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Palaeoflood evidence on the River Nore, South East Ireland

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Past geomorphic changes can be detected in sediment sinks, through the investigation of natural sediment archives. Since the advent of palaeoflood hydrology in the 1980s, numerous authors have demonstrated that such sediment deposits record valuable evidence of past flooding events. Many of these studies have focussed on fluvial systems in arid environments, with bedrock channels proving to be particularly successful field sites. In some districts, the collected datasets are now routinely employed to augment analyses of flood frequency and magnitude, which have traditionally relied on extrapolation of short hydrometric datasets.

This study targets river reaches in a temperate humid environment, with a predominantly alluvial channel. The River Nore is one of the largest catchments draining South East Ireland. It is situated in a valley with an inherited glacial legacy and is principally a lowland river catchment. Specific morphological zones have been targeted which are optimal for flood deposit preservation, including palaeochannels, tributary junctions and floodplain overbank settings.There are a variety of anthropogenic pressures evident in this landscape. Among them are channelisation of select tributaries, a legacy of coal mining in the upland Carboniferous limestones, and the installation of man-made obstacles or modifications along the length of the river channel such as sluices and weirs. Regarding land-use, the majority of the catchment is dominated by agriculture, mainly pasture with some tillage.

This study investigates palaeoflood evidence in the River Nore catchment and examines the development of the river floodplain using a variety of complementary field and desk-based methods. The sub-surface and micro-topography of river reaches are investigated using Ground Penetrating Radar (GPR) and Unmanned Aerial Vehicle (UAV) technology. Flood deposits have been characterised by examination of bank exposures and sediment cores. Installation of sediment traps at discrete locations will enable quantification of sedimentation rates of individual flood events over the winter period 2016/17. Historical Ordnance Survey maps, aerial and satellite imagery have been digitised in a GIS (Geographic Information System) to document channel change over time.

Previous authors have noted a paucity of research in fluvial geomorphology in Ireland, particularly in lowland catchments, and this study endeavours to start addressing that gap. Furthermore, in terms of developments in palaeoflood hydrology, this is the first study of its kind in Ireland, attempting to understand and utilise geomorphic evidence of previous flood events in an Irish river catchment.