

Annex B: Benefit Studies

As discussed in the benefits section of the Impact Assessment, the lack of scientific and economic research on the marine environment makes analysis of the additional benefits of designation complicated. Although there has been an evident increase in the number of publications with a focus on ecosystem services and non-market valuation, the economic literature on the protection of the marine and coastal habitats is still limited.

During the first and the second tranche of Marine Conservation Zones, relevant literature valuing ecosystem services was reviewed and included in this annex. For recreational benefits, a detailed literature review was conducted in 2013 by RPA as part of their study on the Value of the Impact of Marine Protected Areas on Recreation and Tourism Services¹, whilst a wider review on the benefits of the marine environment was carried out in 2014 by Turner et al. as part of the NEFAO work package 4 on coastal and marine ecosystem services².

More recently, a full spectrum literature review was undertaken by C. Torres and N. Hanley (2016)³ aimed at providing an overview of the studies on coastal and marine ecosystem services valuation, including those on the recreational benefits analysed within this IA. The authors, using the framework proposed by the Millennium Ecosystem Assessment (MEA), have considered four ecosystem services categories: provisioning services, regulating services, cultural services and supporting services (MEA, 2005)⁴.

Furthermore, in February 2017 the Scottish Government published a report on the socio-economic impacts associated with the management of Scottish Marine Protected Areas (MPAs)⁵. The assessment of these socioeconomic impacts was divided into three sections: the fish catching sector, other marine users and impacts on wider onshore activities such as fish processing, local communities and other marine/coastal developments. The results of this work are consistent with the ones presented in this IA although they are not directly comparable to this proposal since they refer to management activities already in place.

Following the approach adopted for the first and the second tranches of MCZ designations, a literature review on ecosystem services, and related economic benefits, was carried out for the third tranche as well. The table below attempts to review all existing studies containing economic valuation of ecosystem services (marine and coastal) gathered up to April 2017, to support this pre-consultation Impact Assessment. Annex C provide details on the Kenter et al. paper⁶ used to estimate benefits for the 41 sites proposed for this third and final tranche designation.

¹ 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.

² UK National Ecosystem Assessment Follow On: <http://uknSopr@nzi1956ea.unep-wcmc.org/LinkClick.aspx?fileticket=IJEp3mJSVBw%3D&tabid=82>

³ Torres C, Hanley N. Economic valuation of coastal and marine ecosystem services in the 21st century: an overview from a management perspective. 2016 Feb.

⁴ "Millennium ecosystem assessment." *Ecosystems and Human Well-Being: Biodiversity Synthesis*, Published by World Resources Institute, Washington, DC (2005).

⁵ Marine Scotland report: 'Scottish Marine Protected Areas Socioeconomic Monitoring 2016: <http://www.gov.scot/Resource/0051/00514589.pdf>

⁶ Kenter et al. (2013) <http://uknea.unep-wcmc.org/LinkClick.aspx?fileticket=Mb8nUAphh%2BY%3D&tabid=82>

Ecosystem Service category and type of value	Study	Methodology	Key Findings	Impact Assessment applicability
Public willingness to visit (WTV) different coastal settings to assess how biodiversity and psychological restoration are rated	M.P. White et al. (2017)	Online survey panel coordinated by PFA Research in Cornwall It was assumed that higher values of WTV are associated with higher preferences.	<p>People surveyed assigned greater emotional and restorative value to coastal environments with higher levels of perceived biodiversity.</p> <p>Particularly, a one point increase in perceived biodiversity was associated with a .50 increase in WTV</p> <p>Marine wildlife is assumed to influence people's willingness to visit as well; indeed, observing behaviours classed as 'high fascinating' was associated with a .24-point increase in WTV</p>	While these figures cannot be taken into consideration for the valuation of the third tranche specifically, they can be used as an indicator of the significant positive relationship between higher perceived biodiversity/fascinating wildlife behaviour and willingness to visit.

