



# Marine Management Organisation

## Climate Change Adaptation Report

May 2015





Marine  
Management  
Organisation

## MMO Climate Change Adaptation Report February 2015

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## 1. Introduction

The [Climate Change Act 2008](#) is a legally binding, long-term framework for the UK to mitigate and adapt to the impact of climate change. In 2012 government published the [UK Climate Change Risk Assessment](#) (CCRA) (to be updated every five years) and a [National Adaptation Programme](#) (NAP) which responds to the risks within the CCRA. Under the Act, public bodies (including the MMO) must report on the steps that they are taking to respond to climate change. The purpose of this report is to highlight the ways in which the MMO's work is at risk of being affected by a changing climate and to set out any actions to help the organisation adapt. It does not include activity to mitigate the impact of climate change (for example licensing renewable energy development).

In 2013 the MMO commissioned Cefas (Centre for Fisheries and Aquaculture Science) to produce a piece of research which has contributed to the production of this adaptation report. This research was developed in close consultation with MMO staff to ensure that functions were understood, that any risks from climate change were carefully assessed and that any actions proposed were achievable. The research drew on methodologies used in third party adaptation plans, (particularly those of the Environment Agency and Natural England) and on other relevant sources including the Cefas report [Towards a Marine Climate Change Action Plan](#)' (MACCAP, 2013). The main conclusions of this research have been summarised here in this document.

## 2. Analysis of a changing climate

Evidence from [UK Climate Projections 2009](#), the [Marine Climate Change Impacts Partnership](#) (MCCIP) report cards, the [UK's Climate Change Risk Assessment](#) and other sources have been used along with expert judgement to assess the impacts that climate change might have on the marine environment.

The results show that evidence of a changing climate is already being seen around the UK. Sea level has risen by an average of 2 mm per year since 1955, and appears to be accelerating. Sea surface temperatures have risen around the UK by approximately 0.7 °C since the 1970s, whilst the ocean has become more acidic since pre-industrial times (decreasing by 0.1 pH unit). Further changes are expected in the future. The observed trends and predicted changes attributed to climate change described above will have wide ranging impacts for the marine and coastal environment and ecosystems. There are a number of changes already being observed, and more predicted for the future with varying confidence levels.

## 3. Climate change and the MMO

The MMO is a relatively new organisation, having been established and given powers in 2009 under the Marine and Coastal Access Act and vested in April 2010. The MMO is an arms-length body with multiple government department sponsors led by DEFRA (Department for Environment Food and Rural Affairs) and its mission is to enable sustainable development of UK seas.

Predicting how climate change may impact on the marine environment is difficult, as while projections are made using the best available evidence and modelling systems, they are subject to significant uncertainty. Regular monitoring is required to assess whether these projections are accurate and whether our assumptions need to be adjusted. Despite this uncertainty, it is vital that such projections are considered in future planning and decision-making.

Once robust projections are in place, there is then an additional challenge of assessing just how the work of the MMO may be impacted under these scenarios. While some organisations have a direct remit to manage climate change risk (for example through flood risk adaptation), the ways in which the MMO might be impacted are less clear. To assist our understanding, it has proved helpful to consider climate change impacts in two ways: the first are **direct** impacts and would describe MMO functions where the effects of climate change risk overall delivery. An example of this would be impacts on estates or IT infrastructure. The second group are **indirect** and would describe functions that may not themselves be impacted by climate change, but the way in which they are carried out, or the advice provided as part of the function would be different. An example of the latter is marine planning. Functions that fall within the 'indirect' group are just as important and often represent areas where it is anticipated that the MMO can have the greatest adaptation impact.

MMO functions (set out below) were assessed in relation to the following climate drivers (to which they were considered to be most vulnerable)

:

- Sea temperature change
- Increase in acidification and low oxygen
- Sea level rise and surge
- Storms and waves
- Terrestrial impacts e.g. flooding and climate extremes

The following are MMO functions that have been assessed as having either a moderate or high risk from climate change (based on how important the risk is and how soon the risk may be realised). Each of these functions are already taking steps to adapt to climate change, but a number of new actions have been identified to ensure that future opportunities for adaptation can be taken advantage of.

