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Report on the work of the Habitats and Wild Birds Directives – Marine Evidence Group

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Summary

The Marine Evidence Group ('the Group') was established in July 2012 to fulfil measures on improving marine data and evidence set out in the [Habitats and Wild Birds Directives Implementation Review](#) ('the Review'). In particular, it was a response to ongoing difficulties in assessing the impacts of marine developments on protected sites and species. The Group is doing this by addressing gaps in evidence that can create uncertainties when undertaking Habitats Regulations Assessments¹ which may hamper fast, effective and proportionate decision-making.

The Group is seeking to agree a common view on the best evidence available, taking into account that it is not helpful if developers, advisers and regulators use different evidence bases and datasets. It is looking at what can be done to improve evidence now and what needs to be done in the longer term. This includes improving sharing of existing data.

The membership of the Group has been drawn from industry, environmental organisations, academia, Government and its agencies, recognising that it is critical that all parties collectively engage in the development of evidence to ensure their confidence in its use. The Devolved Administration Governments have also been represented on the Group. The Group met in July 2012, November 2012 and February 2013.

This report sets provides an update on the progress made so far by the Marine Evidence Group in addressing the key evidence gaps identified in the Habitats and Wild Birds Directives Implementation Review and on improving access and use of data. The Group has agreed five initial recommendations covering how the evidence base can be improved further and how an improved use of evidence might be built in to the decision making system. A number of projects initiated by the Group are still ongoing at the time of preparing this report the Group will therefore continue to develop these recommendations based on the output from these projects.

Summary of Progress made by the Marine Evidence Group

The immediate requirements are to support decision-making on certain marine developments, such as for renewable energy production. It is important to identify and apply the best evidence available now to assess potential impacts and so inform those decisions. The Group has noted that in terms of the best evidence currently available for use in Habitats Regulations Assessment:

¹ Habitats Regulations Assessments in accordance with

- *on seabirds*: there is evidence from the [Seabird Monitoring Programme](#) for breeding seabirds and from the [European Seabirds at Sea database](#) for distribution of seabirds at sea as well as data collected by developers themselves. Information on concentrations of birds wintering inshore is in a variety of databases. Information collected through the Strategic Ornithological Support Services programme is available to assess impact.
- *on marine mammals*: there is evidence on distribution and abundance collected through the [Joint Cetacean Protocol](#), which provides a gateway to data from industry, NGOs and government-funded survey work. Evidence on the impacts of underwater sound on marine mammals is available from a variety of documented literature;
- *on migratory fish*: the Environment Agency has considerable data on genetic and populations of migratory fish, but information on the impacts of developments in estuaries, which are the key area of concern, is generally fragmented and there have been few evidence collation exercises to date;
- *on mitigation measures*: evidence on effectiveness of mitigation measures is fragmented with information on the types of mitigation applied mainly held in licences and environmental management plans.

The Group has noted that there remain large uncertainties in the evidence base on impacts to marine special areas of conservation (SACs) and special protection areas (SPAs) for birds from various activities. Whilst decisions are based on best available evidence, a precautionary approach is required under the legislation. The scale of developments expected in UK seas over the coming years presents the need to consolidate understanding of best current evidence and to identify priorities for the development of evidence and address these. The Group has scoped and commissioned several projects to draw together a better consolidated picture of the best evidence available and to research the gaps identified by the Habitats and Wild Birds Directives Implementation Review and its follow up work. These include projects on:

- *seabirds*: an evidence review to identify measures that could be used to mitigate or compensate the impacts of offshore wind farms on seabirds;
- *marine mammals*: an evidence review by a specially commissioned expert panel on the displacement of harbour porpoises during pile driving operations for the construction of offshore wind farms;
- *migratory fish*: a review of the evidence on key impacts from development of ports and other projects in estuaries affecting migratory fish;
- *mitigation*: a review of approaches used to mitigate impacts by each sector with the aim of identifying best-practice options for mitigation measures and transferability between sectors, where this is appropriate.
- *post-consent monitoring*: a review of monitoring carried out in response to licence conditions at existing offshore wind farms which will develop recommendations for maximising the effectiveness of post-consent monitoring.

These projects are ongoing and will deliver results over the next six months. Through this work the Marine Evidence Group is aiming to deliver an authoritative expert view on the best available evidence which will support decisions on marine developments in the near future. The Marine Evidence Group will arrange appropriate review of the outputs from these projects and consider when they may need to be reviewed and updated.

The Group has also recognised the importance of work by its member organisations to address the evidence gaps identified in the Habitats and Wild Birds Directives Implementation Review, including :

- work funded by The Crown Estate, Marine Scotland, DECC, Countryside Council for Wales, Scottish Natural Heritage and Natural England to develop an interim Population Consequences of Disturbance (PCoD) Framework for predicting the impacts of disturbance from developments on marine mammals;
- the development of the Offshore Renewables Joint Industry Programme (ORJIP) by DECC, Marine Scotland and The Crown Estate which it is proposed will include projects on :
 - *seabirds*: collision risk and avoidance rate monitoring in offshore wind farms;
 - *mammals*: evidence gathering for a Population Consequences of Acoustic Disturbance model to predict impacts on mammals from underwater noise;
 - *mitigation*: underwater noise mitigation technologies for piled foundations in deeper water;
 - *mitigation*: improvements to standard underwater noise mitigation measures during piling;
 - work by The Crown Estate and Marine Scotland to draw together evidence on the impact of wave and tidal renewable energy development;
 - work by Natural England and the MMO to provide more accurate maps of seabird sensitivity in English territorial waters;
 - seabird tracking and modelling work being supported by DECC and RSPB.

The Group is tasked with addressing actions on sharing of data set out in the Habitats and Wild Birds Directives Implementation Review. The Group has agreed that the focus of these actions should be on data relating to the key species (birds, mammals, fish) for which protected areas (SACs and SPAs) can be designated as listed in the Directives and the habitats protected by SACs. Progress is being made to ensure such data is made more accessible from government organisations. The Crown Estate's [Marine Data Exchange](#) is a major step forward in supporting access to data collected by offshore wind developers. Further discussions are needed to identify the best ways to ensure that data can be of maximum benefit to developers and regulators and that it is not withheld unnecessarily due to commercial considerations.

Initial Recommendations

The Marine Evidence Group makes the following initial recommendations on the basis of its work so far:

1. To achieve authoritative evidence that can inform development decisions, it is critical that Government, industry and environmental organisations engage collectively in the development of evidence to ensure their confidence in its use. This is a key principle underpinning the work organised by the Marine Evidence Group and in the development of Offshore Renewables Joint Industry Programme. It links also to other measures from the Habitats and Wild Birds Directives Review such as the introduction of consistent standards on the acceptable range and quality of evidence that will enable statutory agencies to provide their advice.
2. Evidence development will be facilitated by greater clarity on how the consenting process will consider impacts from different developments in the same area. For example, how evidence of a cumulative impact on seabirds arising from two or more developments will be handled. In this context the Group has identified a need to establish increased clarity on thresholds at which effects on populations of protected species and the integrity of qualifying species and habitats in SACs and SPAs should be judged as significant. These are issues relevant to achieving the optimum sustainable use of the marine area that need a wider discussion across the regulatory process. These considerations point to the importance of strategic environmental assessment for some programmes of marine development.²
3. Further examination is needed of whether the impacts of different sectors and the impacts of wider environmental changes are considered consistently². For example, processes looking at the impacts of different sectors on bird populations could be better integrated. The Group has also noted recent developments towards managing fisheries in SACs and SPAs in accordance with the Habitats and Birds Directives.
4. The work of cross-government Groups charged with evidence coordination in relation to particular issues (eg offshore wind, migratory fish) needs to have a stronger focus on strategic and collective evidence requirements. These bodies need to allow for engagement in evidence development so that the outputs are recognised by government, industry and environmental groups. The functioning of the various evidence coordination mechanisms in support of development should be reviewed alongside the Marine Evidence Group.
5. It is recommended that the Marine Evidence Group should continue its work to support the Defra [Major Infrastructure and Environment Unit](#), specifically to:

² These aspects lie beyond the current scope of the Marine Evidence Group, although the Group can provide evidence to advise on their development.