<p>Public willingness to pay for alternative management regimes of remote MPAs in the North Sea (use and non-use values)</p>	<p>R. Brouwer et al. (2016)</p>	<p>A contingent valuation (CV) survey to estimate WTP of beach visitors and a random sample of coastal and non-coastal residents for two alternative management scenarios of three areas: Dogger Bank, Frisian Front and Cleaver Bank</p>	<p>Three different management options were presented: 1) Status quo scenario 2) Scenario in which the 3 areas under analysis become MPAs where economic activities are permitted under certain conditions 3) Scenario in which the 3 areas are designed as fully protected MPAs and all economic activities are not allowed <u>MAIL SURVEY:</u> DB (double-bounded) mean WTP (per year) for the management option 2 is €87.5 while for the management option 3 is €109.9 OE (Open-ended) mean WTP (per year) for the management option 2 is €56.6 while the average WTP for the third management option is €67.7 <u>BEACH INTERVIEWS:</u> DB mean WTP (per year) for the management option 2 is €110.8 while for the management option 3 is €168.8. OE mean WTP (per year) for choosing the management alternative n.2 is €80.1 whilst people's WTP for management alternative n.3 is €132.4</p>	<p>These sites are not included in the MCZ tranche 3 designations, and therefore the figures are not specifically applicable to the tranche 3 consultation. However, this work does support the findings of a previous study carried out by Börger et al. (2014) that also includes the UK portion of the Dogger Bank and reports positive willingness to pay values for the conservation of an offshore site</p>
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<p>Recreation – Tourism and Sailing: Willingness to pay for conservation of characteristic habitats and species (Use and non-use values)</p>	<p>M. Getzner, M. Jungmeier and M. Špika (2016)</p>	<p>Face to face survey presented to two different groups of visitors at Lastovo Islands (Croatia) covering the period July-August 2013. Group A: Families and individuals who went to the island by car, train, bus and further connecting via public ferry or fast boat. Group B: Sailors anchoring or mooring in selected sites of the island</p>	<p>Willingness to pay for two biodiversity conservation scenarios: Scenario 1-Effective implementation of a Management Plan which is aimed at protecting species and habitats in order to increase biodiversity Scenario 2 – Establishment of a Marine Park and effective zoning. This scenario is associated with a greater increase in biodiversity. The mean WTP to pay of respondents from Group A for Scenario 1 is €3.41 whereas the WTP of Group B respondents, on the same scenario, is €2.03 § The mean WTP of respondents from Group A for Scenario 2 is €4.31 whereas the WTP of Group B visitors for the same scenario is €2.75 Overall, tourists and sailors are willing to pay an entry fee which could raise between EUR 330,000 to 451,000 per year for improvements of marine biodiversity and a greater level of protection</p>	<p>While the study illustrates the benefit of adopting a conservation strategy to reduce loss of marine biodiversity, the figures cannot be used to inform the third tranche specifically due to the very different habitats, climates and cultures involved.</p>
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<p>Willingness to pay for healthy underwater vegetation, protection of pristine areas and size of fish stock in Finland, Sweden and Lithuania</p>	<p>A.K. Kosenius, O. Markku, (2015)</p>	<p>A choice experiment (CE) to assess how much people in each of the countries surveyed would pay for marine and coastal quality improvements</p>	<p>Three marine attributes under consideration: 1. Amount of healthy vegetation 2. Preservation of pristine areas 3. Size of the fish stock Estimated with conditional and random parameters logit models. Overall, the WTP estimates are highest for the Swedes and lowest for the Lithuanians. All the countries elicited a higher WTP for large improvements in vegetation Average WTP per person: Finland \$100.8, Sweden: \$231.4 and Lithuania \$43.2. Protection of pristine areas - average WTP per person: Finland: \$92.4, Sweden: \$120.1 and Lithuania: £35.3. Increase of fish stocks – Finland: \$83.8, Sweden: \$181.1 and Lithuania: \$ 36.</p>	
<p>Recreation – Tourism: willingness to pay to visit Lundy Island (UK)</p>	<p>D-R. Chae, P. Wattage and S. Pascoe (2012)</p>	<p>A combination of valuation methods (travel cost method and contingent valuation method) have been used in order to estimate the willingness to pay for travelling to Lundy Island under three alternative travel cost assumptions: TC1: Fare of ferry or helicopter plus basic motoring costs TC2: Fare of ferry or helicopter plus total motoring costs TC3: TC2 plus opportunity cost of travel time</p>	<p>Results: Willingness to pay of each visitor per trip for the recreational use of the island under TC1 scenario is £359.4 whilst under scenario TC2 is £397.4. Under the third scenario hypnotised, TC3, each tourist would be willing to pay £574.4 per trip. The estimates reported in the study appear to be high but, as pointed out by the author, this may be due to several factors like higher price of petrol in UK compared to other countries and the ferry trip to Lundy also seems to be more expensive than the average ferry ticket cost</p>	<p>Even though this study estimates both the market and the non-market value of recreation and tourism on Lundy Island, these figures cannot be used for the third tranche IA specifically because this site has been already designated during tranche two.</p>

