Ecosystem Services in the Marine Environment

**Keywords**: Ecosystem Services, Production Function Analysis, Net Factor Income, Replacement/Substitution Cost, Market Analysis, Cost-of-Illness, Travel Cost Method, Hedonic Pricing, Contingent Valuation Method, Choice Experiment Method, Damage Avoidance Costs, Productivity Gains and Losses, Defensive Expenditure Costs.

This paper centres on the application of the Ecosystem Approach (EsA) in the management of the marine environment, involving the identification of multi-stakeholder needs and uses of ecosystem services. It provides an overview of the

DPSIR analytical framework and a literature review on ecosystem services provided by the marine environment. Importantly this paper provides a review of approaches to valuing ecosystem services in a marine context. It also provides case studies on the application of the ecosystem services approach to the management of coastal biodiversity and marine aggregates extraction.

**Briggs, J. and S. White, (2009): Welsh seascapes and their sensitivity to offshore developments: Method Report. Countryside Council for Wales**
Available at: http://www.ccgc.gov.uk/landscape--wildlife/protecting-our-landscape/seascapes/seascape-assessment-of-wales.aspx

**Keywords:** Seascape, Sensitivity, Visibility Patterns, Landscape Designations

This study presents the first detailed assessment of the character of Wales's seascapes. It was carried out at a regional scale, producing 50 regional seascape units to cover the whole of Wales. Each unit comprises a section of coastal landscape between major headlands, and also includes a defined visual setting zone, running both landward and seaward from the coastline. The study systematically describes the key characteristics and special qualities of each seascape, producing a baseline of information of relevance to a wide variety of spatial planning uses (both marine and terrestrial).

**Countryside Council for Wales (2001): Guide to Best Practice in Seascape Assessment**
Available at: http://www.ccw.gov.uk/landscape--wildlife/protecting-our-landscape/seascapes.aspx

**Keywords:** Seascape Units, Visual Movement, LANDMAP

This guidance relates to a study of the seascapes in Wales and Ireland. Including:

- Seascape Fundamentals
- Seascape Assessment
- Seascape Characterisation
- Evaluation and Judgement.

The Guide to Best Practice in Seascape Assessment sets out the special techniques and needs of seascape assessment. It explains how to assess and evaluate visual effects at sea and along the coast arising from the special expectations which humans have of the marine environment. These include factors such as horizon, sea and sky colour, headlands and bays, islands, ships, the special effect of lighting across the sea, recession with distance etc. Some of this advice will also apply to large inland water bodies There are several "dos" and "don'ts" connected with the placing of offshore structures and groups of structures in relation to:

- Headlands and bays
- Wilderness and developed coasts
- Each other
- The position of the horizon

- The way in which the eye scales offshore objects;
- Natural lighting and colour, navigation and operational lighting.

The need for Seascape Assessment:

Seascape assessment is intended to assist policy formulation, decision making and project inception along the coast and in the sea.

Seascape assessment is an extension of landscape character assessment rather than a specialism in its own right. It does not replace the need for a thorough landscape assessment on land.

The guidelines should be of assistance in the following instances:

- To identify the areas which form the components of seascape.
- To identify the essential elements in determining the character and quality of the coast.
- To assist in the strategic, regional and local planning of coasts and the adjoining marine environment, and assist in coastal zone management.
- As a starting point to evaluate change, and provide a basis for evaluating potential coastal development and developments below the high-water line including coastal defence works, aquaculture schemes and wind farms.
- To assist in the preparation of Environmental Impact Statements related to coastal and marine projects.
- To contribute to the design process by identifying issues and potential problems which are amenable to mitigation and avoid abortive work.

Some crucial elements in seascape are common to landscape assessment. There are other elements however, that are significantly different or entirely absent in landscape assessment.

These are:

- The effect of historic and cultural issues related to the marine environment
- The coast as an edge
- Variability and dynamism
- Difficulties of scale and distance
- Principles of visual movement
- Amenity functions and uses of the seashore
- Functions and uses of the sea.

If a landscape assessment already exists for the study area, it should be fed into the seascape assessment, along with any landscape and planning policies.

### DECC (2013): Carbon Valuation

Available at: https://www.gov.uk/government/collections/carbon-valuation--2

**Keywords**: Social Cost of Carbon, Evaluation.

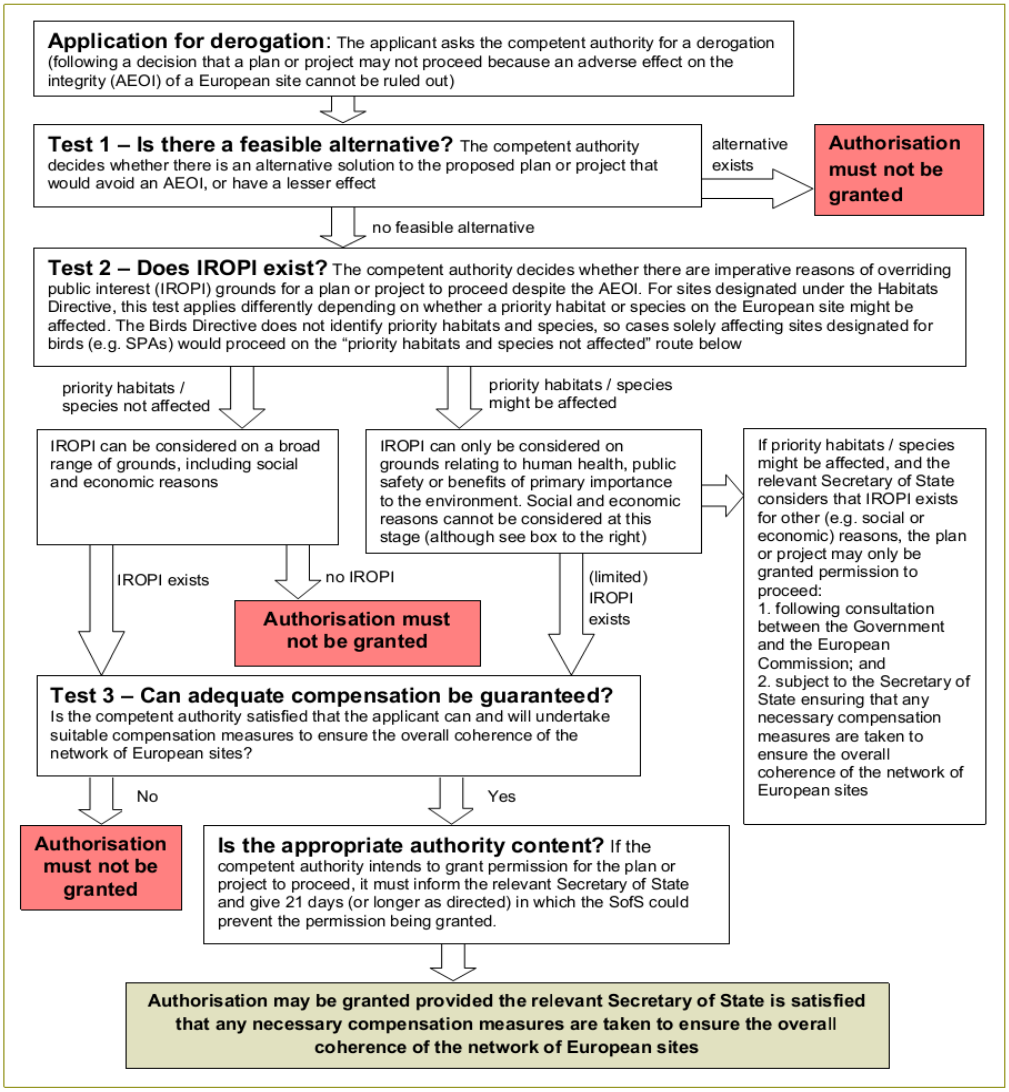
Government webpage providing the most recent agreed set of carbon values to be used in UK policy appraisal and evaluation.

**Defra (2012): Habitats and Wild Birds Directives: guidance on the application of article 6(4) Alternative solutions, imperative reasons of overriding public interest (IROPI) and compensatory measures, December 2012**
Available at:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69622/pb13840-habitats-iropi-guide-20121211.pdf

**Keywords:** European Sites, Alternative Solutions, IROPI, Compensation, Environmental Impacts, Socio-economic Impacts

This guidance sets out a procedure to allow derogations, according to Article 6(4) of the Habitats Directive, in cases where a project may have an Adverse Effect on the Integrity (AEoI) of a European site but still be allowed to go ahead.

