St. Colmcille's church, Skryne, in the catchment of the River Nanny

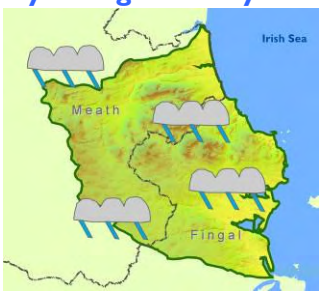
Meath coastline

FINGAL EAST MEATH FLOOD RISK ASSESSMENT AND MANAGEMENT STUDY

Newsletter – 04
May 2009

Included in this issue

Hydrological analysis



Historical flooding

Introduction

Welcome to the Fingal East-Meath Flood Risk Assessment and Management Study (FEM FRAMS) newsletter. The newsletter is produced every three months to provide information on different aspects of the project and to keep you updated on project progress. Please visit our website www.fingaleastmeathframs.ie to obtain a copy of previous newsletters and further information about the project.

The main objectives of the FEM FRAMS are to: identify and map the existing and potential future flood hazard and risk areas within the study area; build the strategic information base necessary for making informed decisions in relation to managing flood risk; identify viable structural and non-structural measures and options for managing the flood risks; and prepare a Flood Risk Management Plan (FRMP) for the study area, and a Strategic Environmental Assessment. The FRMP sets out the measures and policies, including guidance on appropriate future development that should be pursued by the Local Authorities, the OPW and other Stakeholders. This study will ensure compliance with the Governments national policy for flood risk, the EU Floods Directive and the Water Framework Directive.

It is important that the knowledge and views of the general public are taken into consideration during the development of the Fingal East Meath FRMP. Our website www.fingaleastmeathframs.ie has a feedback form where you can submit information and views relevant to the study.

Fingal County Council
Comhairle Contae Fhine Gall

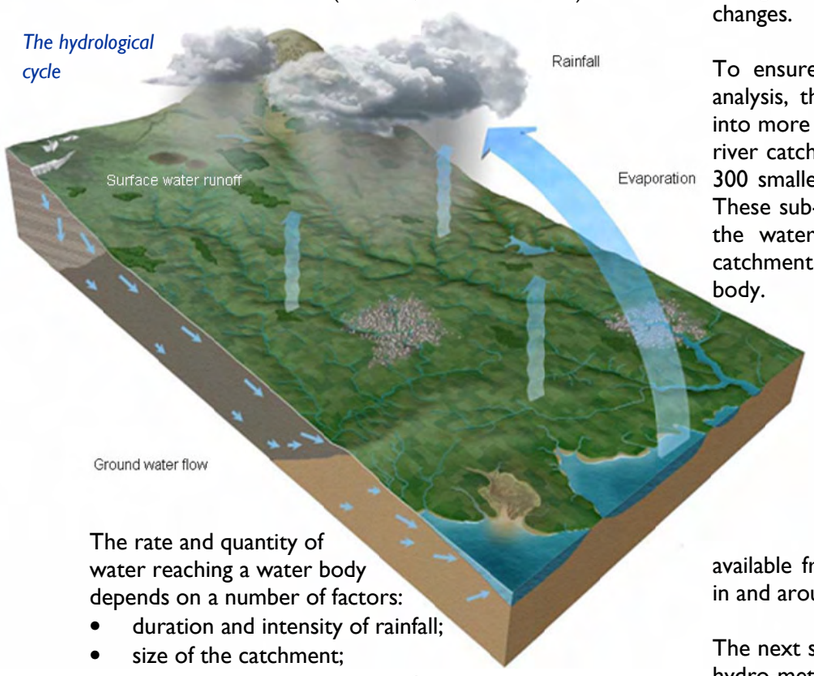
OPW
The Office of Public Works
Oifig na nOibreacha Poibli

HalcrowBarry

Hydrology

Hydrology concerns the occurrence and movement of water in the environment. For assessing flood risk, we are particularly interested in the effects of surface water hydrology, which looks at the relationship between rainfall on the land surface and runoff into water bodies (streams, rivers and lakes).

The hydrological cycle



The rate and quantity of water reaching a water body depends on a number of factors:

- duration and intensity of rainfall;
- size of the catchment;
- topography and geology of the catchment - catchments with steep slopes and impermeable rocks and soil will have a faster rate of surface water runoff;
- land use - urban areas have lots of impermeable surfaces which causes the transfer of water to a water body more quickly than rural farm lands;
- previous weather - if the ground is already saturated, then any new rainfall will have a faster rate of run-off.

