Scientists use historical data to create first assessment of human impacts on biodiversity

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The way humans use land across the British Isles has changed beyond recognition during the past 8,000 years. But what impact has that had on biodiversity and are there lessons from the past that could enhance conservation practices now and in the future?

Those are among the key questions being posed through new research led by the University of Plymouth, in conjunction with Historic England and the University of Birmingham.

Funded by the Leverhulme Trust, it hopes to compile the first ever comprehensive database of both land use change and its impact on plant and insect life.

The three-year project will involve collating existing archaeobotanical datasets, which will be used to generate a detailed picture of how land use has changed at regional levels.

Historical pollen and insect data will then be used to demonstrate what impact those changes had on crops, and many of the creatures that came to rely on them.The ultimate aim of the research is to place current trends in their long-term context, examining whether changes in land use can predict patterns of biodiversity across different spatial scales.

This information will then be presented to conservation agencies, giving them a holistic picture of biodiversity in the British Isles over the past eight millennia which can be factored into future policy.

Professor Ralph Fyfe, Principal Investigator on the project, said: "A lot of modern thinking on biodiversity is based on datasets collected by ecologists over the past 50 years, based on what people have observed and might remember from these earlier times before later agricultural intensification occurred. There is a danger that the middle of the 20th century is thus seen as some kind of hotspot. But while change has certainly happened, archaeological studies enable us to assess this in the light of much longer time frames and provide people with a bigger picture. Through that, we can show more precisely how our landscapes have been shaped and this can be factored into future debates on conservation and biodiversity management."

The new study builds on previous research at the University, also funded by the Leverhulme Trust, which has shown how landscapes have changes in Britain and across continental Europe over more than 6,000 years.

Deforesting Europe demonstrated how the continent was transformed from a land of forests to its current agricultural state, while Changing the Face of the Mediterranean examined how the region of southern Europe has been shaped by its distinctive climate and human activities.

Dr. Jessie Woodbridge, who worked on those studies and is Research Fellow for the current project, added: "The British Isles are among the most intensely studied regions in the world. But while there is abundant data from archaeologists, pollen and insect experts, this has not systematically been drawn together so there is no comprehensive picture of how our changing land use has impacted on the diversity of plant and insect species. This study gives us the opportunity to remedy that and to show how lessons of the past might improve biodiversity in the British Isles in the future."

Ruth Pelling, Senior Archaeobotanist at Historic England, will lead the archaeobotanical research which in the first instance will include a large

data gathering exercise across the country.

She added: "Cereal remains and arable weeds tend to be particularly well represented in archaeobotanical collections, providing an indication of past vegetation and habitats on a much more local scale than pollen. Analysing data covering centuries and from across the country will enable us to model long term ecological change on a more local scale, particularly of arable fields, than pollen alone could. The resulting database will be a valuable resource, creating a stronger knowledge and skills base in the sector, something which Historic England is committed to support."

Provided by University of Plymouth