



1. Requirement overview:

Requirements	To understand environmental, social and economic impacts of climate change in space and time at scales suitable for marine planning.
Requirement detail	<p>Climate change will alter environmental, social and economic conditions and opportunities within or adjacent to marine areas directly or indirectly. Climate change predictions are usually presented at distant time horizons (eg 2100), but impacts (positive or negative) can occur within the 20 year horizon of a marine plan. Impacts are expected to vary in onset time and magnitude among marine plan areas depending on the environmental, social and economic conditions that currently exist and the projections for a plan area.</p> <p>The MMO therefore seeks better understanding of shorter time scale predictions (eg to 2040) and finer spatial resolution (plan area or better) to identify the timing and magnitude of different impacts on environmental, social and economic conditions in each plan area. This would highlight opportunities for marine plans to improve resilience to climate change and facilitate more targeted management solutions to address impacts that are predicated to occur within the lifespan of marine plans.</p>
MMO use	<p><b>Marine Planning:</b></p> <p>Defining likely timings and change upon environmental, social and economic conditions resulting from climate change over the lifetime of marine plans will enable effective policy development to address priority climate impacts among the marine plan areas, or ensure policies that seek other objectives are resilient to expected climate change impacts.</p> <p>Marine planning would particular benefit from data at temporal and spatial scales appropriate to marine planning to allow the development of more spatially specific plan policies that manage change over the 20 year lifetime of marine plans.</p>
External interest	Natural England, Joint Nature Conservation Committee, Centre for Environment, Fisheries and Aquaculture Science, Department for

	Environment, Food and Rural Affairs, Marine Climate Change Impacts Partnership.
Delivery target	Q1 2019 to inform iteration 3 of marine plan drafting and for consideration in the potential amendment of adopted marine plans.

## 2. Aims and objectives

### Aim:

To enhance climate change predictions and understanding of climate change impacts for all marine plan areas over scales at which the marine plans operate.

### Objectives:

- extract, collate and summarise existing information on climate change that is currently available at appropriate scales for marine planning but dispersed throughout existing climate change evidence
- encourage outputs from existing or ongoing predictive modelling activity that include time and space scales relevant for marine planning
- identify current evidence gaps or emerging understanding that require further primary research or new considerations and deliver these

## 3. Existing evidence

MMO	<p>Futures analysis for the north east, north west, south east and south west marine plan areas (MMO1127) reviews past trends and current drivers and develops future projections for selected industry sectors that are active in the these marine plan areas with some comments on climate change however it lacked detail on the impacts of these trends.</p> <p>Sub-national plans analysis for the south west and north west (MMO1110) and south east and north east plan areas (MMO1109) summarise sub-national climate change adaptation and mitigation policy in the plan areas drawing on core strategies, national park plans and River Basin Management Plans, Shoreline Management Plans and Estuary Management Plans.</p> <p>MMO1109, 1110 and 1127 are available on request and will be published at a later date.</p> <p><a href="#">MMO1077</a> used data from the UKCP09 projections and information on the current and predicted use of the south and east marine plan areas to identify risks and opportunities from the effects of climate change for maritime sectors.</p>
Academic	Extensive academic literature exists on climate change. This frequently explores either temporal or spatial scales of relevance to marine planning

	<p>but general not both. For example, large-scale, short-term analyses estimating fisheries revenue losses 1% and 21% (2020–50) (<a href="#">Fernandes et al 2017</a>) or small-scale, long-term assessment of the impacts of climate change on UK estuarine systems (<a href="#">Robins et al 2016</a>).</p> <p><a href="#">Panquin et al (2016)</a> propose a tool to link long-term projections that provide insights on vulnerability to climate change and long term impacts with shorter time-scale system decision making (like marine plans) that consider if and when to develop an adaptation strategies.</p>
Other	<p><a href="#">Marine Climate Change Impacts Report Cards</a> by United Kingdom Marine Climate Change Impacts Partnership (MCCIP) provide co-ordinated advice on climate change impacts for our coast and seas across the High Level Marine Objects with some information given by Charting Progress 2 regions</p> <p>MCCIP also produce <a href="#">Marine Climate Change Impacts Special Topic Report Cards</a> focus on a few key topics in more detail eg <a href="#">biodiversity legislation</a>, <a href="#">fisheries</a> etc. Although more detailed, they are less recent than the above impact report card</p> <p><a href="#">UK Climate Projections Marine and coastal predictions</a> (UKCP09). Until at least 2018, these represent the most up-to-date marine climate scenarios and remain the best available evidence. However, whilst some data for 2030 can be extracted from tables in some places most data is presented for the end of the 21<sup>st</sup> century. Spatially, a case study is presented for the Thames Estuary in 2100.</p> <p><a href="#">UK Climate Change Risk Assessment 2017</a>: (Climate change committee) Much of the evidence is presented at national levels although area specific differences are recognised (eg heat-related impacts are expected to be more pronounced in southern UK areas, and water scarcity and aridity stronger in the east). Risks and opportunities to sectors (in the risk assessment) may be linked with independent data on sector distributions among the plan areas to infer some plan area specific risks.</p>

#### 4. Current activity

MMO is not currently engaged in activities to gather evidence related to this requirement.

#### 5. Associated evidence requirements

Ref	Title
R014	Loss of fringing habitat and transitional communities from coastal squeeze
R027	The economic baseline of the English marine plan areas

More information on associated evidence requirements is available [here](#)

#### 6. Potential delivery route

Given the extensive existing evidence surrounding the requirement and the large number of parties interested in climate change impacts, the MMO will focus on delivering this requirement through **knowledge exchange** and **partnering** with others primarily. It will draw on the expertise of the network of organisations associated with delivery of UKCP18 seeking outputs that include evidence at appropriate scales. Where evidence gaps remain to deliver the requirement, the MMO will seek to partner or **influencing the research of others**.

See table 1 for timescales.

## 7. Contact

For more information or to add further research to the existing evidence list please email [evidence@marinemanagement.org.uk](mailto:evidence@marinemanagement.org.uk)

**Table 1: Delivery timescales 2017 to 2020**

Delivery Route	2017				2018				2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Knowledge Exchange																
Influencing the research of others																
Partnering																