

# Rewild and Rewind: Enhancing the biodiversity value of a university estate

## **Background**

Biodiversity has declined sharply, and the consequence of this crisis has a significant impact on ecosystems as well as society. WWF's Living Planet Report (2022) showed global wildlife populations have plunged by 69% since 1970. The biodiversity loss decreases ecosystem service, resilience against climate change and the quality of life with greenspace.

Protecting biodiversity and endangered species is vital for nature and humanity as they offer valuable ecosystem services, biological resources and social benefits. Each species has a unique role in an ecosystem and their multidimensional interactions are key to maintaining resilient ecosystems that provide diverse benefits. (Dawson et al,2021) For example, biodiverse woodland ecosystems act as a shelter for many species, a fundamental component in food webs, a carbon sink against global warming and crucial economical resources in many societies. Similarly, wetland habitats can remove pollutants and provide vital flood limitation roles. Both habitats also have high restorative potential for human well-being.

Rewilding is a powerful conservation approach for biodiversity conservation because it aims to restore self-sustainable ecosystems with limited human intervention. By reintroducing keystone or/and lost species in the past, the community can reconstruct its dynamic interactions and retain high-biodiverse ecosystems. (Egoh et al, 2021) For example, the reintroduction of wolves in Yellowstone National Park, USA, and beavers into Scotland have shown their positive impacts on the landscape and the integrity of species cannot be achieved by human management. (Martin and Gaywood,2017)

Durham University announced its Biodiversity Net Gain Strategy by 2032. Working with the university biodiversity teams and local stakeholders, this study aims to provide kickstarts for rewilding in the university's wildland.

## **Research questions & objectives**

The objectives of the project are to explore the potential for increasing biodiversity across a major organisation, for the benefit of users of the land associated with the organisation including students, employees, and local residents.

1) What is the potential for rewilding practices and introduction species to be implemented across a diverse university estate to increase biodiversity?

To identify what wildlife and environment used to exist.

To identify applicable and beneficial rewilding practices across the university estate.

To evaluate the potential of possible introducing species and assess their ecological impacts.

2) What is the potential of enhancing the University Estate ecosystem by reintroducing plant species that have been endangered or lost from the estate by using donor seeds and plants from neighbouring areas?

To identify the methods to propagate reintroducing plant species.

To transplant locally endangered or extinct plant species across the estate.

To conduct the primary practice of reintroduction and evaluate its ecological effects.

## **Methods**

The work to be undertaken will be two-fold.

Firstly, desk and field-based research will be undertaken to explore the potential for reintroducing species that have gone locally extinct to the site, and the regional and national occurrence of such species. This component of the research will also explore how rewilding principles could be adopted on-site using, for example, a flock of primitive sheep that the university owns, and the potential for natural grazing to replicate the role of lost large herbivores.

Secondly, experimental work will be undertaken, in collaboration with the University Botanic Garden to explore methods to grow individual plant species that are either locally extinct or endangered. The focus on plant species for the experimental work is necessitated by the limited time of the scholarship.

Below, I provide further details for the methods. The potential for rewilding on the university estate is very context-specific, with limited opportunity in college grounds and in areas of university buildings but with greater opportunities in some of the natural landscape. I will first collate information on the species that would occupy the Durham lowland landscape without human impacts. This will involve searching records from regional (e.g. Graham 1988; Bowey & Newson 2012), national data sources and wider biodiversity records, and could even involve collaboration with historians (e.g. Prof Giles Gasper) to explore the available historic records (e.g. Barnard Castle and Durham Cathedral records). From this information, I will evaluate which species have the potential to exist in sustainable populations in the current landscapes of the estate.

DU biodiversity monitoring revealed that the biodiversity of several estate areas is impoverished relative to nearby protected sites, particularly wetland species. In the second component of this project, I will collaborate with the Department of Biosciences, the DU Botanic Gardens, Durham County Council, Durham Wildlife Trust and the Forestry Commission to collect and undertake germinate and propagation trials of wetland plant species that are locally endangered and extinct on the university site. Focal species will include locally endangered Black Poplar, Greater Tussock Sedge, Skullcap and locally extinct Gipsywort and Nodding Bur Marigold. Working at the Botanic Gardens, I will trial germination/propagation of plants under different treatment conditions (soil types, temperatures and flood conditions). I will also experiment to produce viable seeds of Greater Tussock Sedge by cross-fertilising the remaining DU plant with pollen from plants at the other remaining site. For Black Poplar, working with the Forestry Commission, Chester Zoo and Essex Wildlife Trust, I will experiment with propagating tree cuttings from known UK specimens.

### **Schedule**

Weeks 1-2 Collection of local seed or preparation of previously collected seeds/propagules. Sow seeds in seed-trays under different germination conditions.

Weeks 3-4 Review literature about flora and fauna that formerly occurred and could feasibly be reintroduced to enhance local diversity. Further seed collection and sowing.

Weeks 5-6 Assess the performance and any outstanding work of germination trials. Produce a report on the germination trials and rewilding practice, then communicate findings to relevant stakeholders.

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