Marine Management Organisation

Evidence requirement R071:

Acclimation of birds to disturbance from marine activities

1. Requirement overview:

Requirements	To define the extent and conditions under which birds acclimatise to disturbance generated by marine activities.
Requirement detail	Human use of the marine environment exerts a range of pressures on marine species including disturbance from noise or physical activity. Disturbance results include stress responses, flight, and changes in foraging for example. Such responses can directly or indirectly reduce the fitness of individuals and health of the population. To manage these potential negative impacts, disturbance impacts are considered in decision making. However, there are increasing stakeholder observations and reports that bird species become, at least partially, acclimated to disturbance from some marine activities. If acclimatisation occurs, this may change the threshold at which disturbance impacts become significant and thus is of relevance to marine decision making. The MMO seek evidence on whether, or to what extent, acclimatisation occurs, whether acclimation is species dependant and the conditions under which acclimation occurs such as in interaction with other pressures.
MMO use	**Licensing:** For making licence decisions and to provide developers with disturbance pressure information on which to base environmental impact assessments. **Marine Conservation**: To assist in management of marine protected areas. **Marine Planning**: To write more specific marine plan policies that protects the marine environment from detrimental activities and especially cumulative impacts.
External interest	Natural England, Joint Nature Conservation Committee (JNCC), Centre for Environment, Fisheries and Aquaculture Science (Cefas)

Delivery target	End of 2020

2. Aims and objectives

Aim:
To enhance understand the extent and conditions under which birds acclimatise to disturbance pressures generated by marine activities.

Objectives:

Objectives to deliver this requirement include to

- determine whether acclimation to disturbance from marine activities occurs in birds and if so the extent of acclimation
- assess to what degree acclimation to disturbance is dependent on species, or life stage
- define the conditions under which acclimation occurs, for example the characteristics of the disturbance pressure, effects of space or time/season, the interaction with other pressures

3. Existing evidence

MMO	MMO1034 on bird distribution and sensitivity includes consideration of disturbance pressure but does not differentiate between noise and other contributions to disturbance sources such as visual. MMO1097 undertook spatial modelling of underwater noise generated by continuous activities. While focused on under water noise in in the South marine plan areas, it includes a review of noise sources and levels in the marine environment. MMO1031 undertook a review of post consent offshore wind farm monitoring data associated with marine licence conditions and subsequent post consent monitoring to identify best practice.
Academic	Academic publications confirm the potential for noise impacts specifically and disturbance generally for example visitor noise at a nesting colony alters the behaviour of a coastal seabird (Buxton et al 2017), Significant displacement of seabirds can occur from offshore wind farm in the North Sea (Welcker and Nehls 2016) Goss-Custard et al (2006) present a method for establishing how frequently birds can be put to flight before their fitness is reduced allowing identification of critical thresholds of disturbance by people

	However, evidence is lacking on whether acclimation occurs such that impacts reduce or thresholds increase upon sustained experience of a pressure.
Other	The UK Marine Monitoring and Assessment Strategy sub-group on spatial data collation on human activities and pressures of which the MMO is a member has produced a series of outputs that are progressing toward fulfilment of this evidence requirement. These are described and linked to on JNCC's website on behalf of the group There are a number of ongoing active ties that seen to define potential pressure levels such as the JNCC Marine Noise Registry. These define pressures but not acclimation. Outputs available are lists of activities and pressures, a pressure-activity matrix and assessments of sensitivity and vulnerability and include for example visual disturbance and underwater nose. Cefas and JNCC have also explored methodologies for assessing pressures within UK seas. The UK Marine Monitoring and Assessment Strategy Productive Seas Evidence Group and Healthy Biodiverse Seas Evidence Group produce assessments for reporting on status of UK seas and incorporate pressure mapping into these assessments. The Defra Impacts Evidence Group works on assessment of impacts on designated habitats and species.

4. Current activity

Currently the MMO is an active member of the UK Marine Monitoring and Assessment Strategy sub-group on spatial data collation on human activities and pressures associated with the Productive Seas Evidence Group and Healthy Biodiverse Seas Evidence Group where national work is coordinated and carried out. MMO is also a member of the Department for Environment Food and Rural Affairs (Defra) Impacts Evidence Group where specific impacts to designated habitats and species are examined and assessed.

5. Associated evidence requirements

Ref	Title
R006	Improved understanding of bird collision risk and avoidance
R023	The distribution and condition of major non-protected mammal, bird and fish species
R113	Seasonal risks of marine activities: balancing social, economic and environmental impacts

More information on these evidence requirements is available here

6. Potential delivery route

The MMO will look to partner with organisations of relevance to widen the potential impact of any work undertaken in this area. The MMO will also explore opportunities to influence the research of others to gather evidence that can be applied within a marine management context. Knowledge exchange is required throughout the duration of this requirement and not limited to when delivery is complete.

Partnering

Continue to work with the UK Marine Monitoring and Assessment Strategy sub-group on spatial data collation on human activities and pressures and the Defra Impacts Evidence Group. Contribute to development of standardised and agreed pressure information that is directly applicable to marine management decision making.

Influencing the research of others

In the course of interactions with academics and Defra group organisations discuss and outline the requirement for pressures information to make marine management decisions so that awareness is high among researchers and practitioners. Work with the sub-group to influence research councils to support relevant and priority research relating to human pressures on the marine environment.

See table 1 for timescales.

7. Contact

For more information or to add further research to the existing evidence list please email evidence@marinemanagement.org.uk

Table 1: Delivery timescales 2017 to 2020

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