Forests and Water

Since the 1920s the Irish landscape has undergone a unique transition from being virtually treeless to supporting a highly productive and intensively managed forestry sector, based on plantations. The establishment of these plantations has resulted in large scale land use changes. It is only in recent decades that we have we become more aware of the interaction between these new forests, the atmosphere, the soil and surface waters. In some cases, new forests have presented a threat to the sustainability of our soil and water resources. An understanding of ecosystem processes is essential for the successful implementation of sustainable forest management and the minimisation of potential negative impacts.

A number of scientific studies on the interactions between forests and surface water quality have been carried out since the early 1990s. These have provided us with a deeper understanding of these interactions and have led to the introduction and implementation of Forest Service guidelines on forest operations and water quality. There is, however, a need to understand the long term implications of these interactions and the projects described below are contributing to our knowledge in this regard.

The FORFLUX Project aims to develop a better understanding of biogeochemical cycles and the influence of forest cover on nutrient and water fluxes. The research will directly quantify nutrient inputs through weathering, and losses through leaching and uptake, allowing for a more complete assessment of the potential long-term impacts of changes in forest management practices. This information is fundamental to supporting critical load and dynamic geochemical model assessments aimed at defining long-term ecosystem sustainability. The results of the study will inform policy and practice in relation to forest location and practices.

Ground disturbing operations such as cultivation and harvesting, unless executed with due care, have the potential to cause release of solids and nutrients from soils, causing damage to receiving waters. The SILTATION project (jointly funded by Coillte, EPA and NPWS) has provided valuable insights into pattern and extent of sediment and phosphorus release, and the impacts on instream biota, following clearfelling in a peatland catchment. This work is continued and extended in the SANIFAC project. It has the objective of developing sustainability guidelines for clearfell-sizing and harvesting management of forest coupes within peatland catchments; so that losses from forestry activities are mitigated by dilution or buffer zones, in order not to adversely affect the biota in salmonid receiving waters. The guidelines will be based on comprehensive physical, chemical and biological novel experiments in the field and laboratory; and syntheses of fluxes of water, soil and nutrient inputs, uptakes/releases and outputs.

This thematic area comprises the following projects:

- **FORFLUX**: Biogeochemistry of Irish forests.
- **SANIFAC**: Establishment of erodibility indices and soil and nutrients losses from forest soils.
- **SILTATION II**: Quantification and management of erosion and siltation.