Above-below ground interactions for nature recovery in coastal sand dune wetlands

Project highlights

1. Research one of the rarest habitats in Europe, a UK wetland priority habitat which is a focus of nature recovery.
2. Opportunity to shape the project to your interests but focusing on interactions between ecological processes above and below-ground.
3. Work on internationally important long-term ecological experiments (50 years of data).

Overview

Coastal dune wetlands (slacks) are biodiversity hotspots, but they are under threat: habitat loss and deterioration of ecological condition have reduced the quantity and quality of dune slack habitat. Active management facilitates recovery and increases resilience of plant communities to environmental change. In this project you will develop new understanding of how habitat restoration influences aboveground-belowground interactions in dune slack habitats. The impacts of sand dune processes and management on belowground processes are not well known, despite this being key to ecosystem function and resilience. The objectives are flexible to reflect the students interests but may include:

1. Determine management impacts on below-ground processes (e.g. greenhouse gas emissions) and/or communities (e.g. microbial) through mechanisms such as altered plant nutrient dynamics, litter quality and decomposition.
2. Determine the contribution of changes in community composition vs species traits on belowground processes e.g. by undertaking selective removal experiments.
3. Identify, with dune managers and policy makers, ways to integrate below-ground processes into management plans.

This project offers an exciting opportunity to contribute to existing long-term experiments (e.g. Ainsdale Dune Slacks LTE and the global NutNet or DRAGNet) allowing access to roughly 50 years of data. In addition, unique experiments can be developed.

Funding information

The studentship is funded for 3.5 years starting from October 2025 and provides a tax-free stipend of £19,237 per annum (in 2024/25) plus tuition fees at the UK/EU rate (£4,786 in 2024/25) and a Research Training Support Grant (RTSG) of £8,000. International students (including EU) are eligible to apply and there will be a fee waiver in place covering the difference between Home and International fees for successful candidates.

Application deadline is 8th Jan and is open to UK and international students.

Resilient dunes: determining the impacts of winter flooding variability on coastal dune wetland plant communities using remote sensing.

Project highlights

- Develop remote sensing approaches for monitoring wetland biodiversity hotspots.
- Understand how changing climate impacts flooding frequency and extent in coastal wetland nature reserves.
- Work with key policy and management partners to apply new knowledge and advance managemetn of important nature recovery sites.

Overview

Coastal dune slacks are depressions in dune systems at the level of the water table. They are a very biodiverse and extremely rare habitat which is under threat, and so are a nature conservation priority. Dune slacks are seasonally flooded, and the extent, depth and duration of this flooding is a key control over their ecology. Understanding the dynamics of this flooding is

particularly important in the context of climate change, which is predicted to cause a gradual lowering of water tables resulting in drying or total loss of UK dune slacks (Curreli et al. 2013). Monitoring of dune slack water tables is labour intensive, and so data is highly limited in temporal and spatial extent. Ainsdale Dune Slacks and Newborough Warren National Nature Reserves are two of the most important coastal dunes in England and Wales, with a long history of monitoring both water table depth and vegetation change (54 years at Ainsdale: Clarke and Sanitwong Na Ayutthaya, 2010). Working with Natural England and the UK Centre for Ecology and Hydrology, this project will develop new methods using remote sensing data for advancing understanding of dune slack hydrology, which will be combined with historical monitoring data to evaluate the resilience of their rich biodiversity to climate change.

Funding information

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