### 3.1 Marine planning

The MMO is developing marine plans which will translate how the UK-wide Marine Policy Statement will inform decision-making in specific areas. They will provide policy and spatial guidance for an area and help ensure that decisions made within a plan area contribute to the delivery of UK, national and any area-specific policy objectives. Marine plans will be used to guide marine resource users to where they are most likely to be able to carry out particular activities in light of other users and plan area features. They will cover a period of 20 years after adoption and will affect marine developments (for example offshore wind farms) that may be in place for decades from construction to decommissioning.

The Marine Policy Statement requires that marine plans consider climate change and the East Inshore and Offshore marine plans (the first to be adopted in England) demonstrate this through their inclusion of plan policies on climate change adaptation and mitigation. The consideration of climate change in future marine plans is facilitated by the appointment of a member of the planning team to lead on climate change.

In line with the Marine and Coastal Access Act, marine plans will be reviewed at least every three years for progress reporting, and every six years to review the planning process. This statutory review cycle will enable marine plans to factor in new evidence on climate change projections as it is developed. At the time of this report, the process to prepare plans for the South Inshore and Offshore areas is well underway with climate change matters under consideration. Marine plans for all areas around England should be in place by 2021.

In preparing marine plans, the MMO reviews Shoreline Management Plans and River Basin Management Plans produced by the Environment Agency to ensure consistency between policy relating to environmental change, flooding and coastal erosion. The MMO also reviews Local Authority 'core strategies' to ensure marine plans are, as far as possible, compatible with the policies in those strategies. Marine plans are prepared in consultation with a range of interested parties including public authorities with climate change responsibilities, such as local authorities, the Joint Nature Conservation Committee, Natural England and the Environment Agency.

Marine planning will not be directly affected by climate change, but will be **indirectly** affected. While the MMO will still be able to produce the plans, the content of the plans themselves may need to be changed to take climate change into account. Changes to variables such as sea surface temperature or acidification may lead to new adaptation measures being recommended, either in future plans or alterations to existing plans.

**Table 1: Marine planning: current work and future actions**

Team	Function	Direct/ Indirect	How the MMO are already adapting to climate change	Further adaptation actions	Timeline
Marine planning	Preparation and adoption of marine plans	Indirect	<p>The East marine plans contain plan policies on climate change adaptation and mitigation that reflect the wording in the Marine Policy Statement.</p> <p>These policies were developed following an extensive period of evidence collation and issues identification, both at a plan area and national level through a strategic scoping exercise. In addition, the MMO considered Local Authority core strategies, Shoreline Management Plans and River Basin Management Plans and consulted extensively with interested parties in preparing marine plans (including adjacent Member States).</p> <p>The plans were also subject to a Sustainability Appraisal which considered, <i>inter alia</i>, the impact of the plans on climate change issues.</p> <p>The marine planning team have appointed a climate change lead who is responsible for considering how plans can assist both climate change adaptation and mitigation.</p>	MMO to review outputs from Defra MINERVA project and MMO project 1077 to assess how they can be used to contribute to the evidence base for future plan development.	End 2015
				Attend MCCIP climate change adaptation and mitigation group meetings and feed relevant information into marine planning process.	Ongoing
				Continue the approach set out in the previous column (for the East) for the South plan areas, taking account of lessons learned.	End 2016
				Monitor the implementation and effect of the East marine plans (including checking if the climate change policies are being taken account of). Plans will be reviewed every three years and can be updated if required.	End 2017

### 3.2 Marine licensing

The MMO is responsible for marine licensing in English waters and some areas within the jurisdiction of the devolved administrations under the Marine and Coastal Access Act 2009. In broad terms a marine licence is required for any activities involving the deposit or removal of a substance or object on the seabed or in the water column below mean high water springs or to the extent of the tidal influence of a river. A marine licence may also be required for activities outside UK waters,



where the activity takes place from a British vessel or where the vessel was loaded in UK waters. Once a marine licence is granted, the MMO may provide support to developers and receive post-consent monitoring reports as per the licence requirements. The MMO also carries out enforcement of licences if necessary.

Climate change is likely to have an **indirect** impact on marine licensing. This is because the ability to make decisions will not be affected by climate change, but the decisions made sometimes will be. Sea level rise and an increase in surge, an increase in storminess and waves and resulting coastal erosion, and an increase in fluvial flooding may all affect the need for future coastal and marine developments and the likely impacts of these. This could result in an increase to MMO workload if an increasing number of licence applications are made or additional assessment work is required.

