



Aim

This report provides a high-level overview of current knowledge of habituation of seabirds to disturbance impacts associated with anthropogenic marine activities in English territorial waters and subsequent habituation to those activities. The report explores whether habituation is species or activity dependent and informs on the conditions and scales under which disturbance, displacement, habituation and attraction does or does not occur.

Introduction and methodology

Human use of the marine environment can exert pressures on seabirds including displacement from an area as a result of disturbance from marine activities. Such disturbance can directly or indirectly reduce the fitness of individuals and health of the population. There are reoccurring suggestions however that bird species become, at least partially, habituated to disturbance from some marine activities. If habituation occurs, this may mitigate longer term impacts of an activity and could be accounted for in levels of caution applied within marine decision making.

This project conducted a comprehensive and systematic literature review collating any evidence for displacement and habituation for 7 activity classes (30 sub-classes) and 9 seabird taxonomic groups (38 species).

Activity classes	Species groups
Coastal management	Seaducks
Waste management	Divers
Extraction (living resources)	Tubenoses
Extraction (non-living resources)	Cormorants
Energy generation	Grebes
Traffic and transport	Skuas
Other activities (primarily recreation and tourism)	Auks
	Terns
	Gulls

Literature data were used to compile response scores of displacement and habituation for species in response to each activity. Confidence was also calculated based on the volume and robustness of individual studies. Displacement and habituation scores were then integrated to define sensitivity indices for species in response to each activity.

By comparing evidence of displacement with habituation, overall sensitivities of seabird species groups to marine activity classes were determined in order to understand the potential for long-term displacement in response to these activities. Data gaps were also identified and, where possible, gaps prioritised for future work.

Results

The amount of information available relating to disturbance, displacement and habituation varied considerably between activity classes and species groups. Where data were available to quantify



displacement, responses were highly variable within and between activity classes and species groups.

Activity classes associated with highest displacement and limited habituation were traffic and transport, energy generation, extraction (non-living resources) and other activities (recreation and tourism). Species groups which were generally observed to display the greatest displacement responses were divers, seabirds, grebes and cormorants.

Activity classes associated with lowest displacement impacts were coastal management, waste management and extraction (living resources). Species groups which were generally observed to display the lowest displacement responses were skuas and gulls.

Conclusions and recommendations

The report methodology provided a simple technique for reviewing relative sensitivities for better-studied species and activities and gives a clear picture of where uncertainties lie. The primary use of overall sensitivity values are as indices by which regulators may consider the amount of caution to apply in decision making processes in relation to particular species and activities.

Sensitivity values, accounting for displacement impact and potential subsequent habituation, were produced for 24 of the 63 species group/activity class combinations, with data gaps identified for the remainder.

While data gaps identified may be a consequence of a lack of potential interaction between particular species groups and activity classes eg for tubenoses (a highly pelagic group) in relation to coastal management, there is a general lack of evidence relating to the long-term effects of marine activities on seabird groups.

MMO comments

The MMO specified the project to look specifically at seabirds and as such this did not encompass some species restricted to coastal and estuarine environments. Expansion to include such species may be desirable in the future.

The methodology and associated database provided allow ongoing development of this tool to incorporate new data as it becomes available whilst providing a snapshot of the current state of knowledge and an evidence-base that is widely relevant to a range of stakeholders in the offshore industry.

The primary use of overall sensitivity values are as indices by which impacts of a project or proposal may be judged by applicants and regulators. Further, regulators may consider the amount of caution to apply in decision making processes in relation to particular species and activity combinations. Given the lack of long term and robust studies for the majority of species-activity combinations assessed and uncertainty of indirect impacts there is little potential to move beyond precautionary principles at this time.