- Finalise the outputs from the projects it has set up to address the key evidence gaps identified in the Habitats and Wild Birds Implementation Review including, as appropriate, agreeing on appropriate expert or peer review to ensure they provide an authoritative view on evidence and identify the need for any follow up projects;
- Agree on further, longer term work to address the key evidence gaps identified in the Habitats and Wild Birds Implementation Review, especially from a multi-sectoral perspective, and keep a watch for any new evidence issues hampering decision-making;
- Examine past / existing post-consent monitoring results for ports to determine the need for development of a rolling programme of post-consent monitoring for the ports sector;
- Identify further steps to ensure access and sharing of the key data relevant to imminent consenting decisions to the greatest extent possible;
- Respond to evidence issues identified by the Defra Major Infrastructure and Environment Unit.

6. The work of the Marine Evidence Group should be reviewed again in 12 months.

1. Introduction

The Habitats and Wild Birds Directives Implementation Review (March 2012) was set up to ensure the Directives were being properly implemented but without placing unnecessary costs and delays on developers³. The essential purpose of these Directives is to ensure that the protected species and habitats are maintained at, or restored to appropriate levels. The Directives provide a common legislative framework to follow, for example when seeking to authorise activities that might affect protected sites or protected species, wherever they occur. The relevant protection given by the Habitats and Wild Birds Directives is transposed into UK legislation through the 2010 Habitats Regulations (as amended)⁴ for territorial waters and through the 2007 Offshore Marine Conservation (Natural Habitats, &c) Regulations for waters beyond territorial waters.

These Regulations requires a competent authority to follow a number of steps before permission for an activity is granted, referred to as Habitats Regulations Assessment. Whether or not the planned activity may have a significant effect⁵ on the protected site⁶ is an early question to be addressed, and if the answer is “yes” then a detailed assessment (an “appropriate assessment”) is required. This assessment must identify whether the planned activity may have an “adverse effect” on the integrity of the site and if there is none, then permission for the activity can be granted under the consenting process. If there may be an adverse effect then permission to carry out the activity will be refused. However, in certain situations (and with certain conditions attached⁷), the activity may still proceed in spite of the possibility of there being an adverse effect if there are no feasible “alternatives” and the activity is justified by “imperative reasons of overriding public

³ In the Habitats Directive this is the concept of “favourable conservation status” (FCS). The Wild Birds Directive contains no obligation to achieve FCS, but there is an obligation in Article 2 to maintain populations of all wild bird species.

⁴ Conservation of Habitats and Species Regulation 2010 amended.

⁵ ‘Likely to have a significant effect’ is a term used in both the Habitats Directive and the Habitats Regulations. However, case law (Waddenzee C-127/02) has interpreted this as meaning that there may be (as opposed to is likely to be) a significant effect.

⁶ The assessment requires the effect of any activity (technically known as a ‘plan’ or a ‘project’) to be assessed alone or in combination with other ‘plans’ or ‘projects’.

⁷ The criteria are that there are no feasible alternatives, the plan or project must proceed for imperative reasons of overriding public interest (IROPI) and that compensatory measures are taken to protect the overall coherence of the protected site network.

interest” (IROPI). Habitats Regulations Assessments are usually reviewed in parallel with Environmental Impact Assessments⁸.

The Review identified the need to improve the quantity and quality of data and evidence on protected sites and species so as to ensure proportionality in the standard of evidence required, recognising that uncertainties and gaps in evidence, particularly in the marine environment, lead to slow and/or overly precautionary decisions by regulators.

Reflecting this challenge, the Review identified scope to prioritise evidence improvement around issues which can most hamper decision-making related to the Directives. It also identified opportunities to improve the use and availability of existing data, including that held by statutory agencies, regulators, developers and The Crown Estate. The Review also uncovered opportunities to improve aspects of data collection and how to target post-consent monitoring. Post-consent monitoring is important because it provides evidence on both the specific impacts of activities in practice and the effectiveness of mitigation measures. This information can be used to influence future licensing conditions and support better evidence-based decision-making.

To address these issues the Review established a Habitats and Wild Birds Directives – Marine Evidence Group to focus on three priorities:

- improving the accessibility and use of marine data through better data sharing (including identifying and overcoming legal barriers) and ensuring that maximum use is made of evidence from existing data and information;
- addressing priority research gaps where improved understanding of existing evidence, or filling of gaps in research, would support fast, effective and proportionate decision-making in the marine environment. Areas identified in the Review included;
 - Modelling of effects on population of seabirds and validating critical input parameters, eg population framework, collision and displacement risk;
 - Modelling of effects on populations of marine mammals and validating critical input parameters, eg population framework, displacement risk;
 - Impacts of marine activity (eg offshore wind, cabling) on the seabed and priority species;
 - Cumulative impacts of marine activities;
 - Understanding better the specific impacts of different marine sectors and how they can be avoided and the solutions more widely applied;
 - Understanding better the populations of mobile species at appropriate scales and the population implications of any impacts from significant infrastructure projects in English waters.

⁸ As required under the Environmental Impact Assessment Directive (Council Directive 85/336/EC) before permission is granted for projects which are likely to have significant environmental effects by virtue of their nature, size or location.

- developing a more strategic approach to post-consent monitoring of marine developments so that monitoring is better-designed and targeted to inform future development proposals, mitigation measures and conditions of licences.

The Habitat and Wild Birds Directives Marine Evidence Group met for the first time in July 2012. The membership of the Group includes expert participants from Government, its agencies, The Crown Estate, industry, particularly energy, ports and marine minerals, environmental organisations and academia. Representatives from the Devolved Administrations are included as it is recognised that they are facing many of the same issues. The Group is chaired by Defra. Defra and Cefas provide Secretarial support. The terms of reference used to guide the initial work of the Group and a list of members is at Annex I.

This membership is multi-sectoral in terms of development sectors and between government, industry and environmental non-governmental organisations and the Group has recognised the need to develop a common view on what currently represents the best available data and evidence for the assessment of the impacts of developments on protected sites and species. It also needs to agree on priorities for the shaping and development of marine data and evidence over the mid- to long-term.

Accordingly contributions from all member organisations are essential to support the delivery of the Group's objectives, for example through providing leadership on specific pieces of work. Member organisations recognise that such contributions may be subject to review, either within the Marine Evidence Group itself or through independent peer review, and there needs to be an awareness that such contributions may need to be shaped and developed in such a way as to meet the common aims of the Group.

The Marine Evidence Group is both informed by, and provides advice to, the bodies engaged in delivering the other measures initiated by the Review, including the Defra Major Infrastructure and Environment Unit and the Defra Secretary of State's [Major Infrastructure and Habitats Group](#). There is also relevance to other measures identified in the Habitats and Birds Directives Implementation Review on [evidence plans](#) and consistent standards on the acceptable range and quality of evidence to enable statutory bodies to provide their advice.

The Marine Evidence Group has also needed to establish an effective interaction with other bodies tasked with determining and addressing evidence gaps and acts to develop synergies between its own activities and these bodies. Where possible, the Group also seeks to encourage synergies between these different groups with a view to shaping the longer-term structure for evidence development.

This report provides the update of the work of the Marine Evidence Group up to March 2013, which Defra committed to publish in the Habitats and Wild Birds Directives Implementation Review. Given the relatively short lifetime of the Group, a number of pieces of evidence collation are still ongoing at the time of preparing this report. It has therefore not been possible to reflect on the results of this work at the time of writing. The report is structured around the main issues the Group was tasked with by the Habitats and

Wild Birds Directives Implementation Review. The Group has regrouped the key research gaps identified in the Review under the headings: seabirds, marine mammals, migratory fish, mitigation and cumulative impacts. Progress in addressing each of these evidence gaps is described in the following chapters against a standard set of questions. Key messages from this work are provided. The final two chapters describe the progress made in developing more strategic post-consent monitoring and in improving access and use of marine data.

2. Relationship to other evidence coordination work

The Habitats and Wild Birds Directives – Marine Evidence Group has been introduced into a landscape of existing evidence coordination activities. Importantly the Marine Evidence Group is seeking to take a multi-sectoral view on evidence needs and to do so with the engagement across government, industry and environmental non-governmental Organisations (NGOs).

Many organisations represented on the Marine Evidence Group have their own evidence development programmes, which provide an important means for addressing the evidence needs of the Group. Examples include the DECC's Offshore Energy Strategic Environmental Assessment research programme and Defra's Marine Research Programme. DECC, Marine Scotland and The Crown Estate are developing a joint research programme with industry to address evidence issues which pose the most imminent risk to the consenting of offshore wind (Offshore Renewables Joint Industry Programme (ORJIP)). ORJIP has an engagement strategy that follows similar principles to the Marine Evidence Group in terms of engagement, recognising that it is critical that Government, Industry and environmental organisations engage in the development of evidence to ensure their confidence in the use of its outputs.