Examples of additional applications may include maintenance of sea and flood defences due to increased storminess or new defences required as a result of sea level rise and surge risk increase. There may also be a need for more aggregate extraction than at present, putting pressure on subtidal habitats. Sea level rise may also affect the need for compensatory habitats as existing coastal habitats are lost. Fluvial flooding may result in siltation of river mouths and estuaries, meaning that more maintenance dredging is required. An increase in summer temperatures and coastal visitor numbers may lead to an increase in applications to the MMO for recreational marinas or improvements to sea fronts. Sea temperature, pH and low oxygen may also impact on the function as there may be a need for more assessment work and consideration of effects on fisheries if there are changes in MPA or ecosystem vulnerabilities.

As marine developments can be in place for a number of decades they can be vulnerable to climate change. Changing environmental conditions may result in developments not being able to meet their licence conditions, thereby potentially affecting MMO enforcement work. Some examples are given here, but this list is not exhaustive:

- Sea level rise may affect offshore wind farms as there is a safety requirement for a certain distance to be kept between the turbine blades and the sea surface. Rising sea levels would steadily reduce this distance and so potentially mean that developments are unable to function efficiently or breach their licences.
- Sea level rise and surge and resulting coastal erosion can cause pipelines or cables to become exposed onshore or offshore.
- Fluvial flooding may affect sediment deposition resulting in the need for more frequent maintenance dredging in estuaries or river mouths which might exceed that allowed within their existing licences.
- Increased storminess and waves may mean that jetties, sea defences or breakwaters need reinforcing or extending. Storminess may affect the number of days on which monitoring which can be carried out, and so risking a licence breach.

Such impacts will need to be considered in post consent monitoring along with potential requirements to revise a licensing condition if necessary.

**Table 2: Marine licensing: current work and future actions**

Team	Function	Direct/ Indirect	How the MMO are already adapting to climate change	Further adaptation actions	Timeline
Marine licensing	Decision making on licences for marine activities and infrastructure and post consent monitoring.	Indirect	Climate change impacts considered within EIAs. For example: Shoreline Management Plans and River Basin Management Plans are considered by staff when assessing coastal applications. Coastal processes are also considered.	Keep under review the information on adaptation and mitigation in consent applications.	Ongoing
				Ensure integration with marine plans (to implement any climate change adaptation policies).	
				Ensure advice is sought on impacts associated with climate change from relevant consultees.	
				Production of licensing desk notes and ensuring they are kept up to date with relevant research.	Spring 2018
				Ensure that climate change is considered as part of ongoing discussion into decommissioning (to ensure that the logistics and financial impact of decommissioning in changing climatic conditions is considered).	Spring 2021
				Ensure that climate change is considered as part of ongoing research into cumulative impacts.	
				Develop a process for assessing impacts of climate change on existing consents.	
Use of data collected through long term erosion monitoring to feed into wider MMO work e.g. marine planning.					

### 3.3 Marine conservation and enforcement

#### **Testing the effects of oil spill treatment products (OSTPs)**

The MMO is the licensing authority for oil spill treatment products such as dispersants, sorbents, surface cleaners and bioremediation products. It administers the scheme that tests and approves oil spill treatment products. The MMO also

provides specific approvals and authorisation for the use of products in English waters, taking into account scientific advice particularly from statutory advisors.

This function may be **indirectly** affected by climate change. This is because the effects of chemicals on the environment may change as species become more or less stressed with changing environmental conditions and as they react to combined stresses. Effects on marine organisms, or on behaviour of chemicals, may be seen as a result of sea temperature rise, ocean acidification and low oxygen conditions. Storms and waves may also impact the function as individual chemicals become more or less suitable for use in stormy conditions. The conditions of use of certain chemicals may therefore not be suitable under future climate conditions.

The MMO reviews its protocols for testing dispersal chemicals. Approved OSTPs are reviewed every five years to check that they are still suitable, although they are not necessarily retested. Some chemicals which are currently approved by the MMO will be used in warmer climates and so should not be affected by an increase in sea temperature around the UK, and will have tolerance limits defined. Adaptation actions listed in the table below should be reviewed periodically to ensure that as climate change effects become better known, testing regimes and the list of approved chemicals remains fit for purpose. Carrying out these actions would necessitate a minor resource allocation, but changing testing protocols and retesting chemicals is likely to require major resource, with a knock-on effect for the chemical industry.

