Gloucestershire Wildlife Trust
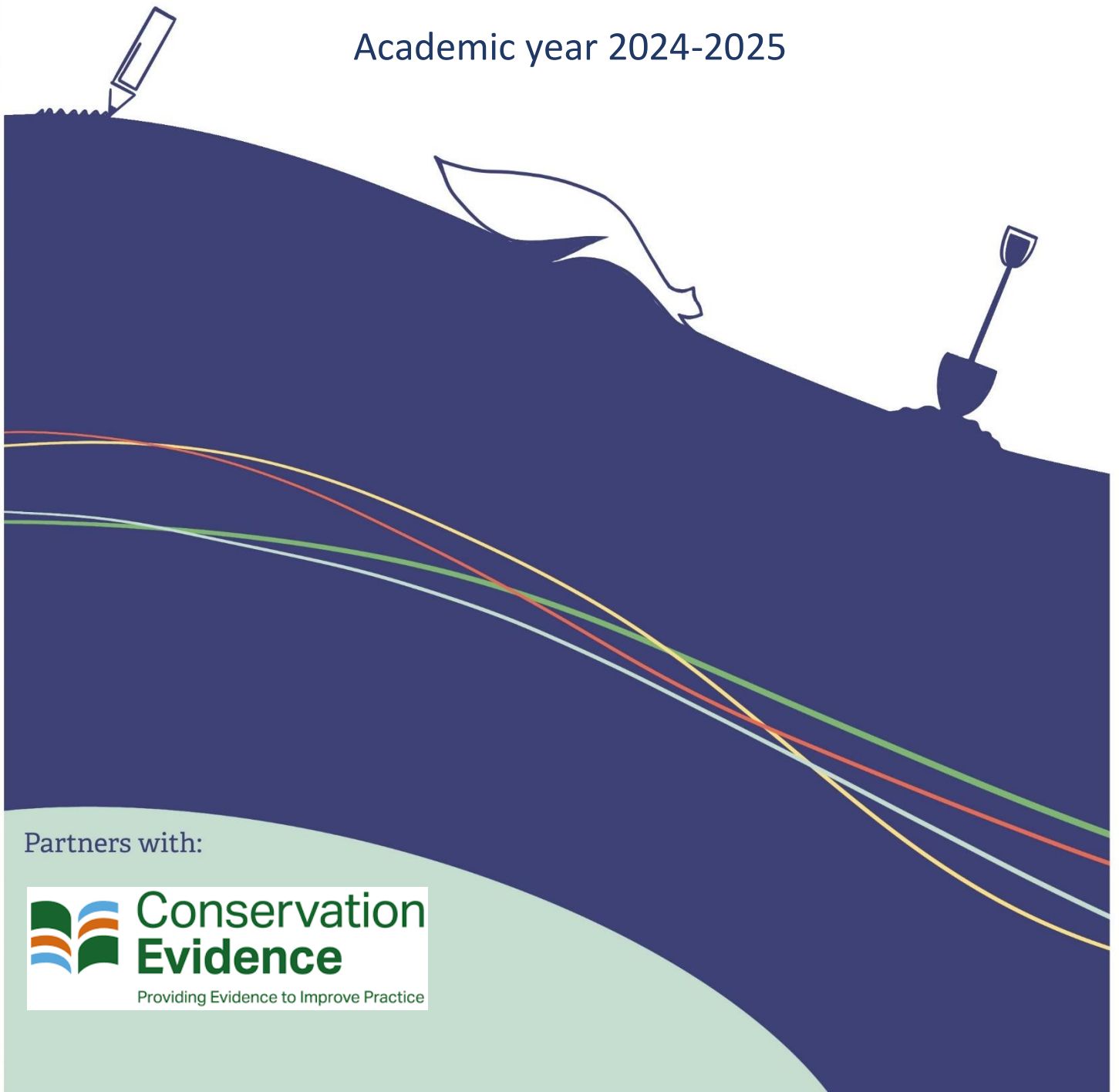
Research project portfolio

Using research to inform conservation & management

Academic year 2024-2025

Partners with:

Conservation Evidence

Providing Evidence to Improve Practice

About us

Gloucestershire Wildlife Trust (GWT) is the largest conservation charity in the county of Gloucestershire. We manage 60 nature reserves covering over 2,000 acres in addition to identifying key sites of nature importance. Our aim is to secure a natural environment which the people of Gloucestershire and visitors to the area can enjoy for generations to come. We aim to connect and improve Gloucestershire's wildlife and wild places as well as urban areas. We have a local membership of over 26,500 people and work with 500 regular volunteers who give their time to support the Trust's work.

