

GSI Targeted Projects - Groundwater

Project title: Establishing a groundwater flood monitoring and modelling programme for Ireland

Leader: Prof Laurence Gill, Institute of Technology, Carlow

Abstract:

Due to the unprecedented flood events of 2009 and 2015, flood risk management is seen as a major challenge facing communities across the country. In the Irish context, groundwater flooding represents a significant flood hazard for many rural communities. Groundwater flooding is primarily associated with lowland karst groundwater flow systems in the west of the country. The combination of low storage, high transmissivity and widespread groundwater-surface water interaction leaves these systems particularly susceptible to groundwater flooding.

Recent flood events have reinforced the need for a greater understanding of groundwater flooding as a geohazard, and improve our ability to quantify the location and likelihood of flood occurrence. This project will provide the fundamental technical knowledge and information necessary to enable the development of appropriate groundwater flood mitigation measures, and allow for informed flood assessments to be made in future. Primary objectives of the proposed study are to:

- Establish a permanent monitoring network to provide long-term quantitative groundwater flooding data
- Develop methodologies for improving groundwater flood hazard maps and real-time monitoring of groundwater flooding
- Develop modelling/analysis methodologies for estimating groundwater flood frequency
- Assess likely climate change impacts on groundwater flooding

Budget: €118,520

Start date: 1st October 2016

Project title: Integrated modelling of hydrogeological/hydrological data and climate change scenarios for preselected Irish groundwater systems

Leader: Dr Owen Naughton, Institute of Technology, Carlow

Abstract:

Climate change will be a major driving force in shaping Ireland's water resources and natural environment in coming decades. It will pose significant risks to water management, exacerbating existing pressures in terms of water supply, quality, flooding and drought. Early detection of these pressures in hydrological regimes is key to informing adaptation strategies and minimizing adverse environmental and societal impacts. This project proposes to develop a modelling and analysis approach to evaluate the vulnerability of groundwater systems in Ireland to a changing climate. This will be achieved by modelling and assessing groundwater system behaviour at both short- (flood forecasting) and long- (climate change impact) timescales. Together, project outputs will improve the national capacity to understand how groundwater resources respond to climatic stresses and improve the reliability of adaptation planning and predictions in the groundwater sector. The project will advance our understanding of climate change impacts on groundwater resources, address the deficit of data available in this area and in collaboration with the GSI enable the sustainable management of groundwater resources and to tackle the challenges resulting from climate and global change.

Budget: €169,781.15

Start date: 1st January 2018