### **Provision of advice during emergencies**

The MMO provides advice on the use of oil dispersants and oil spill treatments when an emergency occurs. The Maritime and Coastguard Agency (MCA) leads the spill response, but the MMO are members of the incident group which manages recovery after the incident and minimises environmental pollution. The Department of Energy and Climate Change (DECC) leads the response for oil and gas incidents. During emergencies, the MMO takes advice from Cefas regarding dispersant use and modelling.

There may be an **indirect** effect on this function as a result of climate change. This is because the ability to give advice will not change, but the advice given may. The conditions of use of each chemical may need to be changed or reviewed based on climate information or sea state. The dispersal of chemicals may be harder to monitor in stormy seas and equipment and chemicals may be harder or more dangerous to deploy. There is also an increased risk of container ships spilling cargo if sea state is rough, and so there may be different types of pollution to deal with.

This function may be affected by an increase in sea surface temperature, ocean acidification; low oxygen and sea level rise because these all affect the multiple stressors felt by marine organisms and habitats. These would determine the use of dispersants in different circumstances. Sea temperature and pH may also affect the behaviour of chemicals changing their effectiveness or suitability. Storminess and waves may alter the effectiveness of dispersants or the need for them. If seas are stormy, a pollutant may disperse naturally and not require a chemical dispersant. If

emergencies become more frequent (should seas become stormier) more MMO resource might be required.

### **Support enforcement of Marine Protected Areas through permitting and creating byelaws**

The MMO has powers under the [Marine and Coastal Access Act 2009](#) to make byelaws for the protection of features of marine protected areas (MPAs) which include marine conservation zones (MCZs) and European Marine Sites (EMS). Any management measures developed by the MMO will be informed by conservation advice packages, which define designated features requiring protection and their conservation objectives provided by the relevant statutory nature conservation body.

The creation of byelaws may be **indirectly** affected because climate change will change the distribution of and environmental stresses on habitats and species, and so affect the conservation objectives of MPAs. Byelaws may need to be amended with time as habitats or species move and if evidence shows that MPAs are no longer achieving their objectives. The MMO's ability to make byelaws or issue permits will not be affected, but the byelaws and the permits themselves or the types of activities permissible might be.

The effectiveness and attributes of MPAs may be affected by sea temperature rise, acidification, low oxygen, increased storminess and sea level rise as some species and habitats become more stressed and so more vulnerable to other anthropogenic pressures (it is also possible that some species may benefit from climate change). The statutory nature conservation advisers may need to review the conservation objectives (and any associated targets) of MPAs more frequently, which in turn may require more frequent review of byelaws.

### **Working with and providing advice to each Inshore Fisheries and Conservation Authority (IFCA)**

The MMO holds at least one seat and has a local office representative on each regional IFCA. Through these roles, the MMO supports the IFCAs to develop and enforce fisheries and conservation management measures for inshore waters (within 6nm from the coast). In addition to holding a seat on each IFCA, the MMO quality assure IFCA byelaws and provide a technical review and legal advice on byelaw development as necessary. The MMO and IFCAs often work in partnership to exchange information and collaborate on research, data and intelligence gathering. They alert each other to risks and opportunities and pool expertise and resources.

Climate change may have an **indirect** impact on this function. The key roles of IFCAs are to protect the local marine environment and sustainably manage fisheries. These activities are likely to be affected by climate change as species and habitats become more stressed or populations and species change. As above, the need for development of byelaws may be influenced by climate change requiring more MMO input and quality assurance. There may be more amendments to stock management or seasonal closures necessary in certain areas and byelaws may need changing or new byelaws making more frequently. Climate change aspects may affect different regional IFCAs in different ways. The ability of the MMO to give

tailored advice to IFCA's and stakeholders is unlikely to be affected, but the advice itself may be.

Climate aspects which could affect this function are sea temperature rise, ocean acidification and low oxygen. Acidification could be important for IFCA's through impacts on shellfisheries. Sea level rise may also affect the function if coastal or estuarine nursery grounds become more or less suitable for a particular species.

