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| **DEPARTMENT**  | **Geography** |  |
| Supervisors | Supervisor 1 | Danielle Schreve (RHUL) |
| Supervisor 2 | Samuel Turvey (IoZ) |
| Supervisor 3 | Wildfowl and Wetlands Trust (CASE partner) and Sturgeon Alliance (CASE partner) (TBC) |
| Supervisor 4 |  |
| Your Project ID | n/a |  |
| Funding Status | Competition Funded PhD |  |
| Application Deadline | 19/06/2023 | Or applications accepted all year round | n/a |
| Project Title | **Establishing historical biodiversity baselines to guide UK wetland and freshwater rewilding** |
| Project Description (Max 700 words) | Restoring British natural landscapes through species reintroductions and rewilding is an increasingly widespread paradigm for environmental management. However, in order to be planned and implemented effectively, this approach requires assessment of long-term environmental archives to establish a series of key baselines: how past ecosystems differed from today; the ecology and environmental requirements of lost species; and when, how and why biodiversity change took place. Coordinated interdisciplinary approaches are required to maximise the collection, interpretation and integration of these biodiversity baselines so that they can be of use for modern planning. Understanding past environmental states and the dynamics and drivers of change is particularly important for guiding management and restoration of the UK’s degraded freshwater ecosystems, which represent key carbon sinks and provide essential ecosystem services, but have long histories of human impact and have experienced severe modification and degradation throughout recent millennia.This project will explore the conservation information-content of a range of different historical archives (fossil and zooarchaeological bone and palaeoecological proxy records; pre-modern historical source texts around use of freshwater resources, e.g. manorial and parliamentary records), and how these baselines can be used to reconstruct biodiversity and landscape change across Britain’s freshwater systems through the Holocene (11,500 years ago to present). It will identify and integrate different available archives for multiple freshwater systems to reconstruct their local environmental histories, with a focus on both national-priority wetlands (e.g. Somerset Levels, East Anglian Fens) and river drainages (e.g. Severn, Thames). Key questions will address the extent to which these systems have changed from postglacial baselines, how they have responded to both natural environmental change and human actions across the Holocene, and which components of biodiversity have varied in their vulnerability or resilience to external change over time. These approaches will be used to establish predictive insights about likely wetland responses to future climate change scenarios, across multiple scales (from components of biodiversity to landscape-level system change).The project will also use multiple archival sources (fossil and zooarchaeological bone records, medieval textual sources, 18th-20th century museum specimens) to investigate the past status and ecology of regionally extinct native British wetland species: the Dalmatian pelican (*Pelecanus crispus*), and the European and Atlantic sturgeons (*Acipenser sturio* and *A. oxyrinchus*). These species are currently the focus of discussions around potential reintroduction, but key aspects of their past distribution, landscape use and environmental requirements in Britain remain unknown, hindering effective national conservation planning. The project will use stable isotope analysis of pelican bones to determine: (1) whether British pelicans required open freshwater bodies or coastal marine waters for feeding, with implications for determining the current wetland extent required to support a viable pelican population; (2) whether pelicans were resident year-round or migratory in Britain, with implications for potential local-scale versus Europe-wide metapopulation management. The project will also determine the past occurrence and local extinction histories of different sturgeon species across different British river catchments, to reconstruct past distributions of breeding populations and their changes over time, correlated with independent available historical data on changing local patterns of fishery effort and landscape modification to identify likely extinction drivers (with associated evaluation of whether these drivers still persist within key landscapes). These investigative approaches will be used to inform restoration and management goals needed for these species to become re-established in the UK.The project will establish a crucial new evidence-base to guide restoration of Britain’s critically depleted wetlands and their biodiversity, and will serve as a template for best-practice integration of historical baselines into modern landscape management within a “conservation palaeontology” framework. Environmental archives also vary hugely both in information-content and in data quantity, quality and accessibility; the project will also explore and evaluate the potential of different archives to provide useful insights into past ecology, exploitation and loss of biodiversity, and their resultant capacity to guide modern conservation planning for British wetlands. |
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| Funding Notes - (Max 100 words) – Optional See below |  |
| References – Optional see below | Jennifer J. Crees, Victoria A. Oxley, Danielle C. Schreve, Samuel T. Turvey 2022. Challenges for incorporating long-term baselines into biodiversity restoration: A case study of the Dalmatian Pelican (*Pelecanus crispus*) in Britain. *Ibis.* https://doi.org/10.1111/ibi.13154 |
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| Application link |  |
| REF2021 Results | Link | [REF 2021: Geography and environmental studies | Times Higher Education (THE)](https://www.timeshighereducation.com/news/ref-2021-geography-and-environmental-studies) |