**Figure A2. 1: The derogations process for European sites.**



### Defra Ecosystem Services (2013): Guidance for policy and decision makers on using an ecosystems approach and valuing ecosystem services

Available at: https://www.gov.uk/ecosystems-services

**Keywords:** Ecosystem, UK National Ecosystem Assessment, Decision

The UK National Ecosystem Assessment provided the first analysis of the UK's natural environment in terms of the benefits it provides to society and our continuing economic prosperity. Its findings indicate that ecosystems and ecosystem services, and the ways people benefit from them, have changed markedly in the past 60 years, driven by changes in society.

It also cites that the UK's ecosystems are delivering some services well, but others are still in long-term decline. Research is underway to investigate the mix of future actions likely to secure the most benefits for nature and for people from our ecosystems. It will also develop practical tools to assist decision-makers in applying the lessons of the National Ecosystem Assessment.

### Department of Trade and Industry (DTI) (2005): Guidance on the Assessment of the Impact of Offshore Wind Farms: Seascape and Visual Impact Report

Available at:
http://webarchive.nationalarchives.gov.uk/+/http://www.berr.gov.uk/files/file22852.pdf

**Keywords:** Seascape, Visual Impact, Sensitivity, Landscape Character

This guidance makes recommendations on how to assess and deal with the Seascape and Visual Impact Assessment (SVIA) element of an EIA for an offshore wind farm development.

Seascape effects are the changes in the character and quality of the seascape as a result of development. Hence seascape assessment is concerned with direct and indirect effects upon specific seascape elements and features; more subtle effects on seascape character; and effects upon acknowledged special interests such as designated landscapes for their scenery, wildness or tranquillity. Section 4 of this report discusses the baseline study needed for a Seascape Assessment.

Definition of Seascape: This guidance broadens the concept to mean a term for: "the coastal landscape and adjoining areas of open water, including views from land to sea, from sea to land and along the coastline", and describes "the effect on landscape at the confluence of sea and land".

In Wales this distinction is already understood through the term "Morweddau".

Thus, for the purpose of this guidance, 'seascape' is defined as a discrete area within which there is shared inter-visibility between land and sea (a single visual envelope).

Every seascape therefore has 3 defined components:

- An area of sea (the seaward component)
- A length of coastline (the coastline component)

- An area of land (the landward component).

### Dickie *et al.* (2011): Including the Socio-Economic Impacts of Marine Aggregate Dredging in Decision-Making

Available at:
http://www.cefas.defra.gov.uk/media/462749/mepf%2009%20p104%20annex%20b.pdf

**Keywords:** Sensitivity Analysis, Non-monetised Impacts, Fixed Cost, Variable Cost, Environmental Impact Assessment, Value Added, Gross Value Added, Opportunity Cost, Displacement, Turnover, Shadow Cost, Willingness-to-Pay, Multipliers, Wider Economic Impact, Ecosystem Function, Ecosystem Service.

This study provides a framework to allow marine aggregates extraction options to be analysed using socio-economic information showing the interactions between different uses of the marine environment at both local and regional levels and the data requirements for such a framework. Building on previous work, this framework aims specifically to demonstrate how socio-economic information can be used within EIAs of marine dredging licences. The framework is tested through application to a 'real world' example (the Outer Thames Estuary).

The report provides a generic nine step process to account for socio-economic effects associated with the use of marine resources:

1. Define baseline
2. Identify management options
3. Define and measure impacts
4. Identify human population
5. Value
6. Calculate impacts and values over time
7. Sensitivity analysis
8. Account for non-monetised impacts
9. Reporting.

The data/information requirements relating to each decision-making context are characterised as:

- ***Physical***: data across all sectors relating to the environment/resources (oceanographic data along with data relating to the extent of resources, e.g. potential tonnage of marine aggregates) at a site, local, regional or national level, including over short and long terms.
- ***Environmental***: data relating to environmental indicators such as habitats, the nutrient cycle, turbidity, benthic production, commercial species, carbon cycling and operational carbon emissions.
- ***Economic***: data relating to economic indicators such as, value, demand, fixed and variable costs, and employment.

**Annex A (Data Report)** provides quantitative evidence on the socio-economic issues that are of importance in the selected case study site (Outer Thames Estuary)

and considers the relevant socio-economic impacts and data needs of the framework within the context of this site.

**Annex B (The Framework)** provides the final framework for including socio-economic impacts within the context of environmental impact assessments and applies this framework to the case study site.

**European Chemicals Agency (ECHA) (2008): Guidance on socio-economic analysis– restrictions. Guidance for the Implementation of REACH.**
Available at:
**http://echa.europa.eu/documents/10162/13641/sea_restrictions_en.pdf**

**Keywords:** Annualised Cost, Benefits, Cost-Benefit Analysis, Cost-Effectiveness Analysis, Costs, Damage Costs, Discount Rate, Discounting, Distributional Impacts, Economic Impacts, Environmental Impacts, Existence Value, Externalities, Financial Impact, Health Impact, Hedonic Pricing, Market Value, Monte-Carlo Analysis, Multi-Criteria Analysis, Net Present Value, Present Value, Revealed Preference, Sensitivity Analysis, Social Impacts, Socio-Economic Analysis, Stated Preference, Transfer Payment, Uncertainty, Wider Economic Impacts.

This document describes Socio-Economic Impact Assessment (SEIA) under the Registration, Evaluation, Authorisation & Restriction of Chemicals (REACH) regulation's restriction procedure. Although much of the document focusses on providing guidance relevant to REACH regulation (and is, therefore, not applicable to marine planning) it provides an overall framework for carrying out SEIA that could be applied in a marine planning context. A glossary of key terms often found in SEIA is provided at the beginning of the document.

**European Commission (2010b): Economic and Social Analysis for the Initial Assessment for the Marine Strategy Framework Directive: A Guidance Document**

**Keywords**: Use of Marine Waters, Ecosystem Services, Degradation, Cost of Degradation, Socio-economic Analysis, Baseline Scenario / Business as Usual, Counterfactual, Scenarios, Drivers, Pressures, Impacts, Intermediate Marine Ecosystem Services, Final Marine Ecosystem Services, Use Value, Non-use Value.

This Guidance Document focuses on the socio-economic analyses required for supporting the development of the Initial Assessment under Article 8.1 of the Marine Strategy Framework Directive (MSFD). Among other aspects of relevance to the current study, this Document aims to help practitioners:

- Understand which economic and social analyses are required under the MSFD (Chapter 1)
- Acquire some common language, which can be helpful when discussing socio-economic issues at the international level (e.g. definitions of key concepts in Chapter 1)
- Gain ideas of possible approaches to perform the required economic and social analyses (Chapters 2, 3 and 4)

- Learn from past experiences, both from the recently performed socio-economic analyses for the Water Framework Directive (WFD) and other economic analyses for marine issues (Chapters 2, 3 and 4 and Annex B)
- Find potential data sources that can be used to retrieve the necessary information for undertaking the analyses (Chapter 5).

### European Landscape Convention (ELC), ETS No. 176, Explanatory Report

**Keywords:** Landscape, Policy, Planning

This document explains the origins of the ELC also providing definitions of key terms to do with landscape planning, policy and monitoring. It establishes the special measures which each party must take at national, regional or local level. This document summarises that landscape forms a whole, whose natural and cultural components are taken together, not separately. It also states that the ELC applies to a Parties' entire territory and covers natural, rural, urban and peri-urban areas. It covers both land areas and water areas, and applies both to inland waters (such as lakes and areas of brackish water) and marine areas (coastal waters and the territorial sea).

### HM Government (2011b): Impact Assessment Overview, Ref: BIS/11/1110

Available at: https://www.gov.uk/government/publications/impact-assessments-for-government-policies

**Keywords**: Impact Assessment

This document provides a high level overview of Impact Assessment (IA) requirements. IAs are generally required for all UK Government interventions of a regulatory nature that affect the private sector, civil society organisations and public services.

It outlines the definition of an impact assessment as, both:

- A continuous process to help think through the reasons for government intervention, to weigh up various options for achieving an objective and to understand the consequences of a proposed intervention
- A tool to be used to help develop policy by assessing and presenting the likely costs and benefits and the associated risks of a proposal that might have an impact on the public, private or third sector, the environment and wider society.

The report includes a step-by-step guidance to conduct an IA, or IA Toolkit[31]

### King and Mazzotta (2000): Ecosystem Valuation

Available at: http://www.ecosystemvaluation.org/

[31] http://www.bis.gov.uk/assets/biscore/better-regulation/docs/i/11-1112-impact-assessment-toolkit.pdf.