**Table 3 Marine Conservation and Enforcement: current work and future actions**

Team	Function	Direct/ Indirect	How the MMO are already adapting to climate change	Further adaptation actions	Timeline
Marine Conservation and Enforcement	Testing the effects of oil spill treatment products	Indirect	Chemicals tested every five years for suitability. Some chemicals will have environmental tolerance limits defined.	Review appropriateness of testing protocols	Ongoing
	Provision of advice during emergencies	Indirect	Sea state is taken into account when deciding on use. Conditions of use are considered when choosing dispersants. MMO changes its advice dependant on weather conditions. MCA monitoring risks of extreme weather. MMO increasing numbers of emergency responders.	Review appropriateness of contingency plans and number of MMO emergency responders	Ongoing
	Support enforcement of Marine Protected Areas through permitting and creating byelaws	Indirect	MMO, Natural England and JNCC staff are aware of climate change but it could be considered more and be more forward thinking. MMO considers environmental changes regarding byelaws and permits. VMS being trialled	Discuss with Natural England and JNCC how to engage on climate change and MPAs	Ongoing
	Working with and providing advice to each IFCA	Indirect	Possible to make emergency byelaws in response to environmental changes. Members aware of how climate change affects their own area.	Consider climate change when writing management measures	2018
				Include climate change on the checklist for byelaw quality assurance	2016
				Carry out knowledge exchange on climate change impacts	Ongoing

### 3.4 Fisheries management

The MMO has a number of roles with regard to fisheries quotas. The MMO prepares and distributes quota management rules, manages international quota swaps, issues annual quota allocations to producer organisations and other groups, monitors quota uptake and redistributes quotas amongst smaller vessels. It also manages quota allocations for the non-sector and inshore fleets and sets catch limits for those fleets where necessary. To prevent overfishing of quotas, the MMO can close fisheries to certain groups or to everyone. The MMO, with devolved administrations, monitors boats entering and leaving the fleet.

This function may be **indirectly** affected by climate change. This is because the demand for quotas and their value may be affected as fish distribution and species, change around the UK and move into or out of international waters. Maximum sustainable yield (which is not set by the MMO) could be affected as species recruitment, growth and survival are affected by multiple stressors including climate aspects, and so the quotas allocated to the UK may change. Multispecies fisheries may change in composition due to ecosystem effects. In turn, these will affect the MMO's allocation of quotas across the fleet, or may require a fishery or an area to be closed. If fish move out of UK waters, the quota may not be used by the English fleet, and may be transferred to the Scottish fleet, or if a species moves into UK waters, a new quota or a trade with another EU member state may be required. Temperature may affect the timing of spawning and migration and so affecting vulnerability of stocks to fishing.

Climate aspects which could affect this function are sea temperature rise, ocean acidification and low oxygen. Sea temperature rise may cause the biggest effects as species are more responsive to this than the other aspects. Sea level rise may also affect the function if coastal nursery grounds become unsuitable or less productive. Ocean acidification is expected to impact shell fisheries more than fin-fish fisheries.

There may be opportunities for the fishing industry as new species move into UK waters and new fleets emerge. Quotas for these species will then need distributing and managing. There may be opportunities for expansion of aquaculture in English waters or addition of new species which the MMO would regulate.

**Table 4: Fisheries management: current work and future actions**

Team	Function	Direct/ Indirect	How the MMO are already adapting to climate change	Further adaptation actions	Timeline
Fisheries management	Manage fisheries quotas	Indirect	Changes in fish locations already taken into account. Vulnerable areas can be closed to fishing. Focus groups held with fishing industry to consult on quota allocations.	Consult fishing organisations regarding climate change during focus groups	Spring 2018
				Annually review changes in fish stocks and ensure staff are kept up to date	Ongoing

### 3.5 Infrastructure and estates

As well as the work areas discussed above, the MMO has a more general responsibility to ensure climate change does not impact on the facilities we need to carry out our work. While impacts on business are managed by the MMO, impacts on estates are managed by Defra and in 2010, Defra undertook a climate change adaptation risk assessment on all buildings that are part of its estate (including MMO offices). The risk assessment looked at issues such as flood risk, water security and increased rain/wind speed, identifying risks from low to high. The purpose of this exercise was to allow high risks to be addressed where possible or to be considered in reviewing building suitability for the future. Those areas reflected on were: building location, site layout, building structure, ventilation/cooling, drainage, outdoor spaces and connectivity.

