



Title: Mitigating against recreational disturbances on songbirds in a National Park

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National Parks (NPs) in England and Wales serve two statutory purposes: i) to conserve and enhance natural beauty, wildlife and cultural heritage and ii) promote opportunities for public enjoyment of their special qualities. These goals can be at odds, given the widely-documented negative impacts of nature-based recreation (including e.g., hiking, biking, dog-walking) on wildlife, including on the physiology, behaviour, distribution, abundance and reproductive success of many bird species. Therefore, NPs must implement evidence-led mitigation strategies to reduce recreation-associated harm. However, the effects of specific visitor disturbances on bird communities is unclear, making it challenging to prioritise mitigation options and identify target user groups. Moreover, the effectiveness of behavioural interventions aimed at reducing visitor disturbances are mixed, necessitating that interventions are tailored to specific social-ecological contexts, and targeted to different stakeholder groups with appropriate framing. This interdisciplinary PhD project will use novel approaches to measure the impacts of different recreation activities on woodland and heathland bird communities in the New Forest National Park in southern England, and develop and assess the effectiveness of targeted behaviour-change interventions for reducing harm.

The New Forest is a designated Special Protection Area for its significant breeding and overwintering populations of species of European importance, including Dartford Warbler, Woodlark and Wood Warbler. Recent surveys have indicated declines in many species, anecdotally attributed to changes in climate, grazing, forestry, and recreational use. New housing developments are planned in and around the Park, with a predicted increase of around 11.4% in the number of visits by 2036. To comply with international legislation, a Recreational Mitigation Strategy has been developed and proposes several actions, including “educating visitors to change visitor behaviour”. Proposed interventions include leaflets, posters and signage, exhibitions and face-to-face communication. To be effective, the interventions must be tested and targeted to specific user groups, because effectiveness can vary between and across social-ecological contexts.

The research will be co-designed with key stakeholders including the New Forest National Park Authority (NFNPA), Forestry England (FE), and Game and Wildlife Conservation Trust. The project has two overarching objectives:

1. Measure the ecological impacts to songbird communities of specific recreational disturbances in the New Forest

While previous analyses of predicted visitor and bird distributions in the New Forest suggest that areas with high recreation levels are avoided by several species, it is unclear how specific recreation-associated disturbances influence songbird species behaviours and community composition.

Liaising with the NPA and FE, field sites will be selected spanning a gradient of visitation intensity in both woodland and heathland habitats, guided by existing maps of New Forest visitor intensity. The student will use passive acoustic recorders to monitor birds in environments that vary in recreational disturbance type and intensity. The student will use open-source resources to process and analyse acoustic data for species detection, such as BirdNET-Analyzer (<https://github.com/kahst/BirdNET-Analyzer>), a repository containing BirdNET models and scripts for processing large amounts of audio data, trained using reference libraries primarily from Europe and North America. To complement the species data, acoustic indices will be computed to infer community information from a habitat's soundscape, generally involving calculation of power ratios between multiple frequency and/or time bins across recordings. Such indices are controversial and require careful interpretation. Following best-practice guidance, this project will add important information on acoustic index validation and utility for monitoring bird community responses to anthropogenic drivers.

2. Use behavioural science to design, implement and test the effectiveness of educational interventions at changing behaviours of New Forest visitors

Previous studies on intervention effectiveness have focused on quantifying knowledge and attitudinal responses to interventions, rather than actual behavioural changes, limiting our understanding of intervention effectiveness. The student will design and measure the effectiveness of interventions targeted to specific user groups in the New Forest. The nature of the intervention will be evidence-based and will likely involve signage or other communications material. The impact of the intervention will be measured using an online survey targeted at specific types of recreational user (dog-walkers, cyclists, horse riders), participant observation, and in situ ('go along') interviews with an opportunistic sampling approach.

The findings of this project will be relevant to other natural spaces experiencing increased visitor pressures in the UK, and will be disseminated to a range of audiences, including via workshops, publications and newsletters.

Training opportunities:

This project will involve fieldwork in the New Forest including bird surveys and acoustic sensor deployment.

The student will also benefit from a minimum 3-month placement with the Game and Wildlife Trust.

Funding particulars:

This project has CASE support from the Game and Wildlife Conservation Trust.