**Keywords**: Market Price Method, Productivity Method, Hedonic Pricing Method, Travel Cost Method, Damage Cost Avoided, Replacement Cost, Substitute Cost, Contingent Valuation Method, Contingent Choice Method, Benefit Transfer Method

Website designed for non-economists who need information about ecosystem valuation concepts, methods and applications.

### Landscape institute and Institute of Environmental Management and Assessment (2013): Guidelines for Landscape and Visual Impact Assessment (GLVIA), Third Edition

**Keywords:** Landscape, Visual, Landscape and Visual Impact Assessment

This document is the only national standard guidance on LVIA. It offers detailed advice on the process of assessing the landscape and visual effect of developments and their significance. It also provides guidance on the assessment of cumulative effects.

### HM Government (2011a) UK Marine Policy Statement. The Stationary Office.

Available at:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69322/pb3654-marine-policy-statement-110316.pdf

**Keywords:** Planning, Decision Making, Policy

The effects of activities and developments in the marine and coastal area on the landscape, including seascape, will vary on a case-by-case basis according to the type of activity, its location and its setting. There is no legal definition for seascape in the UK but the ELC defines landscape as “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors”.

This document states that when developing Marine Plans, marine plan authorities should consider at a strategic level visual, cultural, historical and archaeological impacts not just for those coastal areas that are particularly important for seascape, but for all coastal areas, liaising with terrestrial planning authorities as necessary. In addition, any wider social and economic impacts of a development or activity on coastal landscapes and seascapes should be considered.

### Luisetti *et al*. (2010): Coastal and marine ecosystem services valuation for policy and management, CSERGE Working Paper EDM 10-04.

Available at: http://www.econstor.eu/obitstream/10419/48792/1/621202509.pdf

**Keywords:** Ecosystem Services; Ecosystem Valuation; Managed Realignment; Choice Experiment; Cost-Benefit Analysis

This paper reviews the progress to date on both the necessary conceptual framework and empirical valuation studies required to bolster decision support systems targeted at integrated coastal zone management goals. It includes a review

definitions of ecosystem services and highlights and discusses the importance of: spatial explicitness; marginal changes; double-counting; non-linearities; and threshold effects.

Finally, using UK case studies on managed coastal realignment, it sets out an ecosystem services sequential decision support system to environmental valuation and policy assessment.

### MMO (2011b): Marine licensing guidance 8 environmental impact assessment

Available at:
http://www.marinemanagement.org.uk/licensing/documents/guidance/08.pdf

**Keywords**: Environmental Impact Assessment

Guidance on how to conduct an EIA and process.

### MMO (2012): Environmental Impact Assessment (EIA): Guidance Note on Terrestrial Impacts

**Keywords:** Environmental Impact Assessment, Policy, Landscape and Visual Impact Assessment, Scoping Guidance

The document provides guidance on the scope and methods to be used within an EIA for typical marine construction works project as part of the consents application process in England and Wales. This guidance note outlines recommendations on the generic scope and method of future EIA requirements for specialist topics such as LVIAs.

### Marine Management Organisation (MMO) (2012): Seascape Character Area Assessment East Inshore and East Offshore Marine Plan Areas

Available at:
http://www.marinemanagement.org.uk/marineplanning/areas/documents/east_seascape.pdf

**Keywords:** Seascape Assessment, Marine Planning

This document assesses the key characteristics of the seascape character areas within the East Inshore and East Offshore Marine Plan Areas. The document discusses the various stages which were implemented throughout the project particularly concentrating on the consultation stage. It highlights the problems encountered and the lessons learned.

### Natural England (1997): Natural Areas

Available at:
http://www.naturalareas.naturalengland.org.uk/Science/natural/NA_search.asp

**Keywords:** Coastal, Terrestrial, Marine, Wildlife, Landforms, Geology, Land Use

Natural Areas are sub-divisions of England, each with a characteristic association of wildlife and natural features. They provide a way of interpreting the ecological variations of the country in terms of natural features, illustrating the distinctions between one area and another. Each Natural Area has a unique identity resulting from the interaction of wildlife, landforms, geology, land use and human impact. Natural Areas take into account not only the wildlife and natural features of the landscape, but also the views of the people who live and work there. Natural Areas provide a consistent, ecologically coherent countrywide framework to focus national targets to a level that can be used locally.

**Natural England (2004): Marine Natural Areas**
Available at:
http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/englands/marinenaturalareas.aspx

**Keywords**: Wildlife, Ecosystem, Conservation, Geology

Marine Natural Areas are areas of sea around England each with their distinctive wildlife and underlying geology. They emphasise the importance of natural processes, the interaction between these, geology, and wildlife. They offer a framework to help us develop an EsA to managing human uses of the marine environment. Natural England has identified six Marine Natural Areas. Reports have been written on each of the areas identified which provide advice on the natural conservation value of large areas of sea around England.

**Natural England (2012a): An Approach to Seascape Character Assessment**
Available at: http://publications.naturalengland.org.uk/publication/2729852

**Keywords:** Visual Issues, National and Regional Assessments, Seascape Character Assessment Process.

Seascape Character Assessment (SCA) has emerged as a method for assessing, characterising, mapping and describing seascape character. The process of SCA follows the well-established, and widely used, process of Landscape Character Assessment.

This report on assessing seascape character was commissioned by Natural England to contribute to the strategic and integrated management of our seas, as part of the implementation of the Marine and Coastal Access Act 2009. Part 3 of the document describes the process and outputs of seascape character assessment.

**Natural England (2012b): Seascape Characterisation around the English Coast (Marine Plan Areas 3 and 4 and Part of Area 6 Pilot Study (NECR106)**
Available at: http://publications.naturalengland.org.uk/publication/2736726

**Keywords:** Seascape Character Assessment, Landscape Character Assessment, European Landscape Convention

Seascape, like landscape, reflects the relationship between people and place and the part it plays in forming the setting to our everyday lives. It is a product of the

interaction of the natural and cultural components of our environment, and how they are understood and experienced by people.

This work was commissioned to test and refine the emerging methodology for assessing the character of seascapes and to:

- Contribute to the aims of the ELC to promote landscape protection, management and planning, and to support European co-operation on landscape issues.
- Provide practical tools and evidence to assist in responding to the increasing demands being placed upon the related marine and terrestrial environments, building upon the increased awareness of the high profile of the connections between land and sea reflected in the Marine and Coastal Access Act (2009) and the resultant Marine Spatial Planning (MSP) system.
- Undertake a SCA at a strategic scale for a defined area of the English coastline, so that a baseline of Seascape Character Areas is available to:
    - Provide the context for more detailed SCA work
    - Inform Marine Spatial Planning, and the planning, design and management of developments – and a range of other projects – on and around our coastline.

### Natural England (2014): National Landscape Character Areas

Available at: http://www.naturalengland.org.uk/publications/nca/searchpage.aspx

**Keywords:** Geographical Boundaries, National Character Area

Natural England has created a series of National Character Areas for England with their associated profiles attached. Key facts and data documents can be located here regarding each National Landscape Character Area within England. The features that define the landscape of each area are recorded in individual descriptions which explain what makes one area different from another and shows how that character has arisen and how it is changing.

### Northern Ireland Environment Agency (2014): Northern Ireland Regional Character Assessment

Available at: http://www.doeni.gov.uk/niea/niseascapecharacterassessment2014-part_1.pdf

**Keywords:** Policy, Culture, Biodiversity, Data Analysis

SCA: The process of identifying, mapping and describing variation in the character of the seascape. It seeks to identify and explain the unique combination of elements and features that makes seascape distinctive.

Evaluating or making judgements about seascape quality or value, or decisions about the appropriateness of development, are separate from the Seascape Character Assessment process, even though they are informed by the outputs of a character assessment. In undertaking a SCA, the following principles apply:

Principle 1: Landscape is everywhere and all landscape and seascape has character;

Principle 2: Seascape occurs at all scales and the process of SCA can be undertaken at any scale;

Principle 3: SCA should involve an understanding of how the seascape is perceived and experienced by people;

Principle 4: SCA provides an evidence base to inform a range of decisions and applications; and

Principle 5: SCA can provide an integrating spatial framework.

As part of this process, seascape can be divided up into 'Seascape Character Areas'. These are defined as:

Seascape Character Area: A unique geographic area of land, intertidal and marine area with a recognisable sense of place and identity.