Our research portfolio

As a trust we are striving to make more of our management decisions based on solid scientific evidence. In an absence of evidence, we aim to document our management interventions and the resulting changes in a scientific manner, building a body of research. The research work of students and interns is vital for our collection of data. Many of the reports and papers produced will feed into our management plans for species, reserves and habitats across the county.

This portfolio contains a one-page summary of each project we currently have available with a brief description of work that will be undertaken and skills required, as well as gained. Each research project has a designated GWT staff member for support, as well as an internal University supervisor.

For more information

www.gloucestershirewildlifetrust.co.uk

Email: info@gloucestershirewildlifetrust.co.uk

Does the history of previous forestry impact the restoration trajectory of heathland restoration sites?

University supervisor: Any

Skills required: Data collation and review, GIS mapping

Project summary

GWT have 6 heathland/grassland restoration nature reserves across the Forest of Dean district. Some of which have consistently been acid grassland/heathland and some of which are being restored from clearfelled forestry. Within some of the larger reserves, there are also compartments that were felled at different times so a timeline of restoration stages is available.

It is apparent that in some locations, core heathland plant species, e.g. heather and bilberry, recolonise rapidly after felling and the start of restoration, while in other areas, grasses or birch and bracken take over instead. Do we see this pattern because of the soil type (nutrient levels), seedbank or because of the previous timber crop species that has been grown or pre forestry historic land use? Do some conifer species retain a heathland understory better than others, do they impact the soil pH and nutrient levels differently, and can this information be used to predict how the site will respond post felling and therefore inform the restoration management plan that needs to be put in place to avoid sites being rapidly lost under a sea of bracken and birch.

National Forest Estate Subcompartment data with information on stand age and species is available as open data. Old OS maps can be streamed to compare historic land use and GWT restoration management approach can be discussed with staff.

Main questions:

Do the previous forestry species on a restoration site impact the stages of succession that we see?

Can the restoration management plan be guided by understanding previous land use better?

Skills gained

GIS, handing of large data sets, accessing open data services, soil nutrient analysis. The findings of the study will feed into real-life conservation management undertaken by Gloucestershire Wildlife Trust. We are able to provide some time with GWT reserve staff to learn about the reserve and the work undertaken.

Further reading

- Mitchell et.al., 2001, A study of the restoration of heathland on successional sites: changes in vegetation and soil chemical properties, Journal of Applied Ecology, Vol 36 pp770-783.
- Wilton-Jones G. & Ausden M., 2005, Restoring heathland by conifer plantation removal at The Lodge RSPB Reserve, Bedfordshire, England, Conservation Evidence Vol 2, pp70-71

BIRDS & INVERTEBRATES

Moth data interpretation: understanding the moth community at the Tidenham chase nature reserves, habitat preferences and and how does that relate to nightjar feeding preferences.

University supervisor: Any (invertebrate knowledge desirable)

Skills required: population interpretation through Pantheon, GIS mapping

Project summary

Moth surveys (through light traps) have been carried out monthly since 2022 on our Tidenham nature reserves (Poor's Allotment, The Park and Ridley Bottom). The species, count, and weather detailed are recorded and provided to the trust, however, no interpretation has yet been carried out on this data. The moth communities will be influenced by the habitat management we carry out and could be a good indicator of habitat condition. Nightjar are also feed on moths as the main component of their diet, so the ability of the reserves to support nightjar is also of interest.

Main questions:

Can Pantheon be used to classify the moth community into habitat preferences and can that be used to inform GWT management of the sites?

What component of the moth community is suitable food for nightjar and what are the habitat requirements for those moth species?

Skills gained

This project enables students to learn and practice moth ID skills, the use of Pantheon for moth community analysis and GIS. The findings of the study will feed into real-life conservation management undertaken by Gloucestershire Wildlife Trust. We are able to provide some time with GWT reserve staff to learn about the reserve and the work undertaken.