There are also a range of evidence coordination activities which have been put in place to coordinate evidence development between bodies through exchange of information or working to develop joint priorities. These include activities to coordinate the work of similar types of bodies, such as the Defra network bodies⁹ or the Statutory Nature Conservation Bodies (SNCBs)¹⁰. There are also cross-government groups addressing the needs of particular sectors, such as those for Offshore Wind or Offshore Gas, or ecosystem components, such as for seabirds.

To date, the work of the following groups has been of particular relevance Marine Evidence Group:

- The Offshore Renewable Research Steering Group (ORRSG): a cross department group including Defra, DECC, MMO, Marine Scotland, The Crown Estate, NERC and others. The ORRSG was established to co-ordinate research in support of offshore wind development and other marine renewable energy technology in the UK. ORSSG is working particularly to support the Offshore Renewable Energy Licensing Group which has the aim of promoting well organised and efficient

⁹ Cefas, Environment Agency, Natural England, Marine Management Organisation

¹⁰ Countryside Council for Wales, Joint Nature Conservation Committee, Natural England, Northern Ireland Environment Agency, Scottish Natural Heritage.

regulatory and examination processes amongst UK regulators. ORSSG is currently reviewing its role, including through a focus on research coordination and technology innovation, and membership.

- The Strategic Ornithological Support Services group (SOSS) funded by The Crown Estate. This group provided advice to the offshore wind farm industry between 2010 and 2012 with the aim of resolving the consenting challenges posed by the potential for offshore wind farms to impact on bird populations. A steering group, comprising representatives of developers, regulators and advisory bodies, oversaw a programme of work to identify and help find solutions to key ornithological issues relating in particular to the 'Round 3' development zones, though more broadly in relation to the development of offshore wind farms in general. The primary aim was to reduce the consenting risk posed by current key gaps in knowledge of the effects of offshore wind farms on birds.
- The NERC Marine Renewable Energy Knowledge Exchange Programme is working to ensure an environmentally sustainable future for the marine renewable energy sector. It is helping to build stronger partnerships between the academic, public, private and voluntary sectors . It is also assisting the integration of policy, business and research needs thereby enabling a better understanding of the risks and benefits of deploying renewable energy arrays in the marine environment.

The Marine Evidence Group is working to ensure awareness between itself and these other groups carrying out evidence gathering and development activities. Where appropriate the Group is seeking to clarify and assist the uptake of the work of these other groups. In some cases the work of these bodies has acted as the basis for conclusions by the Marine Evidence Group or has enabled the Group to take a lighter touch and not duplicate ongoing processes.

3. Key Evidence Gaps – Seabirds

Key messages

- Evidence on seabirds has been recognised as one of the most pressing issues for the consenting of offshore wind energy developments. Key research needs in the Habitats and Wild Birds Directives Implementation Review were focused on offshore wind.
- Research is being established or is underway to improve data on the rates of collision of birds with offshore turbines and to improve knowledge of avoidance behaviour. Further work is needed to improve understanding of displacement of seabirds by developments.
- Work is underway to identify measures that could be used to mitigate or compensate offshore wind farm impacts on seabirds.
- Further consideration needs to be given to use of population-based approaches for assessing impacts.

What are the key evidence gaps that hamper decision making on marine developments

The assessment of impacts on populations of certain bird species has been recognised as one of the most pressing evidence issues for the consenting of offshore wind energy developments in UK seas. The Habitats and Wild Birds Directives Implementation Review identified the key evidence gaps that were hampering decision making as:

- modelling of effects on populations of seabirds especially the validation of critical input parameters, eg population framework, collision and displacement risk;
- understanding better the populations of mobile species at appropriate scales and the population implications of any impacts from significant infrastructure projects;
- cumulative impacts of marine activities on SPA conservation objectives for birds.
- Collision/avoidance rates, displacement, population frameworks and cumulative impacts were also identified as the key priorities by the Strategic Ornithological Support Services (SOSS) group.

There is growing interest in whether there is sufficient evidence to support measures to mitigate or compensate the impacts from certain developments on seabirds as a possible route to meet renewable energy targets.

How is the Marine Evidence Group contributing to a shared understanding of what currently constitutes the best available evidence in respect of these evidence gaps?

Collision and avoidance rates

The risk of birds colliding with wind turbine blades is potentially one of the most significant environmental impacts from offshore wind farms. Relatively few detailed monitoring studies have been undertaken and there is considerable uncertainty over the scale of any impact. However, the results from studies undertaken, compiled during a project under the SOSS programme, indicate a high level of avoidance behaviour. The results from these studies are used widely and extensively in wind farm applications to demonstrate that there will not be any significant or adverse effects arising from the proposed development. The studies generally relate to small inshore and coastal wind farms and it is not clear to what extent their results are representative of impacts on pelagic-feeding species offshore. The predicted cumulative impacts of increasing numbers of offshore developments suggest that there is an ever-increasing risk that the numbers of birds predicted to collide, based on the current level of knowledge, will result in projects not gaining consent under either the Habitats Regulations Assessment or Environmental Impact Assessment.

The Marine Evidence Group has welcomed the initiative by DECC, Marine Scotland and The Crown Estate and the Offshore Renewable Energy Joint Industry Programme (ORJIP) to develop a proposed project under the Offshore Renewable programme to quantify bird avoidance behaviour and collision impact rates for key species at operating offshore wind farms, building on the recommendations from SOSS. The proposed project aims to use proven, practical and cost effective monitoring systems to deliver data on micro and macro-scale avoidance and collision rates. Micro-scale avoidance is broadly considered to be the avoidance by birds within very close proximity (ie. Within tens of metres) of the turbines and the avoidance of blades. Macro-scale avoidance is the avoidance of turbines by birds ranging from some hundreds of metres to a few kilometres of the turbine structures. This data should reduce the uncertainty over the prediction of the impact of new offshore wind projects on key bird species and the levels of precaution that need to be used in the light of that uncertainty. The aim is that initial, peer-reviewed data from this project would be published after a first field-season of monitoring has been completed, with the aim of allowing an iterative improvement of the assessment of impacts.

Displacement

Displacement from feeding grounds as a result of offshore wind is mainly an issue for species with a narrow habitat preference and has been the subject of limited study to date. SOSS identified a displacement study as the second highest priority for seabird research after collision risk and avoidance. The Marine Evidence Group and ORJIP have considered the scoping of a project to develop evidence on displacement rates around wind farms. Further studies are required to determine the magnitude, spatial scale and duration of displacement and how best to evaluate its potential population level consequences. This will require field studies designed to enable, through modelling, the

statistical testing of changes in bird densities (recorded at suitable spatial resolution), both inside the wind farm and at an adequate spatial extent around it. There are challenges as such studies will need to cover a large spatial scale. This approach has the benefit of allowing consideration of the cumulative impacts from different wind farm developments. The Marine Evidence Group has noted that a first step in the scoping of a project to improve evidence on rates of displacement would be to examine data from post-consent monitoring at wind farms where birds with a narrow habitat preference are present. This highlights the preference for licence conditions for post-consent monitoring to take into the account possibilities for addressing generic evidence needs where this is relevant to a particular development.

Population Frameworks

The Marine Evidence Group has also considered the grounds for assessing the impacts of marine developments on seabirds against population frameworks, rather than the consideration of impacts only on numbers at protected sites, as this will link more effectively to cumulative and in combination effects. The rationale for a population-level approach is that birds present within the immediate area of any offshore development could come from a number of breeding sites and could be adult or immature. This is particularly the case in the non-breeding seasons. Population frameworks would identify where each species occur, provide a broad understanding of overall movements and show species interactions. There would also be a need for thresholds to indicate when effects on populations should be considered significant. Work may also be required to include impacts from non-UK developments and industries.

The Habitats Regulations Assessment must consider impacts in relation to the conservation objectives of protected sites. However, there are other considerations where the use of population frameworks could be relevant including:

- that the conservation objectives for sites could be set in the context of their contribution to the wider population, thereby potentially introducing more flexibility for some species (eg where a small proportion of the population is in the site);
- where there are difficulties in linking birds to a particular protected site;
- for assessing impacts on birds in the non-breeding seasons;
- to inform consideration of options to mitigate or, where appropriate, compensate the impacts of developments through measures taken at other locations.

The use of population framework approaches would also need to be examined for on-shore, in-shore and estuarine developments to ensure consistency between sectors, while taking into account ecological differences in the different environments.