The seascapes of Northern Ireland are subject to change as a result of both natural and man-made influences including:

- Natural processes and climate change
- Visitor pressure and recreational activity
- Commercial marine activity and fishing
- Offshore energy and mineral development
- A range of development pressures along the coast
- Land management changes.

**Office for National Statistics (ONS) (2012): Measuring Tourism Locally Guidance Note 1: Definitions of Tourism. Office for National Statistics Tourism Intelligence Unit**
Available at: http://www.ons.gov.uk/ons/guide-method/method-quality/specific/economy/economic-value-of-tourism/measuring-tourism-locally/2012/note-1/index.html

**Keywords:** Tourism, Tourism Activity

This guidance note is one of a collection with the aim of providing a framework within which various facets of tourism activity can be measured and data collected.

Tourism is made up of the demand side and the supply side. The definition for the demand side is given as *"a movement of people to places outside their usual place of resident, pleasure being the usual motivation*". The document also provides definitions of each term used in the definition. The definition of tourism from the supply side is given as the provision to visitors of goods and services which make up tourism expenditure, and again each term is described.

### Price *et al.* (2007): The Social Cost of Carbon and the Shadow Price of Carbon. What they are, and how to use them in economic appraisal in the UK

**Keywords**: Social Cost of Carbon, Shadow Price of Carbon, Carbon Price, Economic Appraisal, Marginal Abatement Cost, Discount Rate.

This paper provides a definition of the social cost of carbon and the rationale for adopting a Shadow Price of Carbon (SPC) for use in policy and investment appraisals across UK government. It sets out the factors which the SPC reflects which the Social Cost of Carbon (SCC) does not and provides advice on how the SPC should be used in policy advice, and why it differs from other carbon price and cost concepts.

### Scottish Natural Heritage (2005): An Assessment of the Sensitivity and Capacity of the Scottish Seascape in Relation to Wind farms

Available at:
http://www.snh.org.uk/pdfs/publications/commissioned_reports/f03aa06.pdf

**Keywords:** Wind Farms, Visibility, Policy

The study identified 33 Seascape Units at a strategic scale, described their character and assessed their sensitivity to a single development scenario. A visibility assessment was carried out using GIS to produce a comparative scale of visibility for the seascape units. Seascape values were assessed for each Seascape Unit, based on consideration of national and regional designated landscapes and SNH wildland search areas within 10km of the coast.

This document includes detailed information on Seascape Character areas. Section 4 discusses how to use the seascape assessments.

### RPA, Bright Angel Coastal Consultants, Ichthys Marine, RSS Marine Ltd (2013): Value of Marine Protected Area on recreation and tourism services, Methodology report for Defra, July 2013, Loddon, Norfolk, UK

Available at:
http://sciencesearch.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=18546

**Keywords:** Marine Protected Areas, Recreation, Tourism, Methodology, Valuation

This report sets out a methodology to assess the benefits of Marine Protected Area (MPA) designation on recreation and tourism. It is based on findings from a literature review. The methodology is intended for economists and people carrying out a benefit assessment of MPA designations.

This report provides categories and sub-categories for marine recreation and defines it as "*leisure activities done for enjoyment when one is not working. Many recreational activities will be enjoyed by local residents however tourists will generally take part in recreational activities as well while visiting the area and this may even be the main reason for their visit*". This report defines tourism as *"all*

*activities of visitors including both 'tourists (overnight visitors)' and 'same-day visitors'. To be classified as a 'tourism day visit' a trip must:*

- *Involve participation in leisure activities, which may include sports or other outdoor activities*
- *Have lasted at least three hours (including travel)*
- *Not be an activity which is undertaken 'very regularly'*
- *Be in a destination outside the respondent's place of residence (or place of work if this was the start point of the trip). The exceptions to this are trips to special public events, live sporting events and visitor attractions".*

### Scottish Natural Heritage (2006): Visual Representation of Windfarms: Good Practice Guidance

Available at: http://www.snh.gov.uk/docs/A305436.pdf

**Keywords:** Windfarms, Visibility, Environmental Statement, Guidance

This guidance is derived from research reported within the publication Visual Assessment of Windfarms: Best Practice, by the University of Newcastle (2002). The sections of this original work concerning visibility maps, viewpoints and visualisations have been updated and refined through a review of current Visual Impact Assessment (VIA) practice, current illustrative methods, consultation with stakeholders and reference to other guidance documents. This Good Practice Guidance focuses upon only the VIA element of LVIA. This process usually requires visibility maps and visualisations that are then used differently by different people for different purposes.

### Surfers against Sewage (2009): Guidance on environmental impact assessment of offshore renewable energy development on surfing resources and recreation.

Available at http://www.sas.org.uk/wp-content/uploads/sas-guidance-on-environmental-impact-assessment.pdf

**Keywords:** Environmental Impact Assessment, Recreation, Renewable Energy

This guidance document sets out a process to consider the impacts on surfing from offshore renewable development. It also includes a literature review of the value of surfing to the local economies in the UK (expenditure on surfing in Cornwall to include £830 per person per annum on visiting costs by visiting surfers; Rip Curl estimated that the worth of 2001 Newquay Board Masters Tournament to be £17 million to the local economy, 2001 data).

### The Countryside Agency (2002): Landscape Character Assessment

**Keywords:** Landscape Character Assessment, Guidance, Landscape, Planning

This guidance provides advice on Landscape Character Assessment (LCA), an important tool for all those involved in influencing the landscape. The guidance reflects how methods and techniques for LCA have developed and builds upon interim guidance which was the subject of consultation in 1999. The guidance has

been prepared for England and Scotland but may be relevant for use within other parts of the British Isles. The guidance is aimed at all those individuals and organisations whose activities affect the landscape. Its main audience includes those involved in commissioning, carrying out, and using results from a LCA.

Assessment, including practitioners in local authorities, government departments and agencies, development companies, utilities and private practice.

### The Countryside Agency (2004): Topic Paper No. 6: Techniques and Criteria for Judging Capacity and Sensitivity

**Keywords:** Landscape Character Assessment, Sensitivity, Assessment

Landscape Character Assessment is being widely employed as a tool to help guide decisions about the allocation and management of land for different types of development in both England and Scotland, and particularly to contribute to sensitivity and capacity studies.

The paper describes principles for recording and presenting information relating to assessments of capacity and sensitivity, and makes suggestions as to how layers of information can be combined, using a GIS, to arrive at a final assessment. An outline of key issues arising from current practice is provided, underlining the importance of transparency and accessibility for any outputs of sensitivity and capacity studies. It ends by giving an overview of the continuing debates and questions surrounding the assessment of sensitivity and capacity.

### Turner *et al.* (2010): An Introduction to Socio-Economic Assessment within a Marine Strategy Framework

**Keywords:** Averting Behaviour, Benefit Transfer, Choice Modelling, Consumer Surplus, Contingent Valuation, Cost Effectiveness, Cost-Effectiveness Analysis, Defence Expenditure, Discounting, Economic Analysis, Economic Efficiency, Economic Value, Ecosystem Service, Final Ecosystem Service, Hedonic Pricing, Intermediate Ecosystem Service, Marginality, Market Price, Market Value, Multi-Criteria Analysis, Multiplier Impact, Net Present Value, Non-market Value, Non-use Value, Opportunity Cost, Replacement Cost, Revealed Preference Methods, Scenario, Stated Preference Methods, Sunk Cost, Total Economic Value, Travel Cost Method, Use Value

This report sets out a decision support system for a version of SEIA that is compatible with the EsA adopted by OSPAR[32].

The report begins by providing an overview of the DPSIR analytical framework[33] and illustrates the types of drivers and pressures which are most relevant to marine and coastal zones and their ecosystems. Approaches to scenario analysis are explained. Section 4 focusses on the difference between financial and economic valuation and

[32] Oslo/Paris convention (for the Protection of the Marine Environment of the North-East Atlantic)
[33] DPSIR (Driving forces, Pressures, States, Impacts and Responses) is a causal framework for describing the interactions between society and the environment .

provides an analytical sequence for scoping out an economic assessment. The following key concepts are explained: weak and strong sustainability; welfare, benefits and costs; ecosystem functions and ecosystem goods and services; total economic value. In Section 4.3.2, a conceptual framework for ecosystem services is provided which separates between ecosystem processes and functions in intermediate and final services. This approach seeks to provide a transparent method for identifying the aspects of ecosystem services which are of direct relevance to economic valuation, and critically, to avoid the problem of double-counting.

