

SUMMARY OF FINDINGS

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Evaluating the influence of groundwater pressures on groundwater-dependent wetlands

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The chemical and quantitative status of groundwater bodies must be classified as either good or poor to meet the requirements of the EU Water Framework Directive. The classification process involves a series of tests, one of which relates to groundwater-dependent terrestrial ecosystems (GWDTEs). The overall aim of this project was to contribute to the development of chemical and quantitative status tests for GWDTEs.

Key Words: Water Framework Directive, Groundwater Directive, GWDTEs, groundwater body pressures, chemical status, quantitative status.

Background

The EU Water Framework Directive requires all surface waters and groundwater to reach good status by 2015 (or 2021, 2027 with exemptions). Groundwater body classification involves, among other things, an evaluation of the impact of groundwater body nutrient (chemical) and abstraction/drainage pressures (quantitative) on GWDTEs. In Ireland, GWDTEs include a broad range of groundwater-dependent habitat types requiring designation for conservation under the EU Habitats Directive. The development of chemical and quantitative status tests for Irish GWDTEs requires an improved understanding of the impacts of a change in groundwater level and/or increased nutrient inputs to different GWDTE types. In addition, the chemical status test demands the use of groundwater nutrient threshold values (TVs) for the classification process. Exceedance of these values at a monitoring point within a zone of groundwater contributing to a GWDTE triggers further site investigations. To date, threshold values have not been determined for the range of GWDTE types occurring in Ireland.

Key points

- The project attempted to determine **groundwater nutrient threshold values (TV) for GWDTEs** using currently available datasets and a predetermined methodology developed by the UK WFD Technical Advisory Group (TAG) National Wetlands Task Team. The first step involved the collation of Irish GWDTE and groundwater quality monitoring datasets. Following initial spatial queries which identified the number of groundwater monitoring points within 5km of GWDTE sites, it was decided to develop a nitrate TV for calcareous fens (alkaline fens and species rich *Cladium* fens). The lack of reliable information on the ecological condition of sites

- prevented the grouping of sites into good and poor ecological condition categories and therefore the UK TAG methodology was not fully applied to the Irish situation
- The project investigated 11 GWDTE types, as per Natura 2000 codes for example alkaline fens (7230); species rich Cladium fen (7210); petrifying springs (7220); transition mire (quaking bog) (7140); active raised bog (7110); turloughs (3180); flushes in blanket bog (7130); wet heath (4010); alluvial forests (91EO), machair (21AO) and humid dune slacks (2190).
 - **Models were developed in cooperation with the wider scientific community.** Schematic diagrams and tables are used by the project to describe the important **pathways** of water flow into each of the 11 GWDTE types and the potential ecological responses to abstraction/drainage pressures and nutrient inputs from associated groundwater bodies. The landscape setting and associated soils and subsoils are also described..
 - Methods for incorporating groundwater body flow regime into the current quantitative pressure risk assessment process and for site-specific investigations of abstraction/drainage pressures on GWDTEs are also proposed by the project.

Findings/Recommendations

- The key recommendation is that **the EPA and NPWS agree on a priority list of GWDTE types for GW nutrient TV and GW level standard development for the next WFD River Basin Cycle.**
- The main conclusion of the research is that currently available data are insufficient for determination of scientifically robust nutrient threshold values (TV) for calcareous fens.
- The main knowledge gaps hindering the development of chemical and quantitative tests for Irish GWDTEs are the lack of (a) reliable information on the spatial extent of some GWDTE types; (b) reliable information on the ecological condition of GWDTEs and (c) monitoring of GW level and/or flow both within GWDTEs and their associated groundwater bodies.
- **Baseline surveys** are also recommended to confirm the presence, extent and ecological condition of some GWDTE types designated for conservation. Groundwater nutrient data should be collated from the monitoring network, or collected from installed boreholes, for sites representative of good and poor ecological conditions in **order to generate a reliable dataset for TV development** using the UK TAG approach.

For Further Information

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Project website: www.tcd.ie/Geology/research/epa-gwdteproject

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