In addition to this, the MMO is also drafting its own business continuity plan (BCP) to ensure alignment with ISO standard 22301. Once prepared, the BCP will set out how the MMO can respond to emergencies to ensure its business processes are still operational. Such emergencies include extreme weather events that may occur as a result of climate change. To assist in its development, the MMO has commissioned a 'Business Impact Analysis' to identify potentially vulnerable business services and processes. The Business Impact Analysis and other information will enable the MMO to identify risk assessed solutions to facilitate recovery of MMO business services, work and estates within 14 days of disruptive incidents and such solutions will form the basis of the BCP.

Unlike the impacts described above for functions such as marine planning or licensing, impacts to estates and infrastructure are **direct**, in that damage or loss to buildings or equipment will directly affect the ability to carry out business functions. Should climate change impacts cause an unforeseen disruption to business, the BCP will set out what resources would be required to ensure all necessary activities can continue.

**Table 5: Infrastructure and estates: current work and future actions**

Team	Function	Direct/ Indirect	How the MMO are already adapting to climate change	Further adaptation actions	Timeline
Knowledge and Information Management	Business Continuity	Direct	Risks to estates and infrastructure are currently managed by Defra.	Publish an MMO Business Continuity Plan	End March 2015

## 4. Interdependencies

Collaborative working is key to the successful delivery of MMO functions, with the MMO dependant on the contribution of other organisations and external stakeholders to achieve its objectives. Many of the actions identified in this report require contribution from a number of organisations and stakeholders and it will be important for the MMO to work closely with these organisations to ensure they are achieved.

This may occasionally mean that delivery takes longer (as discussions and consultations are required), but by involving other parties we can ensure that fully integrated solutions are reached.

Examples include the action to develop marine plans in consultation with a wide range of interested parties (including local communities), and the actions for marine licensing to consider process amendments in collaboration with others (for example Cefas, Natural England, the Environment Agency and JNCC). These organisations are statutory consultees on licence applications and so would be affected by changes to the licensing process made by the MMO.

MMO functions are also largely dependent on the availability of third party computer systems (e.g. IBM and CEFAS) and as such have been factored in to the Business Impact Analysis described in section 3.5.

## 5. Implementation and reporting

The MMO has an obligation under the Climate Change Act 2008 and its associated [Adaptation Reporting Power](#) to report on its climate change adaptation progress every five years. The additional actions identified in this report will be carried out by MMO staff and reviewed every three years as part of the wider MMO business review cycles. By reviewing these actions alongside other MMO objectives, they are more likely to become embedded within the MMO culture and will stay in place long enough to evolve as climate change impacts become more evident. Every three years the MMO will report on what has been done to carry out these actions and whether any new actions have been identified. The actions will be reviewed in accordance with the most up to date scientific knowledge on climate change risks.

To ensure the MMO can adapt to a changing climate, it is vital that the organisation maintains a strong level of awareness of the most up to date scientific knowledge and takes account of this knowledge in future decision-making. Personnel from the MMO sit on the MCCIP and Cefas' Marine Climate Change Centre steering groups and relevant information from these forums will be circulated to staff via newsletters, training sessions or the MMO intranet. This will ensure a higher level of awareness and preparedness amongst its staff. These forums may also prove useful in identifying future collaborative actions.

**Table 5: Infrastructure and estates: current work and future actions**

Team	Function	Direct/ Indirect	How the MMO are already adapting to climate change	Further adaptation actions	Timeline
All	Implementation and reporting	Indirect	Attendance at MCCIP and Marine Climate Change Centre meetings	Communicate publication of MMO Climate Change Adaptation Report to all staff	End 2015
				Keep MMO staff up to date on latest climate change projections and ongoing	Ongoing