Annex 1 provides an overview of methods for economic assessment (covering Cost-Benefit Analysis (CBA), Cost-Effectiveness Analysis (CEA) and Multi-Criteria Analysis (MCA)) and a discussion on dealing with uncertainty, irreversibility and related concepts. It outlines the theory behind CBA, CEA and MCA, the steps involved in conducting them and their advantages and disadvantages. Annex 2 focusses on the economic valuation of ecosystem goods and services and outlines the advantages and disadvantages of contingent valuation, choice modelling, travel cost method, hedonic pricing, averting behaviour and defensive expenditure, cost of illness and lost output, market pricing, replacement costs and benefit transfer, along with methods for eliciting non-economic values. Annex 3 provides a series of case studies on the valuation of the most common marine and coastal ecosystem benefits/services.

*This is a key report that explains many of the main concepts and techniques for carrying out SEIA in the context of marine planning.*

### Van Beukering *et al.* (2007): Valuing the Environment in Small Islands: An Environmental Economics Toolkit

**Keywords**: Market Prices, Replacement Cost, Damage Cost Avoided, Net Factor Income, Production Function Approach, Hedonic Pricing, Travel Cost Method, Contingent Valuation, Choice Modelling, Value Transfer, Total Economic Value, Use/non-use Value, Direct Use, Indirect Use, Option Value, Bequest Value, Cost-Benefit Analysis, Multi-Criteria Analysis.

This report provides a toolkit specifically for valuing the environment in small islands. Of particular relevance to the current study is the information set out in Chapters 4, 5 and 7. Chapter 4 deals with scenario development and impact assessment and explains the concept of ecosystem services, while Chapter 5 covers economic valuation. Various valuation methods are explained (step-by-step) and consideration is given to their strengths, limitations and applicability to specific situations. Chapter 7 provides a review of decision support tools (specifically cost-benefit analysis and multi-criteria analysis) explaining their structure as well as their strengths and weaknesses. It also covers how to deal with risk and uncertainty and distributional, spatial and temporal issues within these frameworks.

## Other MMO Evidence Reports

### MMO (2011a): Maximising the socio-economic benefits of marine planning for English coastal communities. MMO Project No: 1001

Available at: http://www.marinemanagement.org.uk/marineplanning/key/se.htm

**Keywords**: Marine Activities, Employment, Labour Utilisation, Deprivation

This guidance document was commissioned by the MMO to help them to consider how marine planning activities could support the socio-economic development of coastal communities. The marine activities are those included in the MPS (Marine Policy Statement). The study has a focus on employment impacts and deprivation and as such may be more relevant for this part of the socio-economic assessment only. Importantly the study describes the labour market catchment for each activity and impacts on the locality which may help to set the geographical boundaries of the SEIA. These aspects are replicated in the following table.

**Table A2. 3: Impact catchment area by activity.**

| Activity | Catchment area/Geographical aspects |
|---|---|
| Defence | Recruitment into the defence sector itself can be broadly said to be national in nature. Changes in this activity are unlikely to make significant differences to local infrastructure and connectivity.<br>Research has suggested that supply chains for military bases are at times relatively non-local. |
| Energy production and infrastructure | Oil and gas industries frequently recruit from national rather than local labour markets. Local infrastructure is likely to be affected and in turn it may have significant effects on local environments and neighbouring uses. |
| Ports and shipping (including marine dredging and disposal) | Research suggests that labour market catchments for port activities are generally relatively local in nature. Port activities, and associated infrastructure development, may have significant effects on local environments and neighbouring uses. |
| Marine aggregates | Assumes that aggregates extraction vessels are taken from local labour markets near these licence areas. Aggregates activity can have very significant space requirements, and place greater demand on local road and rail transport infrastructure. Marine aggregates activities are in themselves unlikely to lead to the expansion of local infrastructure and connectivity. |
| Telecommunications cabling | The local impacts of the process of manufacturing and laying marine cables are likely to be modest in coastal communities. Cable laying is carried out by specialist contractors using large vessels. |

| Activity | Catchment area/Geographical aspects |
|---|---|
| Fisheries | The labour market catchments and aspects of the supply chain can be relatively local for this activity. In some communities, the industry is likely to have a very important Role in tourism, and place-making, and the broader culture of a place. |
| Aquaculture | Labour market catchments are likely to be local. It is unlikely that this activity will have a significant impact on investment in local infrastructure and connectivity but there is no evidence of positive or negative impacts on local terrestrial environments, heritage or neighbouring uses. |
| Surface water management and waste water treatment and disposal | It can be assumed that a fair proportion of the workforce is made up from local employment markets. This marine activity will have little impact on local infrastructure and connectivity. Aspects of these activities may have bad neighbour effects. Waste water treatment infrastructure has the potential to have negative visual impacts within communities and on seascape unless carefully designed. Impacts of odour can be far reaching. |
| Tourism and recreation | Tourism labour market catchments are relatively local. Local connectivity may be enhanced by tourism demand. Tourism can create valuable year-round amenities for local residents that improve the quality of life offered by an area. However, local environments can be damaged by the weight of tourism numbers. Impacts of tourism do need to be managed quite carefully. |

The study also develops coastal typologies to differentiate between different types (or categories) of coastal area on the basis of their socio-economic characteristics (refer below).

**MMO (2011c): Coastal typologies: detailed method and outputs, MMO Project No: 1001**
Available at:
http://www.marinemanagement.org.uk/marineplanning/key/documents/se_typologies.pdf

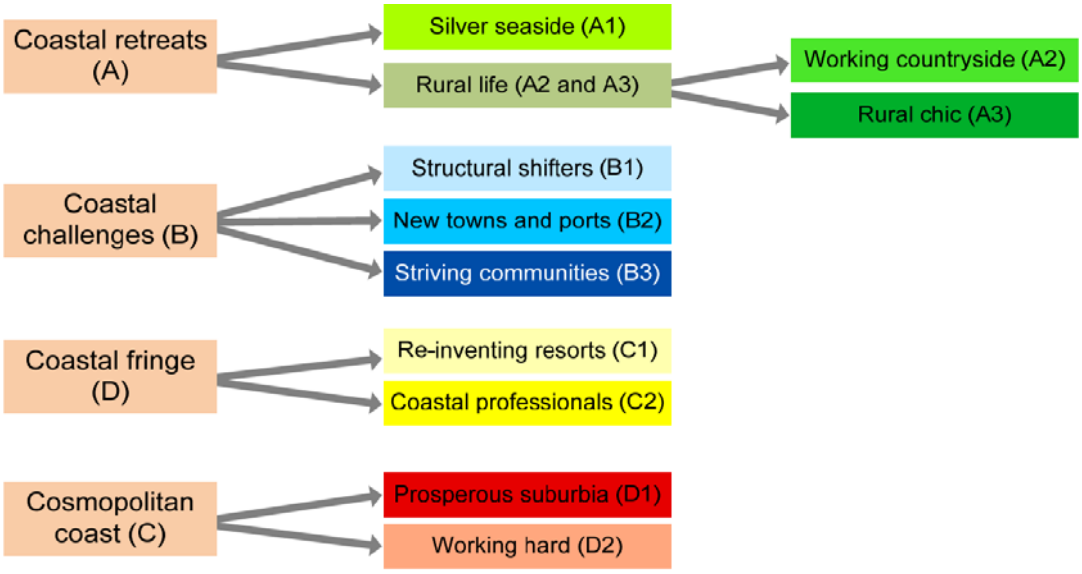
**Keywords**: Employment, Pensionable Age, Deprivation, Clusters

This study provides detailed background into the typologies developed for the two reports entitled *"Maximising the socio-economic benefits of marine planning for English coastal communities*" and *"The Eastern marine area: maximising the socio-economic benefits of marine planning"* report. The study short-listed 42 variables to create the typology and the final 11 clusters are depicted in the following figure.

The typology provides a set of benchmark 'types' (i.e. the average for the group of areas in each typology category) and can be used by the MMO internally and to start discussion with local planners but are not to be used to base planning decisions on. The typology may be more important for multi-criteria type of processes as it may

help with licensing decisions, e.g. when employment impacts are given a greater weight in communities with higher than average levels of unemployment (e.g. for striving communities).

**Figure A2. 2: Coastal typologies.**




**MMO (2012): Compilation of spatial data on marine recreational activities. A report produced for the Marine Management Organisation, pp94. MMO Project No: 1013. ISBN: 978-1-909452-00-8. October 2012.**
Available at: http://www.marinemanagement.org.uk/evidence/1013.htm

**Key words:** Recreation, Spatial Data.

The study provides a review of the available spatial data in relation to recreation in England. Recreational activities covered include: angling, bait collection, beach pastimes, beach sports, coasteering, diving/snorkelling, game, paddle based sport, power boating, sailing, surf boarding, swimming, water skiing, wind surfing. These activities are further broken down to include more specific types of activities.
A series of maps are presented with overarching findings and area specific examples. Some coastal regions have more comprehensive data available than others.