Recognising the above uses, the SNCBs have begun a process to develop the technical basis for the development of population frameworks. As a complementary initiative, Natural England and MMO have initiated a project to produce a set of seabird sensitivity maps for English territorial waters drawing on the European Seabirds at Sea database.

Measures to mitigate or compensate offshore wind farm impacts on birds

The Marine Evidence Group has advised on the development of a project commissioned by Defra and CEFAS to review evidence to support the identification of measures that could be used to mitigate or compensate offshore wind farm impacts on birds either at protected sites or elsewhere.

This project addresses the need identified by the Major Infrastructure and Environment Unit to deepen understanding on the potential for use of the provisions of Article 6(4) of the Habitats Directives. These provisions provide for a plan or project to be carried out where an adverse effect on the integrity of a protected site has been concluded (or where it has not been possible to rule this out), where there are no less damaging alternative solutions and if they are deemed to be imperative reasons of overriding public interest (IROPI). If that is the case the Habitats Directive sets out that all necessary compensatory measures which must be taken to ensure that the overall coherence of European sites (Natura 2000) is protected.

The project is specifically seeking to compile evidence of measures that could be taken to mitigate or compensate offshore wind farm impacts on birds by supporting populations, normally at protected sites or at other locations. The project is being carried out by the consultants MacArthur Green Ltd. And is being guided by a steering group involving Defra, Cefas, Joint Nature Conservation Committee (JNCC), Natural England, DECC, RenewableUK and RSPB. This project is planned to report to the Marine Evidence Group and Defra in June 2013. The project will be informed by a workshop involving regulators, advisers and developers which is planned for May 2013.

How will an improved view on current evidence or any new evidence be taken-up into the decision making system?

It is hoped that new data from the ORJIP collision and avoidance rate monitoring project will become available after the first field-season of monitoring providing an iterative improvement of the assessment of impacts. It is important that regulators, advisers and developers work together to develop a shared understanding of this new data and its value in improving the modelling of impacts on birds. This is the focus the ORJIP engagement strategy.

The Marine Evidence Group has noted that it would help the application of this new evidence and the shaping of further evidence to develop greater clarity on the framework for judging cumulative impacts. This would include the development of limits for acceptable impacts on seabirds, including on populations as well as sites, under the terms of the Habitats Regulations taking into account other sources of disturbance and mortality acting on populations.

The work on mitigation and compensation measures will provide evidence to inform the legal analysis of options to mitigate or compensate offshore wind farm impacts by Defra's Major Infrastructure and Environment Unit. It is also aimed to provide useful information to

developers, regulators and advisers on the effectiveness of specific measures for dealing with offshore wind farm impacts.

How should mid to long-term work to address these gaps be further shaped and developed?

Given the ongoing efforts to address the immediate evidence issues on seabirds, there is a need for the Marine Evidence Group and other actors to monitor the results of the above projects, to consider their effectiveness and identify what further work is necessary. These considerations should take into account recommendations for research from the SOSS including:

- further development of appropriate methods for the assessment of in combination and cumulative impacts on seabirds to support the development of best practice guidance.
- a cumulative assessment of the potential impacts from collisions for migrants from UK protected sites. This would be a cost-effective way of identifying which migratory species are most likely to be at risk and which are unlikely to be affected, reducing the work required in individual Environmental Impact Assessments.
- tracking surveys to evaluate: i) the areas used by seabird species from protected sites during the breeding season; ii) the areas used by the same seabird species during the non-breeding seasons; and iii) the migration routes of birds from protected sites and their flight heights.

There is an ongoing need to support appropriate assessments with the most up-to-date contextual data on bird distributions/densities at sea. There is spatial and temporal variation in the importance of parts of UK seas for seabirds, with populations typically using different areas across all UK waters in the summer and in winter. This variation is not uniform among species or between years.

Considerable data was gathered from observer surveys from boats and planes to support the environmental assessments and mitigation actions of the offshore oil and gas industry which is held in the European Seabirds at Sea database hosted by JNCC. This information has improved knowledge of the distribution patterns of seabirds at sea and continues to underpin advice given by SNCBs on developments in the hydrocarbon, aggregate and fishing industries. More recently it has been used as the basis for advice on renewable energy industry developments. There have been strategic surveys for wind, wave and tidal energy developments funded by Marine Scotland and DECC. These include projects funded by DECC to track tagged seabirds to determine whether they forage in areas proposed for offshore wind farms. Offshore wind farm developers carry out bird surveys as part of their environmental impact assessments the outputs of which can be used to undertake appropriate assessments by the competent authority. The RSPB have also been leading the international [Future of the Atlantic Marine Environment project](#) (FAME) which has carried out tracking studies on five seabird species: fulmar, shag, kittiwake, guillemot and razorbill, which provide information on foraging ranges of adults from selected colonies on the Atlantic coasts of the UK. Similar projects in English waters have

been undertaken under other funding. The Marine Evidence Group is continuing to consider how to support access and assimilation of data from these exercises.

4. Key Evidence Gaps – Marine Mammals

Key messages

- The main evidence issues on marine mammals that hamper decision making relate to knowledge of population frameworks and displacement for use in the prediction of the effects of underwater sound.
- Work is underway by the SNCBs to define population frameworks (management units) for marine mammals.
- The Marine Evidence Group and its member organisations have initiated two related short-term projects to develop a consolidated view on evidence that can be used to assess the extent and consequences of displacement of marine mammals as a result of marine development.
- A longer term need to improve quantitative data, on the thresholds at which sound may cause adverse behavioural response and the exposure rates of mammals, may be addressed through work proposed under the ORJIP research programme

What are the key evidence gaps that hamper decision making on marine developments?

The Habitats and Wild Birds Directives Implementation Review identified that the key gaps where a lack of evidence is hampering decision making relate to the effects of underwater sound. In the absence of quantitative evidence of marine mammal behaviour, it is only possible to model the effects of sound. Two of the key input parameters to these models that need improvement are the population framework and an assessment of displacement risk. These are especially issues in assessing the impact of noise from pile driving operations during the construction of offshore wind energy infrastructure. The Marine Evidence Group has noted that noise from operational wind turbines is likely to pose a low level of risk to marine mammals, although there is some indication that it may have an effect on certain fish species.

How is the Marine Evidence Group contributing to a shared understanding of what currently constitutes the best available evidence in respect of these evidence gaps?

The Marine Evidence Group has noted that the Joint Cetacean Protocol (JCP) provides a basis for understanding seasonal patterns in the distribution of marine mammals, but is not ideal for quantification of absolute abundance. The Group has noted that the JCP shows no evidence of decline in marine mammal species in the North Sea as a result of offshore oil and gas development. Based partly on the JCP, work by JNCC with the SNCBs and the Sea Mammal Research Unit (SMRU) to define population frameworks (management units) for marine mammals is close to maturity. A paper on population frameworks has been considered by the SNCB “chief scientists group” and will be discussed shortly with regulators. JNCC are also leading the development of a noise registry, primarily in the

context of the Marine Strategy Framework Directive, to develop a spatial and temporal record of activities that generate loud, low-and mid-frequency impulsive noise.

The Marine Evidence Group has thus focused on what evidence is available and needed on the extent and effect of displacement during construction of offshore infrastructure, especially as a result of noise from pile-driving, where there is a lack of quantitative data. There are also impacts on seals from coastal developments which have not so far been discussed by the Group. The Group suggest that questions on seals might be dealt with by the [Natural Environmental Research Council Special Committee on Seals](#).

DECC, Marine Scotland, The Crown Estate, Countryside Council for Wales, Natural England and Scottish Natural Heritage are funding a project led by the Sea Mammal Research Unit Ltd. This project is to develop a Population Consequences of Disturbance (PcoD) Interim Framework aimed at evaluating population level impacts of the construction and operation of offshore renewable on harbour porpoise, bottlenose dolphin, minke whale and seal species marine renewable devices using expert elicitation. The work is underway and the final report is expected in the second quarter of 2013.

This interim approach will be suitable for assessing the potential effects of the construction and operation of all types of offshore renewable energy devices on populations of marine mammals in UK waters. It will provide a protocol that may be used by regulators and developers to evaluate the potential effects of individual project proposals, and by regulators to assess the cumulative effects of multiple proposals.