Hydrological Analysis

The hydrological analysis for the FEM FRAM Study uses the scientific findings of the Flood Studies Report (NERC, 1975) and Flood Estimation Handbook (IoH, 1999) together with recorded river flow and rainfall data to estimate rates and quantities of river flows in the study area water bodies. These rivers flows will be inputted into computer models of the rivers to generate water levels for a range of Annual Exceedence Probabilities (AEP).

The AEP is a statistical measurement indicating the likelihood of a flood event of a certain intensity occurring or being exceeded in any given year. Thus a 10% AEP describes a flood event which has a 10% chance of occurring or being exceeded in a given year. Design river flows will be produced for the 50%, 10%, 5%, 2%, 1%, 0.2% and 0.1% AEP. Design river flows will also be produced for future scenarios taking into consideration climate change and land use changes.

To ensure the correct focus for the hydrological analysis, the FEM FRAM study area is first divided into more than 24 individual river catchments. These river catchments are further divided into more than 300 smaller areas based on natural sub-catchments. These sub-catchments act like a funnel, collecting all the water within the area covered by the sub-catchment and routing it into the nearest water body.

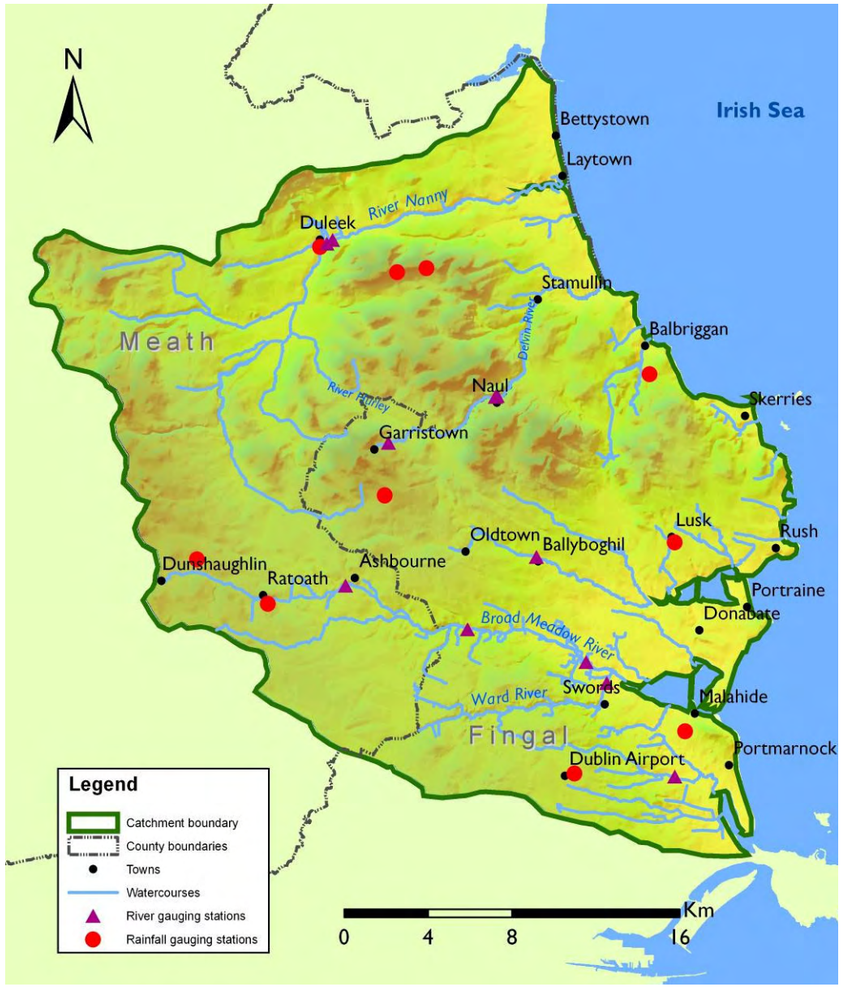
The hydrological analysis is being carried out in three stages. The first stage involved collecting information on historical flooding in the study area and sourcing river flow (hydrometric) data and rainfall (meteorological) data in the study area and neighbouring catchments. Hydrometric and meteorological data is available from a number of gauging stations located in and around the study area as shown on the map.

The next stage consisted of statistical analyses of the hydro-meteorological data to define design rainfall and river flows at the gauging stations; a joint probability analysis to determine the appropriate combinations of fluvial (river) and tidal events; and a review and analysis of historic floods in the study area.

The final stage of the hydrological analysis will involve further analysis on rainfall and river flows to define the design river flows in the catchment watercourses. The effects of climate change and future land use changes on the existing flooding scenarios will also be investigated. The outputs from this final stage will be used in the computer models of the rivers to map the extent of flooding along the watercourses for a range of AEP events.