**MMO and Marine Scotland (2012): A critical review of tools and methods to apply marine social and economic data to decision-making. A report produced for the Marine Management Organisation and Marine Scotland. MMO Project No: 1012. ISBN: 978-1-909452-02-2.**
Available at: http://www.marinemanagement.org.uk/evidence/documents/1012a.pdf

**Keywords**: Cost-Benefit Analysis, Cost-Effectiveness Analysis, Multi-Criteria Assessment, Trade-off Analysis, Life-Cycle Analysis, Bioeconomic Models, Risk Assessment.

This report presents a review of the tools that are available to apply social and economic data to decision-making and in the licensing process. The reports provides

definitions for a number of different tools, including CBA, CEA, MCA and others. It also describes the processes, advantages and disadvantages, and their practical applications. The study also describes specific products to assess the impacts, including different software. These are set out in the next table.

**Table A2. 4: Table showing tools and products available to the assessment of socio-economic impacts.**

| General methods | Specific products |
|---|---|
| Cost-benefit Analysis<br>Cost-effectiveness Analysis<br>Multi-criteria Assessment<br>Trade-off Analysis<br>Life-Cycle Analysis (LCA)<br>Bioeconomic Models<br>Risk Assessment | MaRS<br>Valuing Change in UK Seas<br>DEFINITE (decisions on a finite set of alternatives)<br>IMPLAN (IMpact analysis for PLANning)<br>InVitro<br>SolVES (Social Values for Ecosystem Services)<br>EMDS (Ecosystem-based Management Decision Support)<br>Cumulative Impacts model<br>SPICOSA<br>ARIES, MIMES, InVEST |

Importantly, the study reviews a list of products available in the UK to map and view social and economic data which could be used as the starting point for the screening of impacts in an SEIA. The project also includes a catalogue of socio-economic data searchable by activity but dated 2012. More importantly there is reference to the MMO marine planning portal which set out the different activities taking place under a baseline scenario (or counterfactual). Any project should be assessed in terms of the impact that this may have on any of the activities therein. The activities are those under the MPS[34] but include a further level of disaggregation, such as different types of fisheries.

**Table A2. 5: Tools for impact screening.**

| Tool | Website: |
|---|---|
| The MMO Marine Planning Portal | planningportal.marinemanagement.org.uk |
| **Function:** The Marine Planning Portal is a tool that allows people to contribute marine data to the planning process to support decision-making. It has a number of layers setting out the type of marine activities taking place. The list of marine activities includes those under the Marine Policy Statement but others that may also be relevant to investigate the social impacts such as different coastal typologies. | |

[34] The MPS sets out eleven key activities which take place in the marine environment

| Tool | Website: |
|---|---|
| JNCC MPA map | jncc.defra.gov.uk/mczmap |
| **Function:** This interactive map contains information on Marine Protected Areas in the UK. At the moment there are 108 Special Areas of Conservation (SACs) with marine components, 108 Special Protection Areas (SPAs) with marine components, 28 Marine Conservation Zones (MCZs) and one Marine Nature Reserve MCZs. | |

**MMO (2013e). Economic baseline assessment of the South Coast. A report produced for the Marine Management Organisation by Eunomia Research and Consulting Ltd, pp 125. MMO Project No: 1050. ISBN: 978-1-909452-13-8.** Available at: http://www.marinemanagement.org.uk/evidence/1050.htm

**Keywords**: Marine Plans, Economic Activities, Multiplier Effects, Full Time Equivalent, Gross Value Added, Input-Output Modelling

This report provides a baseline for economic activity currently taking place in the South marine plan areas, and also forecasts the likely economic contributions of the activities expected to take place within the plan areas in the future.

The research included within this report is presented in the absence of marine plans and serves as the baseline against which future impacts associated with the marine plans can be measured. It can also set the baseline for any projects under the licensable activities.

The study includes definitions for a number of key terms related to economic activities, and in line with ONS. It highlights the importance of calculating net impacts. Some of these terms are replicated in the table below.

**Table A2. 6: Key terms to measure economic activity.**

| Term | Definition |
|---|---|
| Gross Domestic Product | Economic metric used to measure all economic activity within a geographical area over a given period, and is widely used to compare different economies on a consistent basis (Office for National Statistics, 2010). |
| Gross Value Added | At a micro-level GVA is the contribution of each individual producer, industry or sector to the economy. |
| Displacement | Displacement is where jobs are filled by people previously employed elsewhere in the region. |
| Direct impacts | Direct impacts occur when additional demand for a unit generates a corresponding unit of output, e.g. production of a chair. |
| Indirect impacts | They arise as demand for materials and fuels used to create that additional unit of output generates, in turn, outputs in other industries, e.g. wood, steel, paint, fabric, electricity, gas, water and other materials, fuels and services used in furniture production. |

| Term | Definition |
|---|---|
| Induced impacts | Induced impacts are felt as increases in compensation of employees lead to increased spending on goods and services in the economy. |

Although the report highlights the importance of multiplier analysis to estimate the economic impacts, particularly on employment, it notes the existence of gaps specific to the marine activities considered in the report. Usefully however, the report highlights a range of multipliers for offshore renewables, ranging from 0.20 jobs per MW to 0.54 jobs per MW from operation and maintenance (direct and indirect jobs, through the activities of those companies with personnel dedicated to the operation and maintenance of the wind farm and down the supply chain, respectively).

**MMO (2013): Social impacts of fisheries, aquaculture, recreation, tourism and marine protected areas (MPAs) in marine plan areas in England. A report produced for the Marine Management Organisation, pp192. MMO Project No: 1035. ISBN: 978-1-909452-19-0. December 2013.**
Available at: www.marinemanagement.org.uk/evidence/documents/1035.pdf

**Keywords:** Social Impacts, Tourism, Recreation, Valuation, Marine Planning, Ecosystem Services, Co-location.

This report covers the social impacts of marine activities on various sectors including tourism and recreation.

Tourism is defined as travel of visitors away from their usual place of residence. A review of the literature concludes that tourism can have both positive and negative effects to individuals and local communities. The impacts are driven mainly by the associated direct and indirect employment generated by tourism, which is affected by seasonality – leading to potential instability. Factors such as community stability, interaction of tourists with local communities and community way of life are some of the factors highlighted that should be considered in marine planning and the type of tourism that should be developed. Negative impacts on local communities may occur due to large volumes of tourists, and the impacts of potential increases in tourist numbers should be considered. In terms of valuing tourism, the study maps employment figures and holiday maker expenditure on a map of England, showing the tourist hotspots.

The range of recreational activities considered is the same as for those identified in the MMO (2013). A review of the literature explored the social benefits of recreation and the level at which the number of recreational users detracts from the user experience. The carrying capacity of the natural environment for recreational users is also explored. There are potential issues of displacement of local recreational users by visitors, causing overcrowding and conflict. Valuation of recreational activities is sometimes difficult due to certain activities not having a marketable good, such as sea swimming. Employment and GVA are used as possible indicators of recreational value. Other methods include the importance of recreation for preventing health

related issues such as stress, and the cost of this to employers. Non-market benefits include stated and revealed preference.

**Table A2. 7: Values of various marine activities given in the literature.**

| Recreational activity | Value |
|---|---|
| Willingness to pay to avoid dog mess/litter on the beach | £6-£11 per household per year Total for England and Wales = £144 million per year |
| Willingness of recreational sea anglers to pay for increased catch | £14 per person per year |
| Willingness of recreational sea anglers to pay to increase the size of fish caught by 50% | £13 per person per year |
| Mean cost of diving | £71±44 per trip |
| Mean cost of Kayaking | £27±24 per trip |
| Mean cost of a wildlife viewing boat trip | £44±27per trip |
| Mean cost of a sea bird watching day out | £28±30 per day out |
| Estimated expenditure in Lyme Bay by: | |
| Sea anglers | £13.7 million per year |
| Dive clubs | £1 million per year |
| Boat charters | £3.5 million per year (turnover) |
| Note: Figures are a summary of values given from a range of studies within the report | |

Users stated that biodiversity was considered important for certain types of users, in particular divers and wildlife watchers, with kayakers stating the weather as a major factor of importance. Other non-monetised benefits gained from using the natural environment, from a Natural England study, included feeling refreshed, relaxed and healthy. In terms of marine planning, the benefits of promoting/increasing coastal recreation can be increased participatory enjoyment, improved health and wellbeing both physical and mental (though more study is required on this subject). The carrying capacity of the natural resources and social capacity are important considerations.