## Annex 1: Full list of MMO actions

Team	Function	Direct/ Indirect	How the MMO are already adapting to climate change	Further adaptation actions	Timeline
Marine planning	Preparation and adoption of marine plans	Indirect	<p>The East marine plans contain plan policies on climate change adaptation and mitigation that reflect the wording in the Marine Policy Statement.</p> <p>These policies were developed following an extensive period of evidence collation and issues identification, both at a plan area and national level through a strategic scoping exercise. In addition, the MMO considered Local Authority core strategies, Shoreline Management Plans and River Basin Management Plans and consulted extensively with interested parties in preparing marine plans (including adjacent Member States).</p> <p>The plans were also subject to a Sustainability Appraisal which considered, inter alia, the impact of the plans on climate change issues.</p> <p>The marine planning team have appointed a climate change lead who is responsible for considering how plans can assist both climate change adaptation and mitigation.</p>	MMO to review outputs from Defra MINERVA project and MMO project 1077 to assess how they can be used to contribute to the evidence base for future plan development.	End 2015
				Attend MCCIP climate change adaptation and mitigation group meetings and feed relevant information into marine planning process.	Ongoing
				Continue the approach set out in the previous column (for the East) for the South plan areas, taking account of lessons learned.	End 2016
				Monitor the implementation and effect of the East marine plans (including to check if the climate change policies are being taken account of). Plans will be reviewed every three years and can be updated if required.	End 2017

Team	Function	Direct/ Indirect	How the MMO are already adapting to climate change	Further adaptation actions	Timeline
Marine licensing	Decision making on licences for marine activities and infrastructure and post consent monitoring.	Indirect	Staff are aware of climate change. Climate change impacts considered within EIAs. For example: Shoreline Management Plans and River Basin Management Plans are considered when assessing coastal application. Coastal processes are considered.	Keep under review the information on adaptation and mitigation in consent applications.	Ongoing
				Ensure integration with marine plans (to implement any climate change adaptation policies).	
				Ensure advice is sought on impacts associated with climate change from relevant consultees.	
				Production of licensing desk notes and ensuring they are kept up to date with relevant research.	Spring 2018
				Ensure that climate change is considered as part of ongoing discussion into decommissioning (to ensure that the logistics and financial impact of decommissioning in changing climatic conditions is considered).	Spring 2021
				Ensure that climate change is considered as part of ongoing research into cumulative impacts.	
				Develop a process for assessing impacts of climate change on existing consents.	
				Use of data collected through long term erosion monitoring to feed into wider MMO work eg marine planning.	

Team	Function	Direct/ Indirect	How the MMO are already adapting to climate change	Further adaptation actions	Timeline
Marine Conservation and Enforcement	Testing the effects of oil spill treatment products	Indirect	Chemicals tested every five years for suitability. Some chemicals will have environmental tolerance limits defined.	Review appropriateness of testing protocols	Ongoing
	Provision of advice during emergencies	Indirect	Sea state is taken into account when deciding on use. Conditions of use are considered when choosing dispersants. MMO changes its advice dependant on weather conditions. MCA monitoring risks of extreme weather. MMO increasing numbers of emergency responders.	Review appropriateness of contingency plans and number of MMO emergency responders	Ongoing
	Support enforcement of Marine Protected Areas through permitting and creating byelaws	Indirect	MMO, Natural England and JNCC staff are aware of climate change but it could be considered more and be more forward thinking. MMO considers environmental changes regarding byelaws and permits. VMS being trialled	Discuss with Natural England and JNCC how to engage on climate change and MPAs	Ongoing
	Working with and providing advice to each IFCA	Indirect	Possible to make emergency byelaws in response to environmental changes. Members aware of how climate change affects their own area.	Consider climate change when writing management measures	2018
				Include climate change on the checklist for byelaw quality assurance	2016
				Carry out knowledge exchange on climate change impacts	Ongoing
	Fisheries management	Manage fisheries quotas	Indirect	Changes in fish locations already taken into account. Vulnerable areas can be closed to fishing. Focus groups held with fishing industry to consult on quota allocations.	Consult fishing organisations regarding climate change during focus groups
Annually review changes in fish stocks and ensure staff are kept up to date					Ongoing

Team	Function	Direct/ Indirect	How the MMO are already adapting to climate change	Further adaptation actions	Timeline
Knowledge and Information Management	Business Continuity	Direct	Risks to estates and infrastructure are currently managed by Defra.	Publish an MMO Business Continuity Plan	End March 2015
All	Implementation and reporting	Indirect	Attendance at MCCIP and Marine Climate Change Centre meetings	Communicate publication of MMO Climate Change Adaptation Report to all staff	End 2015
				Keep MMO staff up to date on latest climate change projections and ongoing	Ongoing