

FORFLUX

Biogeochemistry of Irish forests

PROJECT TEAM

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BACKGROUND

The Irish landscape has undergone a unique transition from being virtually treeless to supporting a highly productive, intensively managed forestry sector during the last six decades. These plantation forests are distinctly different from the naturally regenerated and long-established managed forests of most of Europe and North America. Understanding ecosystem processes in plantation forests is a key to sustainable forest management. In recent decades, we have become more aware of the interaction of the forest with the atmosphere, the soil and surface waters. The need now is to understand the long term implications of these interactions.

OBJECTIVES

- Quantify major nutrient pools and fluxes at Irish forest monitoring plots.
- Develop tools supporting sustainable forest management assessment.
- Quantify concentrations and long term trends of atmospheric ammonia and solutes in deposition, throughfall and soil water.
- Model soil water percolation, nutrient nitrogen and mineral weathering rates.

PROGRESS

The principal activities during the reporting period have focused on the development of monitoring capacity, collection of field samples (soils) and the collation of historic data. Ambient trace-gas monitoring stations have been established for NH₃, SO₂ and NO_x at the three intensive forest

monitoring plots. Data loggers have been installed for soil water and temperature. Additional soil sampling has been carried out at ten Level 1 forest monitoring sites.

A database of forest biogeochemistry is being developed and will be used in the time-series analysis of forest biogeochemistry. In addition, data have been collected for soil water percolation modelling and the determination of nutrient pools.

The first meeting of the project advisory group was held in May. In conjunction with the project, an MSc project was carried out at UCD and a PhD research position was establishment at Trent University.

ACTIVITIES PLANNED

- Installation of field equipment (for monitoring of deposition chemistry, persistent organic pollutants and soil nutrient contents). Collection of additional soil and vegetation.
- Ongoing ambient-trace-gas monitoring for NH₃, SO₂ and NO.
- Testing of forest biogeochemistry database and completion of time series analysis of forest biogeochemistry (preparation for publication).
- Second meeting of the advisory group. Attendance and research presentation at the BIOGEMON and LSW conferences.

OUTPUTS

Huber, C., Aherne, J., Weis, W., Cummins, T., Farrell, E.P. and Göttlein, A. *Seepage water quality before and after clear cutting of Norway spruce stands at Ballyhooly (Ireland) and Höglwald (Germany) under high sea salt and nitrogen deposition*. EUROSOIL, Vienna, Austria, 25–29 August 2008.

Hyland, Alison. *Investigating the Predictive Capacity of Pedotransfer Functions for Estimating Bulk Density and Soil Organic Carbon of Irish Forest and Moorland Soils*. MSc Thesis. Masters in Environmental Resource Management, UCD, 2008.

Input to curriculum development and teaching: case study on forest biogeochemistry planned for new UCD course Soil Science Applications, utilising Level 2 site Ballinastoe and real-time datasets.

Shared file server for Project group, hosted by UCD.