A review of the links with ecosystem services, such as water quality, are also provided for tourism and recreation.

The study also develops a co-location matrix which can be used to assess the potential social conflicts between different marine activities, shown below (no data were available for tourism). Co-location is defined as two or more activities overlapping the same spatial footprint. The matrix is useful for gaining an overview of potential conflicts, social implications and benefits that could arise under different marine planning options. The matrix is based on the assumption that when physical compatibility is low management is likely to be high, whereas high compatibility requires low management. The study notes that due to conflicting views between stakeholders the matrix should be used only as an illustration.

**Table A2. 8: The impacts of co-location of marine activities on recreational services.**

| Activity | Co-location impact on recreational services (by level of intervention) |
|---|---|
| Fisheries | Medium |
| Aquaculture | Medium |
| Metal ores extraction, Other mining and quarrying | Medium |
| Electricity production and distribution | High |
| Tourism | - |
| Shipping | Medium |
| Telecommunications | High |
| Public administration and defence | Medium |
| Sewage and Sanitary services | - |
| Recreational services | Medium |
| Marine Protected Area | Low |
| Surface water management | Medium |
| Key:<br>High = Co-location not possible without high levels of intervention<br>Medium = Co-location possible but would require medium levels of intervention<br>Low = Co-location possible with low levels of intervention<br>- = No data<br><br>Note: Information only covers recreational services and has been adapted from the report. | |

The study also presents a social impacts matrix, but notes this needs further study, and uses both matrices to identify the impacts of co-location at various case study sites.

**MMO (2013): Compilation of spatial data on marine activities: Phase 2. A report produced for the Marine Management Organisation, pp 83. MMO Project No: 1043.ISBN: 978-1-909452-10-7**
Available at: http://www.marinemanagement.org.uk/evidence/1043.htm

**Keywords:** Recreation, Spatial Data.

The work builds on MMO1013 - a 'Phase 1' project (MMO2012). This project was a short-term study to provide gap-filling of spatial data to support the South Coast Inshore and Offshore Marine Plan Areas, Folkestone to the River Dart; and the development of tools to support the future development of national recreation datasets.

Whilst the first focus of the data collation has been to collect spatial locations, additional attribute information related to this was also sought where possible, such as frequency of visitation, membership numbers of clubs, value to businesses, employment, temporal, age, gender and restrictions to the activity. In addition, information was collected where possible to inform the quality and confidence in the data, including age of data supplied, method of collection, source, and date

### MMO (2013): Potential for co-location of activities in marine plan areas. A report produced for the Marine Management Organisation, pp 98. MMO Project No: 1010. ISBN: 978-1-909452-08-4.

Available at: http://www.marinemanagement.org.uk/evidence/1010.htm

**Keywords:** Marine Uses, Co-location, Conflict, Management.

This report evaluates the potential for co-location of activities and interests in marine plan areas. It provides a high level screen of the co-location potential of activities/structures, primarily focussing on their physical compatibility/incompatibility and the resulting levels of management that may be required to facilitate successful co-location.

The report proposes a matrix methodology for use in considering physical compatibility. It also proposes a framework to assess the socio-economic implications of co-location. The matrix outputs and the socio-economic framework are discussed in light of a number of case studies of co-location in practice.

## Other relevant reports

### Alban, Appéré and Boncoeur (2008): Economic Analysis of MPAs: A Literature Review

**Keywords**: Bio-economic Model, Non-use Value, Option Value, Quasi-option Value, Economic Rent, Discounting, Consumer Surplus, Visitor Surplus, Kaldor-Hicks Criterion, Ecotourism, Efficiency, Equity, Cost-Benefit Analysis, Market Cost, Non-market Cost, Scenario, Non-market Use Value, Opportunity Cost, Hedonic Pricing, Travel Cost Method, Contingent Valuation Method, Willingness-to-Accept, Willingness-to-Pay, Shadow Price, Cost-efficiency Analysis, Spill Over Effect.

This report reviews the socio-economic literature dedicated to various aspects of MPAs: ecosystem preservation, fisheries management, recreational activities, and distributional consequences of MPAs. It reviews the literature on methodological issues for cost-benefit analysis and its application to MPAs, and the specific problem of economic valuation of non-market values.

### Australian Government Bureau of Rural Sciences (2005): Socio-Economic Impact Assessment Toolkit: A Guide to Assessing the Socio-Economic Impacts of Marine Protected Areas in Australia

**Keywords**: Socio-Economic Impact Assessment, Direct Impact, Indirect Impact, Flow-on Effect, Indirect (Production) Effect, Induced (Consumption) Effect, Input-Output Analysis, Integrated Modelling, Computable General Equilibrium Modelling, Output, Value Added, Multipliers, Operating Cost

Of particular relevance to this study is Section 1 of the report, which discusses the range of methods used to undertake socio-economic impact assessment within a fisheries or MPA context. The advantages and disadvantages of using various approaches are discussed, together with a consideration of their likely timeframes

and costs. Appendix 2 provides a summary of key social and economic impacts that could be of relevance to the fishing sector.

**CEC (2010): Study on the economic effects of Maritime Spatial Planning Final report**
Available at:
http://ec.europa.eu/maritimeaffairs/documentation/studies/documents/economic_effects_maritime_spatial_planning_en.pdf

**Keywords**: Marine Spatial Planning, benefits

This study reviews the benefits from Marine Spatial Planning (MSP) and how large will these benefits be. This study aims to provide greater insight into MSP's economic effects, i.e. the effects of MSP for the maritime economy and stakeholders directly related to the maritime economy. Factors such as employment and environmental effects are not included in this study. The report is mostly limited to a qualitative assessment of the benefits associated with MSP, although it also includes a methodology which has been applied to provide an indication of the quantitative effects of MSP. These quantitative effects need to be interpreted with care; they provide insights on a macro-economic level, but are based on assumptions and require additional studies on a case-by-case basis in order to be able to draw more accurate conclusions.

**Cefas (2001): North sea fish and fisheries, Technical report produced for Strategic Environmental Assessment – SEA**
Available at: http://www.cefas.defra.gov.uk/media/20461/tr_003.pdf.

**Keywords:** Strategic Environmental Assessment, Fish, Fisheries, Offshore Oil and Gas, Marine Licensing

This report contributes to the Strategic Environmental Assessments (SEAs) to assess the potential impact of the offshore oil and gas licensing rounds, and to promote the environmentally sound development of Britain's hydrocarbon resources. It describes issues related to fish and fisheries and can be used to describe environmental sensitivities in the Southern, Central and Northern North Sea regions.

**European Commission (2008): Roadmap for maritime spatial planning: Achieving common principles in the EU, Brussels.**
Available at:
eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:DKEY=483715:EN:NOT

**Keywords:** Maritime Spatial Planning, EU.

This paper sets out the main issues for a debate on Maritime Spatial Planning at an EU level. It provides information on existing approaches to Maritime Spatial Planning in Member States and other international examples, and international and EU instruments that have an impact on Maritime Spatial Planning. Based on these the paper identifies key principles for Maritime Spatial Planning as a basis for a broad debate on a common approach to Maritime Spatial Planning in the EU.

### Frau (2010): Socioeconomic valuation of the marine environment in Wales: implications for coastal management

**Keywords**: Ecosystem Services, Use Value, Non-use Value, Direct Use Value, Option Value, Existence Value, Bequest Value, Willingness-to-Pay, Total Economic Value, Revealed Preference, Stated Preference, Contingent Valuation, Choice Modelling, Travel Cost Method, Hedonic Pricing, Replacement Cost, Production Function Method

This study identifies and quantifies the value of the marine environment to different users and non-users of the coast around Wales.

Of particular relevance to the present study is Chapter 1 of the report, which provides an overview of the types of ecosystem services of relevance to the marine environment along with a framework for assessing the total economic value of marine ecosystems. The main economic valuation techniques used in socio-economic assessment, together with their applications, requirements and limitations are discussed in Section 1.5. Relevant data for carrying out a socio-economic assessment for Wales may be provided in Chapters 2, 3 and 4.