Joint probability analysis

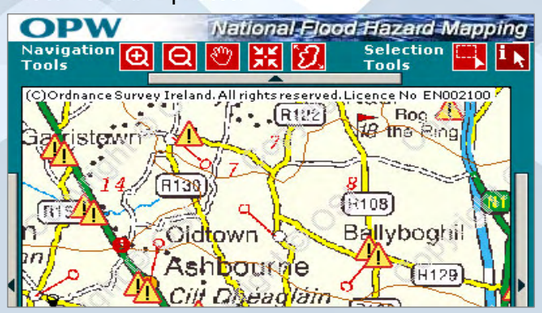
The rivers being studied as part of the FEM FRAMS are both tidally and fluvially influenced where they discharge to the Irish Sea. Therefore the flood risk along this coastal zone can be from either fluvial, tidal or a combination of both. A joint probability analysis has been carried out to determine the chance of two or more conditions occurring at the same time to produce a high water level e.g. high river flow and high tidal level.



Map of the Fingal East Meath study area showing the location of rainfall monitoring stations and river flow gauges.

Review and analysis of historic flood events

A review of available flood records relevant to the study has been undertaken. Information was made available from a number of sources including Fingal County Council, Meath County Council and the OPW. The OPW National Flood Hazard Mapping website www.floodmaps.ie contains information on past flood events in the form of various reports, documents and photos.



Sample image from www.floodmaps.ie website

Flooding at North St., Swords in November 2002

The results of this analysis will inform the calibration and validation of the computer models of the rivers at later stages of the project.

Hydrology report

A hydrology report will be prepared detailing all aspects of the hydrological analysis undertaken for the FEM FRAMS. The report will be available to download from the project website later this year.

Rainfall and river gauging stations

Rainfall gauging stations are located at a number of locations in and around the study area, which record the amount of rain which falls on the catchment. Hydrometric stations record the flows in the rivers. The rainfall and hydrometric stations in the FEM FRAM study area at which historical data was available are shown on the map.

The data from these gauges has been used in the hydrological analysis to estimate rates and quantities of water runoff into the study area water bodies. The gauges in the study area are maintained and monitored by organizations such as Met Eireann, the OPW, EPA and the local authorities.

Project progress update

Throughout the project we will keep you updated on our progress through both the quarterly newsletter and the project website.

Channel and structure survey

The channel and structure survey commenced in January 2009 with DigiTech 3D appointed as the survey contractor to carry out this important survey work. In order to collect the required survey data it may be necessary for DigiTech 3D survey teams to gain access to your land. Access inside houses and buildings will not be required. The surveyors will make every effort to contact land owners before entering lands. We would be grateful if you could assist the study by granting the surveyors access to your land to carry out necessary survey work. All surveyors will carry identification documents and will take great care not to damage property. Surveys of the Ward River and its tributaries and the Broadmeadow main river channel are complete. Surveying of the remainder of the river channels in the study area are ongoing with survey works expected to be complete by mid summer 2009.

Preliminary Hydrology Report

A preliminary hydrology report has been prepared. This report sets out our initial understanding of the hydrology in the study area. A detailed hydrological assessment is under way and will be completed later this summer. Details of this assessment will be contained a hydrology report which will be published later this year.

Stakeholder workshop

A stakeholder workshop, comprising environmental authorities, local authorities and key environmental consultees was held in early February. The purpose of the workshop was to identify key environmental issues, constraints and opportunities associated with the study area relating to flood risk and its management. The workshop also provided an opportunity for the stakeholders to express their views and feedback on the study. The activities of these stakeholders may be directly affected by the plan and may influence decision-making.

The outcome of the workshop and any pertinent issues raised will be reported in an Environmental Scoping Report to be published during the summer.

If you have any questions or require any further information relating to this study or if you would like to be included on a distribution list for future issues of this newsletter please email fem-frams@fingalcoco.ie

If you would like to contact us by post, please send your request to Denise Treacy, Water Services Department, Fingal County Council, Grove Road, Blanchardstown, Dublin 15.

In the next issue of the newsletter we will be providing information on the computer modelling being undertaken for the FEM FRAMS. Computer model are being used to solve advanced mathematical equations to estimate water levels and flows along the river channels and floodplain for flood events of various magnitudes.

The next issue of the newsletter will be available in August 2009.

Our project website www.fingaleastmeathframs.ie provides up to date information on the FEM-FRAM Study, including project activities, project programme, public information days and project reports.

A feedback form on the website provides you with an opportunity to provide information you feel is relevant to the study.

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