



Evidence Project Final Report

- Note**

In line with the Freedom of Information Act 2000, Defra aims to place the results of its completed research projects in the public domain wherever possible.

The Evidence Project Final Report is designed to capture the information on the results and outputs of Defra-funded research in a format that is easily publishable through the Defra website. An Evidence Project Final Report must be completed for all projects.

- This form is in Word format and the boxes may be expanded, as appropriate.

- ACCESS TO INFORMATION**

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Project identification

- Defra Project code
- Project title
- Contractor organisation(s)
- Total Defra project costs (agreed fixed price)
- Project: start date
end date

6. It is Defra's intention to publish this form.

Please confirm your agreement to do so..... YES NO

(a) When preparing Evidence Project Final Reports contractors should bear in mind that Defra intends that they be made public. They should be written in a clear and concise manner and represent a full account of the research project which someone not closely associated with the project can follow.

Defra recognises that in a small minority of cases there may be information, such as intellectual property or commercially confidential data, used in or generated by the research project, which should not be disclosed. In these cases, such information should be detailed in a separate annex (not to be published) so that the Evidence Project Final Report can be placed in the public domain. Where it is impossible to complete the Final Report without including references to any sensitive or confidential data, the information should be included and section (b) completed. NB: only in exceptional circumstances will Defra expect contractors to give a "No" answer.

In all cases, reasons for withholding information must be fully in line with exemptions under the Environmental Information Regulations or the Freedom of Information Act 2000.

(b) If you have answered NO, please explain why the Final report should not be released into public domain

Executive Summary

7. The executive summary must not exceed 2 sides in total of A4 and should be understandable to the intelligent non-scientist. It should cover the main objectives, methods and findings of the research, together with any other significant events and options for new work.

1. There is an urgent scientific and policy need to consider the implications of climate change for species conservation, and the likely effectiveness of existing management, policy and legal frameworks for addressing these challenges.
2. One of the most important tools for conservation has been the establishment of protected areas, of which one of the most successful has been the Special Protection Area (SPA) network which has benefitted the conservation of bird populations across Europe. The likely resilience of this network to future climate change is uncertain. By projecting future changes in the abundance of qualifying species at individual SPAs as a result of climate change, CHAINSPAN has assessed the implications of future climate change for the resilience of the UK's SPA network.
3. Sufficient data were available to produce 118 models (including separate models for the same species in different seasons) relating bird density to climate. It was not possible to produce models for a moderate number of species, particularly terrestrial breeding species, due to a lack of available data or insufficient geographical range of data to capture sufficient climatic variation. However, we have qualitatively assessed likely potential changes to these species.
4. Many of the models had fairly low predictive power in describing current spatial patterns of bird density. This suggests that at present, climate is less important in determining site-specific variation in species abundance than site-quality. As a result, there is likely to be considerable potential for site-based management to increase the resilience of sites and bird populations to climate change.
5. Two methods were used to project future changes in abundance, which produced comparable assessments of change. Overall, more species were more likely to benefit from climate change in the short-term. However, over time, and with increasing severity of climate change, a greater proportion of species were projected to decline in abundance. A greater proportion of negative effects of climate change were projected for Annex I than for migratory species.
6. The most vulnerable species groups to climate change were assessed to be northern breeding species including both seabirds and terrestrial species. Populations of many wintering waterbirds were projected to increase as a result of milder winters, although the potential for such patterns to be realised may be limited by ecological changes on the breeding grounds. Diving wintering waterfowl were more likely to decline in abundance, potentially as milder winters enable them to remain further north outside of the UK. Southerly distributed heathland species were projected to benefit from climate change. We present a matrix of species vulnerability to climate change and the degree of

confidence in that assessment to summarise species where we project greatest change. Recent population trends for these species are similar to projected future trends.

