

PROJECT DETAILS
Project Title
Assessing the impact of human disturbance on wildlife: general insights to underpin environmental decision-making
Project Summary
<p>Assessing the impact of human disturbance on wildlife is a major conservation priority as human populations rise and ecosystems come under increasing pressure from environmental change. Understanding the consequences of disturbance for wildlife has remained a challenge for ecologists, but is required if stakeholders are to correctly assess the threats posed by increasingly diverse disturbance sources.</p> <p>The project will address this knowledge gap by building on a current PhD that has predicted the impact of disturbance within a single site, Poole Harbour, and highlighted how more general predictions could be possible. The project is based on research (e.g. Stillman & Goss-Custard 2010; Stillman et al. 2015) that has shown how the impact of environmental change on birds can be predicted. The study system is coastal wading birds and wildfowl, which have international protection, but are potentially highly vulnerable to disturbance.</p> <p>The project has the following objectives.</p> <p>1) <i>Identify mechanisms through which disturbance can impact birds.</i> The mechanisms through which different types of disturbance (e.g. wildfowling, noise, dog walking, boats) can affect different species (e.g. intertidally shorebirds and wildfowl, and marine wildfowl) will be assessed. The impact of disturbance will depend on factors including the frequency of disturbance, the overlap in space and time of the disturbance and birds, the behavioural response of birds to disturbance, and the ability of birds to compensate for disturbance. Identifying mechanisms will highlight the types of disturbance to which different species may be especially vulnerable.</p> <p>2) <i>Assess ability of birds to compensate for disturbance.</i> Disturbance has three main effects on birds; it reduces the area of habitat, reduces the time available for feeding and increases energy demands when birds take flight. The population consequences of the area, time and energy costs of disturbance depend on the ability of birds to compensate, which in turn depends on the amount of food available and how long it is exposed by the tide. Computer models will be developed for both real (e.g. Poole Harbour, Exe estuary) and hypothetical sites to predict the link between behavioural responses to disturbance and population consequences, taking into account the ability of birds to compensate, the type of disturbance and bird species, to rank the impact of different sources of disturbance.</p> <p>3) <i>Identify disturbance thresholds to advise conservation.</i> Conservationists often need to respond quickly to potential disturbance threats, without time or resources to conduct detailed studies. The research will identify simple rules through which the impact of disturbance can be predicted, based on thresholds of factors such as frequency of disturbance, overlap between humans and birds in space and time, and the ability of birds to compensate for disturbance. These results will be communicated through journal papers, but also a website, being constructed as part of an ongoing project. This will allow stakeholders to quickly assess the potential impact of disturbance.</p>
Academic Impact
<p>Academic impact will be through papers and conference presentations advancing understanding in three main areas: (i) identifying the mechanisms through which disturbance impacts animal populations; (ii) ranking bird species in terms of their potential sensitivity to different forms of disturbance; and (iii) devising simple rules through which the impact of disturbance can be predicted, both in birds, but also more generally. The methods developed during the project will be based on a thorough understanding on the behaviour and ecology of waterbirds. Research will be directed towards filling gaps in existing knowledge of the effect of human disturbance on bird behaviour,</p>

including the trade-offs birds make when responding to disturbance. Models will provide the link between bird behaviour and population ecology, and the response of populations to disturbance, another existing knowledge gap. Applied papers will address threshold amounts of disturbance that limit the number of birds that can be supported on coastal sites. A website will be produced to communicate to stakeholders in simple terms how the impact of disturbance on wildlife can be understood.

Societal Impact

Societal impact will be achieved by assessing whether current or future amounts of disturbance from human activities are likely to adversely affect waterbird populations. Coastal managers and conservationists often need to make decisions on the impact of disturbance to sites. Examples include proposals to build or extend ports, changes in the amount or type of recreational activities (including wildfowling), and increases in the amount of housing near the coast. Time and financial resources are usually limited and so decisions need to be made quickly and with little expense. The project will provide a quick way of assessing risks and prioritising the relative impacts of different types of disturbance on coastal birds. For example, conservationists could rank a number of disturbance types in terms of their potential impact on the birds, focussing their resources towards regulating or managing the most serious. Presently, there is a lack of information on which these decisions can be based, and as a result conflicts between interest groups often arise. The project therefore provides a means for a range of interest groups to work more efficiently, while safeguarding the conservation needs of the birds.

Training Opportunities

You will gain a detailed understanding of animal behaviour, and how behaviour and variation between individual animals is connected to the ecology of animal populations. You will gain field experience of coastal birds, their invertebrate prey species and habitats, through observations of bird behaviour and responses to disturbance, intertidal invertebrates and analysing associated datasets, and the balancing of differing interest group needs on coastal sites.

The project will build and test computer models using a combination of existing and newly collected field data. You will gain technical experience in computer and mathematical modelling, and statistical analysis of bird datasets. You will be given opportunity to undertake specialist courses in computer modelling and statistical analysis. ***NB: You will have the option of either modifying existing models, or developing models of your own, for example, depending on your experience of such modelling.***

The supervisory team has expertise in bird ecology and behaviour, intertidal invertebrate ecology and bird modelling, and integrating regulated wildfowling with conservation needs on coastal sites, and so will be able to support you in all aspects of the project.

SUPERVISORY TEAM

First Supervisor	Richard Stillman, Bournemouth University
Additional Supervisors	John Goss-Custard, Bournemouth University Matt Ellis, British Association for Shooting and Conservation
Recent publications by supervisors relevant to this project	Stillman, R. A. & Goss-Custard, J. D. (2010) Individual-based ecology of coastal birds. <i>Biological Reviews</i> , 85, 413-434. Stillman, R.A., Railsback, S.F., Giske, J., Berger, U. & Grimm, V. (2015) Making predictions in a changing world: The benefits of individual-based ecology. <i>BioScience</i> , 65, 140-150. Stillman, R.A., Wood, K. A., Gilkerson, W., Elkinton, E., Black, J. M., Ward, D. H. and Petrie, M. (2015) Predicting effects of environmental change on a migratory herbivore. <i>Ecosphere</i> , 6(7), 114. http://dx.doi.org/10.1890/ES14-00455.1 . Wood, K.A., Stillman, R.A. & Goss-Custard, J.D. (2015) Co-creation of

	<p>individual-based models by practitioners and modellers to inform environmental decision-making. <i>Journal of Applied Ecology</i>, 52, 810-815.</p> <p>Nolet, B. A., Gyimesi, A., van Krimpen, R. R. D., de Boer, W. F. & Stillman, R. A. (2016) Predicting Effects of Water Regime Changes on Waterbirds: Insights from Staging Swans. <i>PLOS One</i>, 11, e0147340. doi:10.1371/journal.pone.0147340</p> <p>Stillman, R. A., Wood, K. A. and Goss-Custard, J. D. (2016) Deriving simple predictions from complex models to support environmental decision-making. <i>Ecological Modelling</i>. 326, 134-141.</p>
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INFORMAL ENQUIRIES
<p>To discuss this opportunity further, please contact Professor Richard Stillman via email: rstillman@bournemouth.ac.uk</p>
ELIGIBILITY CRITERIA
<p>All candidates must satisfy the University's minimum doctoral entry criteria for studentships of an honours degree at Upper Second Class (2:1) and/or an appropriate Masters degree. An IELTS (Academic) score of 6.5 minimum (or equivalent) is essential for candidates for whom English is not their first language.</p>
HOW TO APPLY
<p>Please complete the online application form by 6th May 2016. Further information on the application process can be found at: www.bournemouth.ac.uk/studentships.</p>