



GIS modelling used to calculate flood risk damages for river & sea flooding

Rivers Agency, a division of the Department for Infrastructure (DfI), is the statutory drainage and flood defence authority for Northern Ireland. The Agency's aim is to reduce the risk that floods pose to human life, the environment, cultural heritage, and economic activity by working together with a range of stakeholders to effectively manage the risk. The provision of LPS mapping and consultancy services help Rivers Agency to achieve this aim.

Challenge

A key aspect of flood mapping in complying with the EU Floods directive is to communicate information on flood risk. Users of this information range from emergency planners to the general public. The challenge is presenting flood mapping in a manner that is easily accessible and understood. The mapping shows the risk of flooding and potential consequences associated with a variety of flooding scenarios. This was then used as a basis for flood risk management plans.

The flood risk maps detail the potential impacts on property, economic activity, notable pollution sources and other protected areas.



What is Geographic Information (GI)?

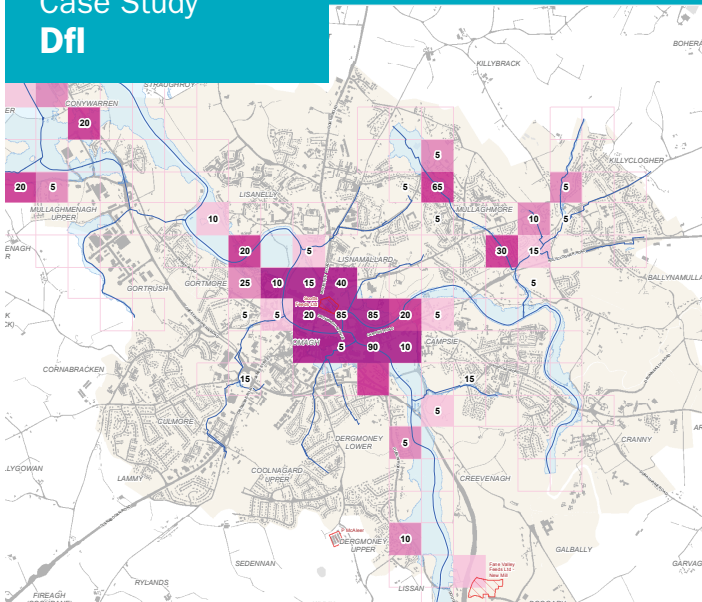
Over 80% of data used by our public sector services can be described as GI because it has a geographic element i.e. an address; and because of this, it can be mapped.

What is a Geographical Information System (GIS)?

(GIS) refers to a range of software packages that helps organisations harness the geographic element of data, not only to map the data, but to analyse it in new and more powerful ways.

LPS GI Consultancy Services

LPS provides a free GI consultancy service to the public sector in NI. The team provides tailored advice and assistance on how GI can improve processes and service provision and how to interrogate and present data using GIS.



Map visualisation of modelling results showing the potential adverse consequences of flooding summarised across a 250 metre grid.

The Solution

Through the use of GIS, Rivers Agency modelled and mapped the flood extents and flood depths for a range of potential flooding scenarios.

This data was then used to identify and select building footprints from OSNI Large Scale mapping provided under the Northern Ireland Mapping Agreement (NIMA).

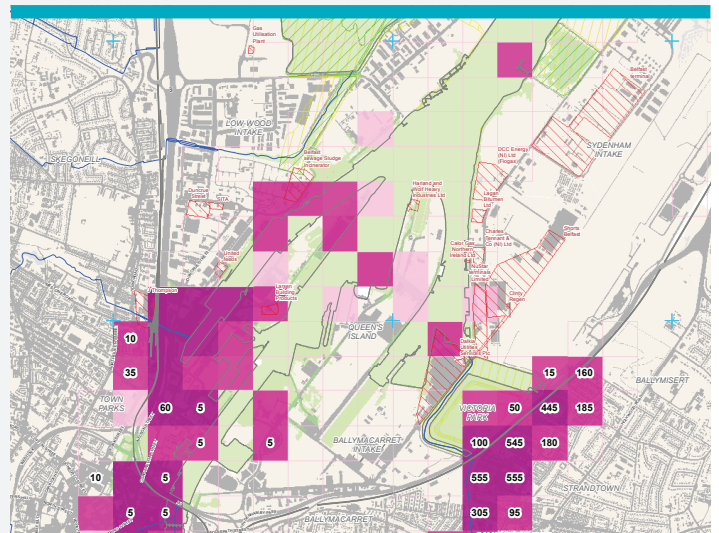
These footprints were then used to compute the impact of flooding on people and economic activity. This process was automated using a GIS based Flood Risk Metric Tool.

The tool allows users to assess and quantify economic, social, and environmental impacts. The results from the Flood Risk Metric Tool were summarised into a 250 metre grid.

The project results were then made available internally and externally via the Agency's web based mapping applications. The map viewers utilise OSNI base mapping provided by LPS Spatial NI web mapping services.

“The project has delivered a step change in NI’s knowledge and interpretation of flood risk information. We now have detailed flood mapping available for most major settlements in NI, that should help us plan for the delivery of flood prevention, protection and preparedness measures.”

Malcolm Calvert - Rivers Agency



The purple symbology indicates the magnitude of the economic damages; the numbers show the number of people affected.

The Benefits

New Insights: GIS enabled the data to be analysed spatially providing new insights into the distribution of flood risk across Northern Ireland. The model predicts annual average damages of up to £11M from river flooding.

Informing Decisions: The outputs informed the Flood Risk Management Plans, developed here in compliance with the EU Floods Directive. This allowed amongst other approaches, the Agency's capital budget to be prioritised to target the greatest need.

Operational Efficiencies & Planning: The Flood Risk Metric Tool has enabled the Agency to be more efficient in undertaking the in-depth analysis required for potential flood alleviation schemes.

Improved Communication: The data can be viewed by staff and members of the public. This has raised the profile of flood risk and promoted interest and discussion among staff, stakeholders and the public.