### Harte MJ, Campbell HV, and Webster J (2010): Looking for safe harbour in a crowded sea: Coastal space use conflict and marine renewable energy development

Available at:
http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/17332/Harte_Conflict_final.pdf?sequence=6

**Keywords:** Marine Conflict, Marine Renewable Energy, United States Spatial Conflict, Licensing Process.

This paper highlights the nature of marine space conflicts associated with marine renewable energy and describes key issues for the growth of the marine renewable energy sector in the United States.

### Hynes S and Hanley N (2004): Conflict between Commercial and Recreational Activities on Irish Rivers: Estimating the Economic Value of Whitewater Kayaking in Ireland using Mixed Data Sources, Working Paper No. 75, Department of Economics, National University of Ireland, Galway

Available at:
http://aran.library.nuigalway.ie/xmlui/bitstream/handle/10379/1082/paper_0075.pdf?sequence=1.

**Keywords:** Travel Cost Model, Whitewater Kayaking, Hydro-electric Schemes

This paper provides an estimation of the demand for whitewater kayaking in Ireland, using a case study of the River Roughty in County Kerry. It investigates conflict between whitewater recreational pursuits and hydro-electric schemes. Information was sourced both from the internet and an on-site survey.

**MMO (2013): Compilation of information on tourism relevant to marine planning in the south inshore and offshore plan areas. A report produced for the Marine Management Organisation, pp71. MMO Project No: 1038. ISBN: 978-1-909452-09-1. June 2013.**
Available at: www.marinemanagement.org.uk/evidence/documents/1038.pdf

**Keywords:** Tourism Indicators, Tourism UK Data, Ecosystem Approach, Sustainable Development, Marine Planning.

This study considers tourism in relation to marine planning in the south plan area, but is applicable to the whole of the UK. Definitions of supply and demand side tourism are given[35].

Demand side tourism is defined as: *"a movement of people to places outside their usual place of residence, pleasure being the usual motivation"*.

Supply side tourism is defined as: "*provision to visitors of the goods and services that make up tourism expenditure"*.

Recreation is considered as a separate sector and not covered in this report. The study provides a review of the currently available data on tourism. The most relevant and accessible data are surveys by Visit England, namely the GB Day Visit Survey and GB Tourism Survey, which provide information on tourist volume, expenditure and overnight stays. The ONS also hold data on supply side tourism such as employment. A set of indicators are developed detailing their strengths and weaknesses and the relevant data sources available to measure them.

The study concludes that using an EsA to marine planning can be an effective tool for achieving sustainable development. There are two main considerations regarding sustainable development of tourism in the marine context, these are that tourism can be both a driver of sustainable development due to the links with environment and society, but it can also have a negative impact if poorly planned or over-exploited. The main environmental impacts to consider are outlined in the Table below.

[35] Definitions within the report are taken from the Office of National Statistics (2010): *Measuring tourism locally*. Guidance note 1: Definitions of tourism.

**Table A2. 9: Examples of tourism-related drivers of change and their impacts on the environment.**

| Driver | Impact |
|---|---|
| *Physical impacts* | |
| Intensity and distribution of coastal and marine activities e.g. rock-pooling sea angling, anchoring, scuba diving, intertidal shellfish and bait collection. | Physical disturbance to the seabed and alteration to the local benthic habitat through trampling, clambering, smothering, and other physical disturbance. |
| Intensity and distribution of marine ecotourism and nature watching, and use of other recreational craft e.g. sailing boats, jet skis, etc. | Disturbance of marine wildlife, influencing their feeding, resting or travelling patterns. |
| Development of tourism-related built infrastructure e.g. aggregate dredging, marina development, paving of shorelines. | Land use change and degradation. |
| *Pollution* | |
| Coastal tourism accommodation and other relevant infrastructure; leisure boating. | Discharge of sewage to coastal waters causing health problems and nutrient enrichment. |
| Leisure boating activity and ferries. | Scour from boat wake/wash causing increase in erosion of soft sediment features and an increase in suspended sediment materials. |
| General beach and coastal tourism. | Impact on marine species through ingestion, entanglement and smothering by litter. |
| Transport associated with tourism travel e.g. car travel or ferry travel. | Contribution of transport emissions to climate change and ocean acidification. |
| *Use of resources* | |
| Resource extractive tourism activities e.g. angling, consumption of fish and collection of flora/fauna. | Reduction in stocks of exploited species through their removal. |
| Water intensive tourism infrastructure e.g. hotels, golf courses, swimming pools. | Depletion of water resources, increasing stress on ecosystems during dry periods. |

Table adapted from the report MMO 2013.

### RSBP (2004): Potential Benefits of Marine Spatial Planning to Economic Activity in the UK

Available at: www.rspb.org.uk/Images/MSPUK_tcm9-132923.pdf

**Keywords:** Marine Spatial Planning, Economic Benefits, Marine Management, Conflicting Users.

This study was commissioned to improve the understanding of potential economic benefits of introducing a system of MSP to the UK. It involved an analysis of the

economic sectors likely to be affected by the MSP, a literature review, a review of international MSP, and an examination of the planning context and lessons learnt from management of other areas.

**Tillin HM, Houghton AJ, Saunders JE, Drabble R and Hull SC (2011): Direct and Indirect Impacts of Marine Aggregate Dredging. Marine ALSF Science Monograph Series No. 1. MEPF 10/P144. (Edited by Newell R. C. and Measures J.) 41pp. ISBN: 978-0-907545-43-9**
Available at: http://www.cefas.co.uk/media/463388/monograph1.pdf.

**Keywords**: Aggregate, Dredging Direct Impact, Dredging Indirect Impact, Sediment Plume, Sediment Deposition.

This monograph considers the direct and indirect impacts that arise from aggregate dredging on the physical environment, marine wildlife, historic deposits and other marine users. It concludes that the impacts arising from individual aggregate dredging areas are likely not to be significant as they are minimised through management and mitigation measures by the planning process. Further research is required to assess cumulative impacts and evaluate impacts on ecosystem function.

**The Crown Estate (2006): Guidance on producing management plans for sporting rights leases over Crown Estate foreshore for Wildfowling Clubs not affiliated to BASC 2006**
Available at:
http://www.thecrownestate.co.uk/media/200692/Guide%20notes%20manage%20plan%20nonshooting.pdf

**Keywords:** Wildfowling, Management Plan, Sporting Lease, Guidelines

This document provides guidelines to help wildfowling clubs produce management plans to obtain or renew leases of sporting rights on foreshore owned by the Crown Estate.

**Schuhmann (2012): Regional Governance Framework for the Caribbean Large Marine Ecosystem (CLME) project Deliverable 4: The Valuation of Marine Ecosystem Goods and Services in the Caribbean: A Review and Framework for Future Work**

**Keywords**: Ecosystem Services, Non-market Goods/Services, Use Value/Non-use Value, Existence Value, Option Value, Quasi-option Value, Total Economic Value, Willingness-to-Pay, Willingness-to-Accept, Market Price Approach, Replacement Cost Approach, Cost (damage) Avoidance Approach, Production Function Approach, Productivity Method, Revealed Preference Methods, Travel Cost Method, Hedonic Pricing, Stated Preference Methods, Contingent Valuation Method, Choice Modelling, Benefits Transfer Approach, Meta-analysis, Economic Impact Analysis, Indirect Effect, Induced Effect, Value Added, Multipliers, Economic Multiplier Effect, Marginality, Double-counting, Non-linearities, Aggregation.

This report provides a summary of economic analyses of marine ecosystem services in the Wider Caribbean Region. It provides a comprehensive review of commonly

used valuation methodologies, including the market price approach, non-market approaches (both revealed and stated preference methods) and the benefits transfer approach. It also outlines some of the difficulties associated with economic valuation, including marginality, double-counting, distribution of costs and benefits, non-linearities in ecosystem service valuation and aggregation. While the focus of this report is on the Wider Caribbean Region, the majority of the information on methodologies is also applicable to the UK.

Although much of the report focuses on marine valuation studies in the Caribbean, it provides a useful starting point for anyone considering carrying out marine valuation in the UK. Notably, it provides a section on the valuation of tourism and marine resources.

**Strangford Lough Management Scheme (2001): Strangford Lough Management Scheme - Public information booklet**
Available at:
http://www.doeni.gov.uk/niea/txt/strangfordloughpubinfobooklet_web.pdf

**Keywords:** Management Scheme, Strangford Lough

This management scheme aims to: identify the conservation features to be protected, set the standards to which the features should be maintained, clarify where statutory responsibilities lie for different aspects, establish a programme to monitor wildlife, list the types of activities and development likely to affect the conservation features, identify where further information is needed/action is required to manage activities in consultation with local interests, develop co-ordination between bodies, and promote better communication to the public.