

Nature Conservation in Europe: Approaches and Lessons

Annex UK.9. Biodiversity Climate Change Adaptation Strategies in the UK

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Based on an evidence review, Mitchell *et al.* (2007) consider that the UK Biodiversity Action Plan priority habitats¹ at high risk of impacts are montane habitats, standing waters, floodplain and grazing marsh, saltmarsh, maritime cliffs, saline lagoons and open seas. More recent modelling studies have also indicated that vulnerable habitats include lowland and upland heathland and native pine woodland (Carey *et al.*, 2015), whilst bryophytes and vascular plants have the greatest proportion of species at risk from climate change, and, in general, species of upland habitats are more at risk than those of other habitats (Pearce-Higgins *et al.*, 2017).

In practice, increasing resilience mainly involves reducing pressures and improving habitat quality, though increasing habitat heterogeneity can also be advantageous. To guide such actions, a manual with lists of the key pressures affecting each type of BAP habitat, and recommended adaptation actions that can be taken to alleviate them, has been compiled by Natural England and the RSPB (2019). Tackling new and growing pressures that also indirectly arise from climate change mitigation will also be necessary, such as further renewable energy developments, including tidal-barrages and inappropriately located wind turbines on land and sea. Large-scale expansion of bioenergy and biofuel crops, such as foreseen to achieve the UK's 2050 GHG net-zero target (Committee for Climate Change, 2020) could be especially damaging on/in semi-natural habitats, especially as such land use changes are not effectively dealt with through impact assessments and planning controls. On the other hand, there would be win-wins, where measures to increase carbon storage and sequestration include peatland restoration, and afforestation with native species in appropriate locations. There may also be opportunities to use nature-based solutions to reduce riverine and coastal flooding that could lead to habitat creation and improvements (Burgess-Gamble *et al.*, 2018).

Climate change accommodation measures include providing adequate suitable habitat for species to colonise (i.e. 'space for nature' to move to). In this respect the importance of the protected area network in the UK has been demonstrated for newly colonising birds (Hiley *et al.*, 2013). Moreover, most of the colonisations have occurred in recently created wetlands (Ausden *et al.*, 2014). But most other species are less mobile than birds, and therefore complementary measures may be required to enable them to disperse and colonise new areas. This is often simplistically interpreted as a need to structurally link habitats patches, such as through wildlife corridors. But as discussed earlier, there is limited evidence of their effectiveness for many species, especially in the context of climate change adaptation. Functional connectivity is considered to be more important (Catchpole, 2006) and this can also be provided through habitat patches in the landscape (e.g. see UK modelling by Hodgson, 2011) or by improving the quality of the matrix in which habitat patches occur (Donald and Evans, 2006).

A recent assessment of the evidence of the benefits of various measures to strengthen the resilience of wildlife site networks has resulted in a general 'rule of thumb' list of priorities, with better quality of sites being of most importance, followed by bigger sites, then more sites, and better-connected sites through stepping stones and a more permeable habitat matrix, and finally corridors (Crick *et al.*, 2020). A more detailed decision framework for identifying and prioritising climate change adaptation measures for species in the UK has been developed by Oliver *et al.* (2012, 2015). This has since been tested and found to be practical and effective (Oliver *et al.*, 2016).

It is important to bear in mind that resilience measures, such as increasing habitat area and quality, are likely to increase reproductive success and therefore emigration rates, which will increase the probability of successful dispersal and colonisation. Similarly, actions that increase connectivity may help to increase the resilience of existing small and fragmented populations (i.e. by strengthening

¹ <https://jncc.gov.uk/our-work/uk-bap-priority-habitats/>

metapopulations). These factors are important for many threatened butterflies and moths, and therefore Butterfly Conservation has shifted its focus from site-based actions to landscape conservation (Fox *et al.*, 2015). The approach is to maximise habitat quality within individual sites by targeted management, while also taking account of the spatial context of those sites. In practical terms, this means firstly improving habitat management at sites that are currently occupied by the targeted species to maintain and increase their populations; secondly, improving the habitat of former and potential sites (focussing on larger and less isolated sites that are most likely to be colonised); and thirdly, removing barriers to butterfly dispersal between sites. Fox *et al.* (2015) reported that the approach had been applied in over 70 landscape-scale projects by Butterfly Conservation across the UK. The projects have provided evidence of the effectiveness of such landscape-scale conservation actions and key factors affecting their success (Ellis *et al.*, 2012).

As discussed in *Nature Conservation in Europe* Section 31.6 (Tucker *et al.*, 2023), there is little evidence of substantial implementation of climate change biodiversity adaptation strategies in the UK.

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