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Catchment Models and Management Tools for diffuse Contaminants (Sediment, Phosphorus and Pesticides): DIFFUSE Project

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The agricultural sector is the most common suspected source of nutrient pollution in Irish rivers. However, it is also often the most difficult source to characterise due to its predominantly diffuse nature. Particulate phosphorus in surface water and dissolved phosphorus in groundwater are of particular concern in Irish water bodies. Hence the further development of models and indices to assess diffuse sources of contaminants are required for use by the Irish Environmental Protection Agency (EPA) to provide support for river basin planning. Understanding connectivity in the landscape is a vital component of characterising the source-pathway-receptor relationships for water-borne contaminants, and hence is a priority in this research. The DIFFUSE Project will focus on connectivity modelling and incorporation of connectivity into sediment, nutrient and pesticide risk mapping.

The Irish approach to understanding and managing natural water bodies has developed substantially in recent years assisted by outputs from multiple research projects, including modelling and analysis tools developed during the Pathways and CatchmentTools projects. These include the Pollution Impact Potential (PIP) maps, which are an example of research output that is used by the EPA to support catchment management. The PIP maps integrate an understanding of the pollution pressures and mobilisation pathways and, using the source-pathways-receptor model, provide a scientific basis for evaluation of mitigation measures. These maps indicate the potential risk posed by nitrate and phosphate from diffuse agricultural sources to surface and groundwater receptors and delineate critical source areas (CSAs) as a means of facilitating the targeting of mitigation measures. Building on this previous research, the DIFFUSE Project will develop revised and new catchment managements tools focused on connectivity, sediment, phosphorus and pesticides.

The DIFFUSE project will strive to identify the state-of-the-art methods and models that are most applicable to Irish conditions and management challenges. All styles of modelling considered useful for water resources management are relevant to this project and a balance of technical sophistication, data availability and operational practicalities is the ultimate goal. Achievement of this objective will be measured by comparing the performance of the new models developed in the project with models used in other countries. The models and tools developed in the course of the project will be evaluated by comparison with Irish catchment data and with other state-of-the–art models in a model-inter-comparison workshop which will be open to other models and the wider research community.