To complement this, the Marine Evidence Group has defined questions on the population effects of spatial displacement of harbour porpoises during offshore wind farm construction. These questions have been focused on harbour porpoise, widely acknowledged as the most sensitive mammal species in UK seas. The questions are:

- what would be the size of an anthropogenically-caused gap (or gaps) in distribution of harbour porpoises that would cause a population effect?
- using existing information on the effects of (unmitigated) pile-driving, are there any thresholds (expressed in spatial distribution of pile-driving or other relevant noise generating projects) above which population-scale risks become significant?

As a test for a process for developing independent expert advice, a panel of internationally recognised experts on marine mammals and underwater sound has been convened to address these questions. This panel is in the process of delivering an advisory report which will provide a summary of the current evidence which is available on the following issues:

- noise characteristics and time/space scales of planned industry operations;
- distribution and life history of harbour porpoise, including a summary of their utilisation of habitats. An important issue is whether the current population is food limited;
- short-term and long-term physiological/hearing effects and their consequences relative to behavioural disturbance?

- short-term/acute behavioural effects:
 - what are the porpoises deterred from a pile driving area doing, ie do they resume feeding elsewhere?
 - what are the porpoises remaining in the pile driving area doing?
 - what are the individual/group identities of individuals that return following disturbance – are these the animals that were displaced or new/unexposed individuals?
- potential broad-scale population impacts (including identifying limiting factors for harbour porpoise – foraging areas, other stressors).
 - what are the biological consequences of disturbance from a pile driving operation? How do these vary as a function of habitat features and/or seasonal/life history features
 - what is the cumulative effect of several pile driving events, either sequentially (within the same wind farm) or simultaneously (two or more wind farms)?

The report is expected to be delivered in May 2013 and then be subjected to appropriate review by the Marine Evidence Group, who will determine the need for any further work. The process being used for developing this advice may provide guidance for further quality assurance of advice in relation to Habitats Regulations Assessment.

How will an improved view on current evidence or any new evidence be taken-up into the decision making system?

After agreement by the Marine Evidence Group, the evidence review on spatial effects on marine mammal populations will be published for use by those developing and advising on Habitats Regulations Assessment. Both the marine mammals panel work and the interim population consequences of disturbance project have been shaped with input from regulators, statutory advisors, industry and environmental NGOs. The results may help regulators, advisors and developers by providing guidance on the evidence on the thresholds at which the displacement of marine mammals becomes significant. There are also potential applications for marine planning.

The Marine Evidence Group has noted that it would help the application of this new evidence and the shaping of further evidence to develop greater clarity on the framework for judging cumulative impacts from noise and regulating noise generating activities. This would include the development of the thresholds at which noise impacts become significant under the terms of the Habitats Regulations taking into account other sources of disturbance and mortality acting on populations.

How should mid to long-term work to address these gaps be further shaped and developed?

The Marine Evidence Group will need to review the outputs from the two shorter term projects on marine mammals and noise and consider the need for further work. The

Marine Evidence Group has welcomed the work by DECC, Marine Scotland and The Crown Estate and the Offshore Renewables industry to develop a proposed ORJIP project to address a longer-term need by formulating a proposal for a project to gather quantitative and evidence-based data on the thresholds at which sound exerts a behavioural response and the exposure rates of mammals. This information will be used as the basis for more reliable input parameters to the Population Consequences of Disturbance (PcoD) model.

5. Key Evidence Gaps – Migratory fish

Key messages

- There are evidence issues on migratory fish in connection with consenting of wet renewable energy development inshore (including tidal energy) and ports development in estuarine environments.
- The Crown Estate is developing a position paper on wind and wet renewable energy and migratory fish. The Marine Evidence Group has commissioned a review of evidence on impacts on migratory fish in estuaries (primarily relevant to the ports industry but transferable across all sectors).
- These evidence reviews will be considered further by the Marine Evidence Group which will use them to shape further recommendations.

What are the key evidence gaps that hamper decision making on marine developments?

The Habitats and Wild Birds Directives Implementation Review identified the need to improve understanding of the populations of mobile species at appropriate scales and the population implications of any impacts from significant infrastructure projects in English waters.

Issues relating to improvements in understanding of populations of marine birds and mammals are being addressed under those relevant areas of the Marine Evidence Group's work. There is also a need to agree on best available evidence on migratory fish populations and how they may be affected by significant infrastructure developments. The migratory fish relevant under Habitats Regulations Assessment are sea lamprey, atlantic salmon, allis shad and twaite shad where they are a qualifying feature of an SAC as well as species that are prey for birds that are a feature of SPAs. Evidence on impacts on these species may also be relevant to the management of other migratory species.

Evidence on the impacts of developments on migratory fish species is known as an issue in respect of developments in estuaries, including ports. There are also questions about the impacts from wave energy in sea areas that are important for migration. These include the Pentland Firth for returning Atlantic salmon and waters around Northern Ireland for outward migration of eels. It is not believed that migratory fish mentioned in the Habitats Directive are likely to be affected by offshore wind energy production.

How is the Marine Evidence Group developing a shared understanding of what currently constitutes the best available evidence in respect of these evidence gaps?

The Environment Agency have considerable data and information on the genetics of salmonid and other mixed stock fisheries around the England and Wales coast. There is also a lot of data from tracking studies and other monitoring.

The Crown Estate have active ongoing work on the interactions between wind and wet renewable energy and migratory fish examining the effects of both installation and operation which is intended to support the development during 2013 of a position paper on the current state of knowledge. These issues are especially relevant to the development of wet renewable energy in the waters around Scotland and Northern Ireland. The Marine Evidence Group will consider this position paper when it is available.

For migratory fish in estuaries, the Marine Evidence Group has identified the main issues where an improved understanding of the current best evidence would help reduce uncertainties in the assessment of projects as follows:

- impact of pile-driving noise;
- impacts of electromagnetic fields;
- effects of levels of suspended sediment and the relationship with dissolved oxygen.

An evidence review on these issues has been commissioned to collate and review current literature and understanding. The review, which is being led by Cefas, is focusing on Habitats Directive Annex I migratory fish species. It is also considering other protected fish species, such as those with Biodiversity Action Plans or those included on the OSPAR list of threatened and/or declining species, and species that may be important as prey for higher predators (eg birds and marine mammals). The review will be delivered by May 2013 and then be subjected to review by the Marine Evidence Group, who will determine the need for further peer review and any further work.

The evidence review will give priority to evidence gaps on migratory fish associated with ports operation and development activities but will also consider issues related to other large infrastructure projects in estuaries, where this is appropriate.

In this context, the Marine Evidence Group has noted that the development of Parliamentary Office of Science and Technology Information Note on the environmental impact of tidal barrages is underway. This will summarise evidence on the environmental impacts associated with the construction and operation of tidal barrages, the predictability of these impacts based on existing data, knowledge on the effectiveness of compensatory measures and the impact of emerging technologies. The Marine Evidence Group has noted the possibility that the need for evidence on structures that impede movement, such as barrages and tidal flaps, will become more pressing in the near future to support Habitats Regulations Assessment, both for migratory fish and other environmental receptors.

How will an improved view on current evidence or any new evidence be taken-up into the decision making system?

After agreement by the Marine Evidence Group, the evidence review on migratory fish in estuaries will be published for use by those developing and advising on Habitats Regulations Assessment. The aim will be that it will be an authoritative view on the available evidence on migratory fish. The evidence review is aimed at being of particular relevance to the work of the Environment Agency on migratory fish and advice given by Natural England.

The Group has also noted that the evidence review on migratory fish in estuaries and The Crown Estate position paper on wave, tidal and wind energy and migratory fish would be relevant to the strategic environmental assessments of policies, plans and programmes for development in marine areas. They would also be relevant in the processes of marine planning.

How should mid to long-term work to address these gaps be further shaped and developed?

The Marine Evidence group will consider both the evidence review on migratory fish in estuaries and The Crown Estate position paper and develop recommendations for longer term research.

Issues that need to be explored include:

- establishing rationales for defining populations using best available information;
- supporting improved clarity on how the thresholds at which effects on populations of European Protected Species and the integrity of qualifying species in SACs which should be judged as significant under Habitats Regulation Assessment; and
- operational acoustic interactions with migration when scaling up from single devices to arrays.

6. Key Evidence Gaps – Impacts of marine sectors and their mitigation

Key messages

- Identifying and developing good practice in addressing impacts would have a particular value if it can be used to identify acceptable means to mitigate the impacts of developments from the outset of a project and thus reduce the scope of Habitats Regulations Assessment as well as Environmental Impacts Assessment.
- A rapid review has been initiated of the types of mitigation being applied by different marine sectors with a view to identifying and agreeing what approaches and experiences might be transferable between sectors.
- Further consideration of how work of this type can be taken up by developers and regulators is needed.