Further reading:
- https://pantheon.brc.ac.uk/
- Sierro et. al. 2001, Habitat use and foraging ecology of the nightjar (Caprimulgus europaeus) in the Swiss Alps: towards a conservation scheme, Biological Conservation, Volume 98, Issue 3, Pages 325-331,
- Mitchell et. al., 2022, Metabarcoding reveals selective dietary responses to environmental availability in the diet of a nocturnal, aerial insectivore, the European Nightjar (*Caprimulgus europaeus*), Ibis, Vol 164, pp 60-73.

INVERTEBRATES

Population distribution and trends of Dung Beetle, Wood Ant and Glow Worm in Gloucestershire

University supervisor: Any (statistical, or population analysis knowledge desirable)

Skills required: Data collation and manipulation large data sets, Statistical analysis, GIS mapping

Project summary

Anecdotally, populations of Dung Beetle, Wood Ant and Glow Worms, well known and easily observed invertebrates, appear to be becoming more isolated and less abundant Gloucestershire. Dung on the Forest of Dean restoration sites does not appear to be mechanically broken down and a concern is that although conservation practitioners are working to restore habitat, the ability of key invertebrates such as these, to find the restoration sites is limited due to poor habitat connectivity, or simply too small and isolated populations.

Site management may also impact these species but trends at individual sites also need to be compared to national trends to account for variables such as weather.

The Gloucestershire Centre for Environmental Records can supply local species data, while national data sets can be downloaded from the NBN Gateway.

One or more of the suggested species could be studied.

Main questions:

What is the abundance and distribution of these invertebrates across Gloucestershire and how isolated are the populations?

How do the population trends in Gloucestershire compare to national trends, and can any causes of decline be identified ?

What conservation interventions could increase the resilience of these populations?

Skills gained

This project enables students to learn and practice ID skills, the interrogation of national species and climatic databases and GIS. The findings of the study could feed into real-life conservation project design by Gloucestershire Wildlife Trust.

Further reading:
- https://nbn.org.uk/the-national-biodiversity-network/archive-information/nbn-gateway/
- Storck-Tonon *et al.* 2020, Habitat patch size and isolation drive the near-complete collapse of Amazonian dung beetle assemblages in a 30-year-old forest archipelago. *Biodivers Conserv* vol **29**, pp2419–2438 .
- Robinson and Stockan (Ed), 2016, Wood and ecology and Conservation, Cambridge University Press

- Stewart et al 2020, Artificial lighting impairs mate attraction in a nocturnal capital breeder, *J Exp Biol*, Vol 223 (19):

DESK BASED

Quality v. quantity of urban gardens: distinguishing the value of garden habitat through satellite imagery

University supervisor: GIS/Spatial ecology focus

Skills required: GIS & R proficiency

Project summary

This project aims to identify urban green spaces, particularly gardens, that are good and bad for wildlife. By putting gardens into categories based on their value to wildlife, this can reflect their permeability for the movement of wildlife. As a result, a better understanding of landscape connectivity can be achieved and feed into county and country-level connectivity mapping.

The study will sample gardens from urban areas across the county in towns including Gloucester, Stroud, Cheltenham & Coleford. This will allow a county-wide comparison but also comparison based on socioeconomic factors.

The data will primarily comprise NDVI/Spot/ Sentinel imagery (or a combination) and garden values can be compared with known habitat classifications. All of this data is available online.

This project could be undertaken by multiple students in a cluster, with a focus on different geographic areas or different socioeconomic factors.

Skills gained

This project will have a strong GIS focus and will improve processing and analytical skills in this field. The study and its findings will contribute to a real-life, long term study looking into the connectivity of habitats across the county. Findings will contribute to management and engagement strategies with the general public in relation to urban gardens. Where possible, students may be able to spend time with GWT staff to find out about the Nature Recovery Network and the work GWT is doing on landscape connectivity.

Further reading

- https://gcerdata.com/naturalcapital/
- Deng *et al.* 2019. Methodology to monitor urban expansion & green space... *Remote Sensing* **11**.
- Singh 2018. Urban green space availability in Bathinda City, India. *Environ Monit Assess* **190**.
- Mathieu *et al.* 2007. Mapping private gardens in urban areas using... *Landscape and Urban Planning* **81**.