

Understanding flood risk in Morayshire has required the adoption of a holistic work programme that brought together a multidisciplinary scientific team who used a variety of modelling techniques to investigate groundwater and coastal flood risk within the Lower Findhorn Catchment in Morayshire, N. E. Scotland. This work, which has been largely funded by Moray Council, delimits potential zones of ground water flooding and has informed the design and construction of flood defences, in parts of the catchment where both commercial and residential properties were at risk. It also assessed the potential for coastal flooding of the low-lying coastal zone. Determining the nature of the complex shallow Quaternary strata and the degree of continuity, heterogeneity and relative permeability of packages of sediment in 3D was critical to establishing the areas at risk of ground water flooding. A 'source to sink approach' was adopted covering not only the floodplain of the River Findhorn, but also the interfluves and the surrounding coastal zone. This was achieved by construction of a GSI 3D model of the shallow geology, based on extensive and detailed field investigation of the catchment geology, but also informed by conceptual models of the glacial and postglacial evolution of North East Scotland. The model was calibrated by borehole drilling and trial pitting, and subsequently reattributed with permeability values based on pumping test results and geotechnical analyses. The resulting 3D distribution of shallow subsurface permeability provided a major set of parameters for ZOOM groundwater modelling. This was used, together with outputs from third party hydrological models, to model groundwater flow directions, changes in the water table relative to base level (sea level), and to establish the potential groundwater component of river flooding in the catchment. Regional modelling of changes in Relative Sea Level is also an important component in determining the probable future trends in flood risk in the Lower Findhorn. Unusually for the UK, conceptual models and proxies indicate that little rise in sea level has occurred during the last 100 years and that the coastline is prograding. Consequently, modelling indicates that the risk of inundation of this low-lying portion of Morayshire by coastal flooding is slight, when compared to that from river flooding events.