7. As a result of these changes to bird populations, we project significant latitudinal shifts in species composition; fewer longitudinal shifts were projected. This means that managers can consider species present on more southerly sites to inform likely future changes in bird communities occurring at their site.
8. Irrespective of these changes, as a general principle, large sites will continue to support more birds and therefore remain key sites in the future.
9. Based on these projections, and a qualitative consideration of likely changes in the distribution and abundance of other species, we suggest how site management should be adapted to increase the resilience of populations of Annex I and migratory species and the SPA network, to future climate change.
10. At the policy level, our results provide significant support for existing climate change adaptation principles, and we consider how existing mechanisms may be used to implement these in practice.
11. Better managed SPAs are likely to be more resilient to climate change as well as protecting higher numbers of qualifying species. Improving site-condition provides a win-win for both now and the future – a more strategic approach to SPA management, making positive use of available powers, is suggested. For example, the impacts of atmospheric nitrogen pollution on heathlands, and of diffuse pollution from nutrients on wetlands, could reduce the ability of these habitats to support future assemblages of qualifying species.
12. Targeted habitat creation is likely to be necessary to maintain the integrity of the UK SPA network and to improve connectivity, where important habitats are predicted to change in extent or quality as a result of changes in climate, such as through sea-level rise. Suggestions for a structured approach to this are made. For example, wetland re-creation would be best targeted so that it increases the size of existing large wetlands, and of complexes of large wetlands within close proximity to one another, in order to increase resilience of existing species and to maximise their potential for the accommodation of potential colonists as a result of climate change.
13. For some species there may be a need to improve the connectivity of SPAs, although for many or most qualifying bird species this is unlikely to be necessary.
14. Projected shifts in species distributions mean that it is clearly important to consider the SPA network at several spatial scales (country, UK and international), particularly when considering potential changes in the distribution of migratory species.
15. The habitat related measures described are all interrelated and ideally require consideration at various spatial scales, combined with reviews at regular intervals in light of better scientific knowledge and understanding:
 - a. Species level (within the UK): understanding the role of SPAs and other special conservation measures to enable a particular species to be maintained at favourable conservation status (FCS) over the long-term in light of climate change and other pressures
 - b. UK SPA network level: describing the role of the SPA network in contributing to FCS for a particular species, building in the predicted impacts of climate change
 - c. SPA level: identifying the site level management and related measures necessary to ensure the SPA features realise FCS at site level, taking account of the need for habitat to be in favourable condition and any measures necessary to increase resilience to climate change.
16. At a UK level, the oversight provided by the Natura 2000 and Ramsar Steering Committee could play a crucial role in assessing the need for network level responses, with support from the UK SPA and Ramsar Scientific Working Group. In particular, this could help identify those species where strategic co-operation and co-ordination between relevant devolved administrations and statutory nature conservation organisations would assist development of appropriate responses to projected climate change effects on a species and its SPA network. It could also help identify when and where co-operation of conservation actions would be helpful at an EU or flyway level, based on the findings of future scientific research relevant to that spatial scale.
17. Ongoing monitoring of the condition of the UK's SPAs, their response to climate change and the success of any management interventions, will be key to any strategy devised to help ensure the UK's SPA network is able to adapt to the effects of climate change.
18. This report concludes that the current SPA network will be relatively resilient to future climate change, but that the spatial distribution, abundance and composition of species within the network could be significantly different to the present day. This will be exacerbated in the event of increasing severity of climate change. This has significant implications for management of the SPA network at a UK level and suggests the need for periodic review of network management in light of new monitoring data

and scientific evidence on the impacts of climate change on UK bird populations. In this context, it would seem appropriate to continue with the roughly decadal reviews of the UK SPA network.

19. A website will be available which will contain projections for each species, on each SPA, for each of the three future time frames (2020, 2050 & 2080), three climate-change scenarios (Low, Medium or High), and three probabilities of projected climate distributions (likely, median & unlikely). Furthermore, for many of the models, 95% confidence intervals of the projected abundances will also be available.
20. **Conclusion.** Some species are likely to suffer as a result of climate change whilst others are likely to benefit. The SPA network, through its protection of many significant areas of semi-natural habitats and concentrations of birds is likely to continue to remain very important for bird conservation in a changing climate. Site management may be used to improve the resistance and ability of such sites to accommodate change, whilst existing legal and policy mechanisms in general may be adapted to enable such changes to occur on the ground. Much of this will be 'no-regret' by providing significant conservation benefit now, in addition to facilitating climate change adaptation. The extent to which the SPA network will increase the ability of vulnerable northerly distributed species to cope with climate change remains uncertain.

Project Report to Defra

8. As a guide this report should be no longer than 20 sides of A4. This report is to provide Defra with details of the outputs of the research project for internal purposes; to meet the terms of the contract; and to allow Defra to publish details of the outputs to meet Environmental Information Regulation or Freedom of Information obligations. This short report to Defra does not preclude contractors from also seeking to publish a full, formal scientific report/paper in an appropriate scientific or other journal/publication. Indeed, Defra actively encourages such publications as part of the contract terms. The report to Defra should include:
 - the objectives as set out in the contract;
 - the extent to which the objectives set out in the contract have been met;
 - details of methods used and the results obtained, including statistical analysis (if appropriate);
 - a discussion of the results and their reliability;
 - the main implications of the findings;
 - possible future work; and
 - any action resulting from the research (e.g. IP, Knowledge Exchange).



References to published material

9. This section should be used to record links (hypertext links where possible) or references to other published material generated by, or relating to this project.

Projected future changes to the abundance of Annex I and migratory species on SPAs will be made available on the internet via links through the BICCO-Net website (www.bicco-net.org), where the policy-note will also be made available. There has been no published material from this project to date, but it is hoped that at least two papers will be published based upon outputs from the project.