What are the key evidence gaps that hamper decision making on marine developments?

The Habitats and Wild Birds Directives Implementation Review identified the need to improve understanding of the specific impacts of different marine sectors, how they can be avoided and the solutions more widely applied. Examples of measures to mitigate impacts include avoiding undertaking some activities in periods of ecological importance such as spawning periods and using soft start pile driving to encourage mammals to leave an area before full impact piling is undertaken.

To assist with the delivery of the Directives, there is a specific need to identify and agree on good practice for addressing the impacts of developments through examining what has worked well in existing projects. Identifying and developing good practice that is proportionate and can be practicably achieved would have a particular value if it can be used to identify acceptable means to mitigate the impacts of developments from the outset and thus reduce the scope of Habitats Regulations Assessment as well as Environmental Impact Assessments. Conversely, there would be little value in identifying good practices if this is not acknowledged and their application is to be challenged as not addressing the uniqueness of sites.

How is the Marine Evidence Group contributing to a shared understanding of what currently constitutes the best available evidence in respect of these evidence gaps?

The Marine Evidence Group has noted that evidence on mitigation measures and their effectiveness is fragmented being mainly found in licences and in management plans for individual developments. The Marine Evidence Group has noted the potential to collate this evidence as a means for establishing and exchanging knowledge on good practice on

mitigation options between sectors, noting that such knowledge exchange will also occur through other routes.

The Marine Evidence Group has established a rapid review of the types of mitigation being applied by different marine sectors with a view to identifying and agreeing what approaches and experiences might be transferable between sectors. This review is structured around EC guidance on developing mitigation measures in compliance with the requirements of the Habitats Directive.

How will an improved view on current evidence or any new evidence be taken-up into the decision making system?

The development of a common understanding of best practice options for mitigation of impacts from marine developments has potential for application in the early stages of the consenting process from scoping of the Environmental Impact Assessments and Appropriate Assessments (eg agreement on required evidence base) onwards. Good evidence of the effectiveness of mitigation measures to be employed by developers should be an integral part of managing impacts. It is therefore important that knowledge of the efficacy and applicability of mitigation measures should be taken into account in Appropriate Assessments, Environmental Impact Assessments, the consent itself and any requirements for post-consent monitoring. If this is done, there is also a need to keep the concepts of what constitutes good practice up-to-date.

The Marine Evidence Group will review the outputs from the current work it has initiated. It will consider whether there is scope to develop a common understanding on mitigation of specific environmental impacts that can be endorsed on a cross-sectoral basis by the Marine Evidence Group itself, the Defra Major Infrastructure and Environment Unit and, sectorally, by groups such as the Offshore Renewable Energy Licensing Group or Strategic Environmental Assessment processes. This work is relevant to Habitats and Wild Birds Directives Implementation Review measure on consistent standards on the acceptable range and quality of evidence to enable statutory bodies to provide their advice. There is also relevance for marine planning.

How should mid to long-term work to address these gaps be further shaped and developed?

The Marine Evidence Group will consider further the need for longer term research to develop understanding of mitigation options and their transferability between sectors.

For the offshore renewable sector DECC, Marine Scotland and The Crown Estate have led the scoping as part of the ORJIP programme for two proposed research projects on mitigation of offshore wind impacts, focussing on:

- underwater noise mitigation technologies for pile-driven foundations in deeper water, and;

- use of deterrent devices and improvements to standard mitigation measures during pile-driving.

Work is currently underway to consider the results of research on mitigation measures for underwater noise undertaken in Germany, and to gather evidence from existing uses of deterrent devices. The evidence gathered from this research may help to answer the questions in the two projects referred to above. This work may be relevant to other sectors as well as offshore renewable energy.

7. Key Evidence Gaps – Assessment of cumulative impacts

Key messages

- The difficulties in assessing cumulative impacts have led to delays in the development process.
- Guiding principles developed by a NERC/RenewableUK project on cumulative effects assessment of offshore wind farms provide a sound basis for common expectations on the process.
- There remains a need for more formal guidance on the regulatory use of assessments of cumulative effects to reduce uncertainty further for offshore wind and other sectors.
- Whilst offshore wind farm development has provided a focus for discussion on cumulative and in combination effects, the application of project outputs are relevant for other sectors.

What are the key evidence gaps that hamper decision making on marine developments?

The Habitats and Wild Birds Directives Implementation Review identified the cumulative impacts of human activities as a priority research gap. This research gap primarily relates to the requirements:

- under Article 6 of the Habitats Directive which states that appropriate assessment of the implications of plans or projects for protected sites includes considerations of the implication of that project or plan in combination with other plans or projects; and
- under the Article 5 of the EIA Directive which requires assessment of likely significant effects of the proposed project on the environment ... [including] ... the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project'.

Cumulative/in-combination impact assessment can be considered one of the most significant challenges of Habitats Regulations Assessment and is relevant to the assessment of impacts on seabirds and mammals mentioned earlier in this report.

Gaps in knowledge include the availability of accepted principles and methodologies for assessing these in-combination impacts and the absence of significance thresholds under

which the cumulative impacts of projects can be managed. They also include the need for practical experience in assessing effects cumulatively. Uncertainties over the impacts of individual projects are magnified when considering the combined effects. These uncertainties led to the delay in consenting of projects in the Offshore Wind 'Round 2' Development. The increasing scale of 'Round 3' makes the potential impacts and, correspondingly the challenges, greater.

How is the Marine Evidence Group contributing to a shared understanding of what currently constitutes the best available evidence in respect of these evidence gaps?

The Marine Evidence Group has provided for an exchange of information between government, advisers, industry and environmental NGO's on the development of approaches for the consideration of cumulative impacts assessment either from single or multiple sectors.

The Marine Management Organisation (MMO) has recognised the development of cumulative effects assessment as a key area to inform marine planning as well as licensing decisions. It has also commissioned Cefas & PMSS to review the existing evidence base on cumulative effects from offshore wind farm developments and other major marine development in light of current and future policy drivers. The outcome of this review is currently being finalised. It is also clear that research to develop cumulative effects assessment methodologies is being conducted at various levels including:

- **European Union Research Programmes** – Examples include **a number of** large collaborative projects being funded under the European Commission seventh framework programme, such as Knowseas (The Knowledge-based Sustainable Management for Europe's Seas), MESMA (Monitoring and Evaluation of Spatially Managed Areas), ODEMM (Options for Delivering Ecosystem-Based Marine Management), and VECTORS (VECTORS of Change in Oceans and Seas Marine Life, Impact on Economic Sectors) which all (to varying degrees) consider cumulative effects from marine activities.
- **OSPAR Commission.** OSPAR has been running an intersessional correspondence group on cumulative effects which has the purpose of providing an internationally coordinated use of resources to address cumulative effects assessment. Its work to date includes the development of a set of definitions for a range of environmental pressures and evaluations of a subset of existing and emerging methods, ie CUMULEO (the Netherlands); Harmony (Denmark) and ODEMM. Its ongoing work programme involves further evaluation of developing methodologies for cumulative effects assessment. This group is co-chaired by the UK and Sweden.
- **UK Research** – Defra and NERC have funded a programme of research and development to investigate the challenges associated with upscaling the development of offshore renewable energy (ie, wind, wave and tidal stream) developments. Two projects, QBEX (Quantifying benefits and impacts of fishing exclusion zones around Marine Renewable Energy Installations) and EBAO

(Optimising Array Form for Energy Extraction and Environmental Benefit) are particularly relevant.

- **The Crown Estate** – The Crown Estate has produced a discussion paper reviewing current guidance on cumulative effects assessment. Other initiatives supported by The Crown Estate inform and assist with improved understanding of key receptors to cumulative effects.
- **Natural England** has commissioned work to develop a Generic Framework for Informing Cumulative Impact Assessment (CIA) related to Marine Protected Areas through evaluation of best practice understanding cumulative effects. This is due for completion in Spring 2013.
- **Marine Aggregates Regional Environmental Assessment (MAREA)**, is a voluntary exercise, endorsed by the British Marine Aggregates Producers Association, The Crown Estate and the MMO. A MAREA is designed to describe the baseline environmental characteristics in a region with several marine aggregate licence/application areas and to evaluate the potential cumulative and in-combination effects of all the existing and planned future dredging operations. Currently MAREAs have been produced for Outer Thames, South Coast, Anglian and Humber.

