Evaluating the impact of woodland management and drinking water abstraction on groundwater-fed wetlands

Lead Supervisor: Joanna Clark, University of Reading, Geography & Environmental Science
Email: j.m.clark@reading.ac.uk

Co-supervisors: Anne Verhoef, Geography & Environmental Science, University of Reading; David Macdonald, British Geological Survey; and Debbie Wilkinson, South East Water

Healthy, well-functioning natural wetlands are critically important, yet the world is rapidly losing these important habitats due to anthropogenic pressures (Ramsar Convention on Wetlands 2018). Located in Hampshire, Greywell Fen is a nationally important alkaline fen, which has been negatively affected by a nearby groundwater abstraction plant operated by South East Water (SEW), and by tree encroachment. As part of its commitment to sustainability, SEW will soon cease abstraction to improve groundwater conditions in the fen. **The main aims of this project are to:** 1. assess the relative importance of groundwater abstraction and tree encroachment on hydrological patterns at Greywell Fen using historical and current field observations and hydrological modelling; 2. investigate the value of using non-standard datasets such as sub-daily groundwater depths and soil temperature to calibrate hydrological models in groundwater-dependent wetlands; and 3. assess the hydrological effects of a range of abstraction mitigation and vegetation management scenarios.

To address these aims examples of the **varied tasks required to be undertaken by the PhD student will include:**

- thermal surveys to map high-resolution spatial patterns in groundwater seepage;
- geophysical surveys to develop a stratigraphic model of the fen and underlying deposits;
- development, calibration and validation of a high-resolution integrated hydrological model of the fen, using existing data recorded by SEW and data to be collected by the student.
- use of the model to assess the impact of a range of groundwater abstraction and habitat management scenarios.

Training opportunities: The student will have access to the Reading Researcher Development Programme and will be able to apply to NERC-funded advanced training short courses and policy internships. The student will also receive bespoke training in hydro(geo)logical fieldwork techniques, data analysis and modelling, geophysics, and communication of environmental science, provided by UoR, BGS and SEW specialists. There will be an opportunity to undertake placement(s) and additional training at SEW's headquarters in Snodland (Kent) and/or laboratory in Farnborough (Hampshire). The student will join the Loddon Observatory programme and will receive additional support by Dr Arnaud Duranel, Research Coordinator.

Student profile: The ideal candidate would have a degree in physical geography, environmental science, physics and/or a closely related field, and a demonstrated interest in hydrology and modelling. Strong quantitative and modelling skills would be an advantage. He/she should be able to work independently in challenging conditions in the field. A valid driving license is required for regular travel to the research site.

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