<p>Recreation-Tourism: willingness to pay for grey seals conservation and their recreational value (use and non-use)</p>	<p>V. Bosetti and D. Pearce (2003)</p>	<p>A contingent valuation (CV) to estimate the conservation and recreational value of seals</p>	<p>Location of the study: South West England (Seal Sanctuary – Gweek, Harbours of St. Ives and Dartmouth – seal watching) The researchers aggregated the average WTP expressed in the form of a conservation fee paid in addition to the entrance fee (£5.26) over the annual Seal Sanctuary visitors (166,240) and obtained a yearly gross WTP of £874K (non-use value)</p>	<p>Even though grey seals are not included in tranche 3, this study is still relevant because it shows the aggregate benefits arising from conservation management policies.</p>
<p>Relevant literature considered in Impact Assessments for previous MCZ tranches:</p>				
<p>Willingness to pay (WTP) to protect features of an offshore marine protected area</p>	<p>Börger et al. (2014)</p>	<p>Choice experiment which estimated willingness to pay to protect an offshore habitat: the UK portion of the Dogger Bank.</p>	<p>The study found positive willingness to pay values for the conservation of an offshore site. The only attribute used in the study that is relevant to the designation of MCZs is the diversity of species found in the area (due to removal/reduction of trawling). WTP estimates for a 10% increase in species diversity was £4.19 per household per year while WTP estimates for a 25% increase was £7.76 per household per year. Assuming that there were 26.6 million households in UK in 2013 when the survey was conducted (ONS, 2016), this gives a yearly gross WTP of £1111m and £202m respectively for the increase in species diversity in the UK portion of the Dogger Bank. Likewise, for the protection of charismatic species in the UK part of the Dogger Bank, the yearly gross WTP is £638m and £798m respectively</p>	<p>The Dogger Bank is not part of the MCZ Tranche 3 designation but is an SAC, hence the values cannot be directly transferred to MCZs. However, the study demonstrates that the UK population holds positive benefit values for the conservation of offshore sites and their variety of species, which are relevant to several sites proposed for protection.</p>

Willingness to pay to protect deep sea habitats	Jobstvogt et al. (2014)	Choice experiment which estimated willingness to pay for additional marine protected areas in the Scottish deep-sea.	Scottish households were willing to pay (per household per year): £35.43 to £37.85 for a high discovery potential of medicinal products from deep sea organisms; £22.48 to £26.28 for intermediate level of species protection; and £34.83 to £38.70 for high level of species protection for Scottish deep sea habitats. Assuming that there were 2.3m households in Scotland in 2010 this gives a yearly gross WTP between £51m and £60m for intermediate level of species protection. The yearly gross WTP in Scotland for a higher level of species protection is estimated to be between £80M and £89M	The study considered a hypothetical increase in the number of Scottish MPAs to include deep sea habitats and therefore cannot be directly applied to the third tranche areas. However, it provides evidence on positive benefit people assigned to existence values, option values and values of unfamiliar and remote goods and services in general.
Non-use value of protection for English specific MCZs	Kenter et al. (2013)	Contingent valuation applied to estimate the non-use value of 22 Scottish potential Marine Protected Areas (pMPAs/MPA areas of search), 120 English recommended Marine Conservation Zones (MCZs) and 7 existing Welsh marine Special Areas of Conservation (SACs). The study includes consideration of how these values may alter under different management regimes. A travel-cost based choice experiment was also conducted to estimate annual recreational values.	The report concludes that, if expressed in economic terms, the benefits to divers and sea anglers of designating marine protected areas outweigh the cost of designation (consisting of monetised costs to government and industry). The study estimates benefits from designation of MPAs in England, Wales and Scotland. The counterfactual, one off non-use value of protecting the sites to divers and anglers alone would be worth £730-£1,310m (excluding divers and anglers willingness to pay for specific restrictions on other users). The research also estimated the recreational value of MPAs to be £1.87 – 3.39 billion for England alone.	Study findings used for benefits figures in Impact Assessment but for illustrative purposes. There are various limitations of the study that have been provided in Annex C.

Non-use value of protection (also likely to include some use value relating to protection)	McVittie, A. and D. Moran (2010).	Choice experiment used to estimate the WTP for a hypothetical UK network of MCZs to 'halt the loss of marine biodiversity'.	English respondents WTP £69.49/yr/hh to halt loss of biodiversity, and £3.98/yr/hh to impose moderate restriction on resource extraction. Assuming there were 22 million households in England in 2008 (ONS, 2016) this equates to £1.5bn and £87m respectively.	Study only presents the benefits of a hypothetical UK network. Benefits for the smaller number and area of proposed English MCZs not possible to robustly disaggregate.
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