The immediate need has been for guidance on how offshore wind developers should address the need for the consideration of cumulative effects. A NERC/RenewableUK project has begun to tackle this by developing Guiding Principles for Cumulative Effects Assessment which is due to be published in April 2013. These Guiding Principles seek to provide a framework that develops a consistency of approach in areas prone to uncertainty; by setting an expectation of standards. They do not replace the need for more formal specific guidance on how cumulative effects should be identified and analysed.

How will an improved view on current evidence or any new evidence be taken-up into the decision making system?

The NERC/RenewableUK Guiding Principles were developed collaboratively through a series of workshops with engagement from industry, stakeholders and regulators. The intention was to encourage all parties to sign up to them and ensure that all stakeholders have the same expectations of the cumulative effects assessment process. This approach was taken to reduce uncertainty and streamline the consenting process. The Guidelines have been endorsed by the Offshore Renewable Energy Licensing Group.

The process of cumulative impacts assessment is also relevant to marine planning. Through its role in the development of marine plans, the MMO is required to identify how the potential impacts of activities, including cumulative effects, will be managed. The MMO is currently scoping out what evidence would be required to better incorporate cumulative effect assessment of multiple sectors into marine plan development.

How should mid to long-term work to address these gaps be further shaped and developed?

Building on these numerous strands of work on cumulative effects assessment, there remains the need to develop a rigorous process for assessing cumulative and in-combination effects within the decision-making process on marine developments. This should support the development of more formal guidance on cumulative effects assessment to provide understanding of the how licensing process will address cumulative effects. It will also help to identify the key decisions that need to be made during the licensing process. Two important elements of this are:

- the need for a consistent way of assessing different impacts on the same receptor/ecosystem component and
- the need for clarity on the acceptable limits or thresholds for cumulative impacts.

A decision is also required, informed by the overview provided by the MMO project, on how resources are best deployed and to what degree further projects to develop assessment methodologies are to be initiated. The recommendation in the MMO report is that this be progressed in an iterative way, with the sophistication of the methods evolving as our knowledge and experience improves. This would need to be supported by periodic review of the state of development of assessment methodologies and the supporting data.

There may also be benefit in a collation of examples and case studies on where in-combination effects have been assessed and the methods used.

8. Post-consent monitoring – developing a strategic approach

Key messages

- The Marine Evidence Group has begun work to develop a strategic approach to post-consent monitoring across sectors. Cefas and MMO are leading development of a rolling programme of sectoral reviews of post-consent monitoring.
- Cefas and MMO have initiated a review of post-consent monitoring data associated with marine licence conditions for UK offshore wind farms which will provide the basis for recommendations on an improved framework for identifying and implementing future monitoring.
- The Marine Evidence Group will further consider the role of a rolling programme of sectoral post-consent monitoring reviews given that there is a different degree of maturity in the approaches to specifying licence conditions in different sectors.

What has the Marine Evidence Group been tasked with doing?

The Habitats and Wild Birds Directives Implementation Review identified opportunities to improve aspects of data collection and how to target better post-consent monitoring. Post-consent monitoring was identified as being important because it provides evidence on both the magnitude of effects and the effectiveness of mitigation measures which can influence future licensing conditions and support more evidence-based decision making.

The Review tasked MMO and Cefas with leading a new systematic programme of post consent monitoring reviews on priority marine sectors, such as offshore wind, ports, oil and gas and aggregates. This programme will address issues of consistency and quality. The results will be considered by the Habitats and Wild Birds Directives – Marine Evidence Group and other relevant sectoral groups to enable recommendations to be acted on jointly. In parallel the Marine Evidence Group was tasked with developing a more strategic approach to post-consent monitoring of marine developments so that monitoring is better designed and targeted to inform future development proposals, mitigation measures and conditions of licences.

How has the Marine Evidence Group contributed to the development of strategic approach to post-consent monitoring?

The Marine Evidence Group has agreed that the key priorities to develop a basis for more objectively-designed conditions on monitoring in consents, are:

- use of hypothesis-driven post-consent studies guided by risk and uncertainty, in combination with pre- and during- construction studies;

- using the results of these studies to improve the prediction of impacts of future projects and adaptive management of activities so as not to place unnecessary burdens on industry;
- addressing compatibility and comparability of post-consent studies, for example through standardisation of methods;
- ensuring that data collected are shared with industry and regulators.

As a first step in a rolling programme of sectoral post-consent monitoring reviews, Cefas and MMO have initiated a project to review post-consent offshore wind farm monitoring data associated with marine licence conditions. This project is being carried out by a consortium led by Fugro Emu Ltd (including Sea Mammal Research Unit Ltd, British Trust for Ornithology and National Physics Laboratory) and is being guided by a steering group comprising representatives from MMO, Cefas, Defra, DECC, the Crown Estate, Natural England and RenewableUK. The project has carried out a systematic review of all monitoring results from UK Offshore Wind Farms across the range of receptors: physical processes, underwater noise, benthic ecology, fish and shellfish, marine mammals and birds. This analysis will build into a synthesis of the available evidence gathered from post-consent monitoring of all wind farms and the development of recommendations on a framework for maximising the effectiveness of future post-consent monitoring. A number of the project outputs will be directly transferable to other sectors.

A workshop is being organised for June 2013 to test the recommendations from this project with stakeholders from Offshore Wind Developers and consultants, Government regulators and advisers and environmental NGOs.

How will these developments be taken up into the decision making system?

The final output from the project initiated by MMO and Cefas will be delivered to the Offshore Renewable Energy Licensing Group (ORELG) and the Marine Evidence Group. It will be used as the basis for developing the approach to specifying conditions for monitoring requirements through Marine Licences in such a way to ensure that future monitoring requirements are proportionate to the environmental risks posed by the developments. The framework will ensure that there is a clear feedback from what is learnt from monitoring which can be built into future licensing decisions.

How should mid to long-term work to address these gaps be further shaped and developed?

The Marine Evidence Group has identified the need to consider how a rolling programme of sectoral post-consent monitoring reviews could be taken forward given that there is a different degree of maturity in the approaches to specifying licence conditions in different sectors.

For the ports sector, the Group has identified a need to examine current practice in the monitoring of dredging which could be done later in 2013. Post-consent monitoring for the

ports sector involves monitoring of impacts from dredging and disposal of dredge spoil and large port construction projects such as pile driving.

For the Offshore Oil and Gas Sector, approvals for drilling include conditions setting out any requirements for post-consent monitoring; these are guided by site sensitivities. There is also a focus on regional studies and surveys rather than standard monitoring plans. The O&G Offshore Monitoring Committee has, with funding from industry, commissioned a number of these surveys in recent years and meets regularly to discuss future programmes. As a condition of approval of decommissioning programmes, operators are required to produce a post-decommissioning monitoring programme and seek agreement from DECC. Operators may be required to undertake 1 or 2 post decommissioning monitoring surveys over agreed period of intervals, depending on site sensitivities, and the nature and age of the infrastructure being decommissioned.

The Marine Aggregate Levy Sustainability Fund (MALSF) funded a number of studies pertinent to the scope of the Marine Evidence Group. The Crown Estate has commissioned a document which summarises the MALSF work previously carried out and states how this is being applied by regulators and industry. Once published, this document will be used by the Marine Evidence Group to determine the necessity and scope for any future review work on the monitoring associated with marine aggregate extraction.

9. Improving access and use of marine data

Key messages

- The measures on data access and sharing set out in the Habitats and Wild Birds Directives Implementation Review are being taken forward by the MMO and statutory bodies, but there is a need to continue to track implementation and effectiveness.
- MMO's work to develop a clearer specification of the requirements for submission of data in support of licence applications is of particular relevance in facilitating greater clarity on data requirements from industry.
- The Marine Evidence Group has identified data on seabirds at sea as a case around which to further examine possibilities for sharing of data between industry and regulators at a pre-application stage.

What has the Marine Evidence Group been tasked with doing?

