



Euro-FLOW: a European training and research network for environmental FLOW management in river basins. A MARIE SKŁODOWSKA-CURIE ACTIONS Innovative Training Network (ITN) funded under H2020-MSCA-ITN-2017

ESR 15: Towards integrated e-flow assessment at multiple scales

3 year fixed- term PhD position.

Host institute: Helmholtz-Centre for Environmental Research - UFZ

Supervisors: Prof. Martin Volk, Prof. Ralf Seppelt (UFZ)

Project Description:

Environmental flows (e-flows) are defined as the “quantity, timing and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihood and well-being that depend on these ecosystems”. Hence, this includes basic elements of survival, improved community health, enhanced security, and better social relations. Environmental flows support aquatic biodiversity and a range of provisioning ecosystem services such as clean water, plants, building materials and food like fish or fishery products, but also regulating ecosystem services, such as for erosion, pollution, flood, and pest control.

There is a need for methods to assess ecological impacts of flow management at a range of scales so that appropriate regional management can be implemented, which could be realized by analyzing environmental flow as a key indicator. Hence, this PhD thesis will use multi-criteria optimization to identify and assess the relationships and trade-offs among land and water use, e-flow requirements, and related ecosystem services on local to regional scales. As a main result the project will provide a scale specific framework to evaluate scale-specific e-flow and related ecosystem services to provide related sustainable management strategies.

Objectives:

- (1) Defining the e-flow characteristics, influencing factors and related ecosystem services at local to regional scale case study areas
- (2) Developing a scale-specific framework for e-flow (and related ecosystem services) assessment by using multi-criteria approaches/optimization
- (3) Provision of scale-specific strategies for sustainable e-flow management

Expected outcomes:

- (1) New knowledge of local to regional factors influencing e-flow related ecosystem services
- (2) A multi-criteria e-flow and ecosystem services assessment tool for local to regional scales
- (3) A set of sustainable e-flow and ecosystem services management strategies

Secondments:

One secondment will be Dr Julia Martin-Ortega at the University of Leeds in the UK. The University of Leeds is a project beneficiary, and Dr Martin-Ortega's research focuses on relationships between society and water systems, and has a strong interdisciplinary and policy-relevance emphasis. This secondment is planned to be at around month 6 with a duration of 4 months.

The second secondment is planned to be with Dr Mark Fletcher from Arup Ltd, UK. Dr Fletcher is responsible for all water and flood risk business activity across Arup. He is also member of the project's advisory panel. This secondment is intended to be in the second year with a duration of 2 months. The main purpose of the stay is the development of applications relevant to water businesses.