The Habitats and Birds Directive Implementation Review tasked the Marine Evidence Group with improving the accessibility and use of marine data through better data sharing (including identifying and overcoming legal barriers) and ensuring that maximum use is made of evidence from existing data and information. The Review also set out the following actions to take place alongside the Marine Evidence Group so as to make data more readily available to regulators and developers alike by improving data sharing:

- the statutory agencies, MMO, The Crown Estate and industry committing to manage data consistently in accordance with standards published by the Marine Environment Data and Information network (MEDIN);
- the statutory agencies, MMO, The Crown Estate and industry ensuring that data can be identified and accessed through MEDIN and made available through MEDIN Data Archive Centres or an equivalent facility- except where there are justifiable reasons not to, such as commercial sensitivities;
- Defra exploring the practical implications with MEDIN and other data sharing initiatives of these new measures on operating capacity, with recommendations presented to the new Habitats and Wild Birds Directives Marine Evidence Group by October 2012;
- the statutory agencies and the MMO identifying priority data and setting out their programmes for sharing those data that are not yet publicly accessible (through MEDIN and associated data sharing facilities) by December 2012.

What key data should these actions focus around?

The Marine Evidence Group has agreed to focus on establishing the means to improve the accessibility and use of marine data in relation to the following:

- SAC marine habitats – distribution, extent, condition;
- SAC Marine Species – distribution, abundance, condition;
- Priority birds species (eg Migratory and/or Habitats Directive Annex 1 bird species that make regular use of marine habitats and for which SPAs are selected in the UK).

What progress has been made?

The Marine Evidence Group has reviewed progress in implementing the data measures set out in the Habitats and Birds Directive Implementation Review. The main conclusions are set out below.

SNCBs, MMO and The Crown Estate are making use of MEDIN metadata standards providing a basis for interoperability of data. The Crown Estate has required that developers on Offshore Wind Energy Round 3 sites apply MEDIN data guidelines and produce MEDIN format discovery metadata on all data collected. MEDIN has noticed an increased interest from consultants and developers in standards and guidelines. Environmental NGO's also have relevant data and are interested in making this available and will investigate the use of MEDIN as a means to do this, noting the wider value of making their data accessible to marine planning as well as consenting.

On ensuring that data can be discovered and accessed through MEDIN:

- SNCBs, MMO and The Crown Estate are taking steps to ensure data can be identified and accessed through the MEDIN data discovery portal. The use of MEDIN standards and the publication of metadata through the data discovery portal are important steps towards this.
- A wider range of facilities are being used for archiving data depending on the demands being placed on data, but data can still be discovered and accessed through MEDIN.
- The availability of legacy licensing data is being addressed through an MMO project. This will also consider whether relevant metadata can be published through MEDIN.
- MMO are also initiating work to develop a clearer specification of the requirements for submission of data in support of licence applications in order to facilitate sharing and future use of data collected by industry.

The Crown Estate launched the [Marine Data Exchange](#) in February 2013, which provides access to survey data and reports collated during the planning, building and operating of offshore renewable energy projects. The Crown Estate acts as a trustee for this data which relates to areas of the territorial seabed leased for Renewable Energy development. Data is generally made available after the submission of an Environmental Impact Assessment/Appropriate assessment, although there are some exceptions. The relationship between the Marine Data Exchange and the MEDIN needs to be clarified.

What still needs to be done?

There needs to be further exploration of the scope for sharing data collected at other stages in the project life-cycle (ie before pre-application stage or when registering for a screening opinion). Sensitivities on the part of developers to the use of their data and commercial competition considerations need to be understood and taken into account. The Marine Evidence Group has discussed data on seabirds at sea, for which the European Seabirds at Sea database provides a core resource, as a specific case where the means to enhance common public-private sector data sharing should be explored. The Marine Evidence Group is exploring what initiatives might be available to enhance or complement the data holdings of the European Seabirds at Sea database.

Defra has explored the practical implications of these data initiatives with MEDIN and there is no evidence, so far, of significant additional demands on the operation of MEDIN or other data handling mechanisms. This position needs to be kept under review, especially as the MMO takes forward work to specify requirements for submission of data in support of licence applications.

Annex 1 – Terms of Reference of the Habitats and Wild Birds Directives –Marine Evidence Group

Background

The Habitats and Wild Birds Directives Implementation Review (March 2012) was set up to ensure the Directives were being implemented properly but without placing unnecessary costs and delays to developers. The review identified policy measures in four areas:

- Facilitating nationally significant infrastructure projects
- Improving implementation processes and streamlining guidance
- Improving the quality, quantity and sharing of data
- Improving the customer experience
- The actions associated with Improving the quality, quantity and sharing of data, include establishment of a Habitats and Wild Birds Directives Marine Evidence Group.

Purpose

The purpose of the Habitats and Wild Birds Directives Marine Evidence Group (“the Group”) is to support improvements in the implementation of the Habitats and Wild Birds Directives (“the Directives”) in relation to development decisions in the marine environment by supporting efforts to improve the quality and quantity of data relevant to protected sites and species and to ensure proportionality in evidence standards. The group will specifically address those gaps in evidence in relation to the requirements of the Directive that can hamper fast, effective and proportionate decision making.

Terms of reference

The Marine Evidence Group is tasked with:

- improving the accessibility and use of marine data through better data sharing (including identifying and overcoming legal barriers) and ensuring that maximum use is made of evidence from existing data and information;
- addressing priority research gaps where improved understanding of existing evidence, or filling of gaps in research would support fast, effective and proportionate decision making in the marine environment;
- developing a more strategic approach to post-construction monitoring of marine developments so that monitoring is better designed and targeted to inform future development proposals, mitigation measures and conditions of licence.

Work to address key research gaps will include:

- developing a shared understanding of what currently constitutes the best available evidence in respect of these evidence gaps;
- facilitating the exchange and uptake of this evidence, and;
- developing a shared sense of priorities to how mid to long-term work to address these gaps can be further shaped and developed.

To progress these tasks the Group will need to develop an understanding and interpretation of the evidence requirements of the Directives. This will be informed by work to develop overarching guidance on the implementation of the Directives by the Major Infrastructure and Environment Unit.

The Group will not discuss the merits of specific projects, commercially and / or security sensitive projects or those projects under active consideration by the relevant regulators (eg the National Infrastructure Directorate in the Planning Inspectorate).

Membership

The Group is chaired by Defra. The membership of the Group is drawn from industry, environmental organisations, academia, Government and its agencies.

Mode of work

Meetings: The Group will meet approximately every three months. Secretarial support for the Group will be provided by Defra and Cefas through preparation of papers for the group's meeting and ensuring actions from the Group are completed. The Group may need to agree to delegate work to specific members to ensure that progress can be made between these full meetings.

Progressing work: All participants are encouraged to make contributions to support the effective functioning of the Group and the delivery of its objectives, for example by leading on specific pieces of work. Contributions may need to be reviewed, either by the Group itself or some form of independent peer review, and may need to be shaped and developed in such a way as to meet the common aims of the Group.

Context: The Group will both have to be informed by and provide advice to the bodies engaged in delivering the other measures initiated by the Review, including the Major Infrastructure and Environment Unit and the Secretary of State chaired Multi-Stakeholder Infrastructure and Environment Group.

It is important that the Group develops and maintains an overview of other bodies tasked with determining and addressing evidence gaps and acts to develop synergies between its own activities and these bodies and between these bodies themselves, especially Offshore Renewables Energy Licensing Group, Offshore Renewables Research Steering Group, UK Offshore Energy Strategic Environmental Assessment Steering Group, Marine

Aggregates Sustainability Forum, the Regulators Advisory Forum and the United Kingdom Marine Monitoring and Assessment Strategy.

The Group will also need to contribute to a consistent UK implementation of the Directives through linking to the work of the Devolved Administrations in implementing the Directives.

Reporting and Review

Updates on the work of the Group will be made available through the Defra website and the outputs on priority areas, including new research commissioned and produced, will be made publicly available. Defra will publish an update on the work and outputs of the Marine Evidence Group by March 2013. The operation of the Group will be reviewed at this stage.

Membership of the Group

Terence Illott	Defra (Chair)
Adrian Judd/Stuart Rogers	Cefas
Emma Cole	DECC
Will Armitage/Kathleen Cameron/Richard Emmerson	Defra
Richard Handley	Environment Agency
Mark Tasker	Joint Nature Conservation Committee
Jen Ashworth	Natural England
Patricia Almada-Villela/Michael Coyle	Marine Management Organisation
Annie Linley	Natural Environment Research Council
Mike Cowling	The Crown Estate
Paul Reynolds/Steve Freeman	RenewableUK
Kate Jennings	Royal Society for Protection of Birds
Peter Barham	Seabed Users Development Group
Ali Plummer/Lissa Batey	The Wildlife Trusts
Liz English	UK Major Ports Group
Julia Williams	Welsh Government
Michael Macleod	Marine Scotland
Matt Service/Adele Boyd	Agri-food and Bioscience Institute (Northern Ireland)