

A GIS-Based Approach to Floodplain Mapping

An Abstract of
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ABSTRACT

The purpose of this project is to create digital inundation maps to aid the Nature Conservancy in its restoration planning for the part of the Emiquon floodplain along the Illinois River, and to serve as a model for similar work over the whole floodplain. The project presents an approach for automated floodplain mapping using a combination of GIS and GIS-related software including the desktop GIS program ArcView, HEC-RAS and HEC-GeoRAS. HEC-RAS is hydraulic software that prepared water surface profiles for different flood estimates. HEC-GeoRAS is an ArcView extension that links the HEC-RAS model to ArcView, and maps inundation depths.

In this project, inundation maps are produced for 1.5, 2.33, 10, 50 and 100 year flood estimates. The maps for 1.5 and 2.33 year flood estimates should be helpful for allocating areas for different plant species, whereas the other three maps (for 10, 50 and 100 year flood conditions) should aid in the designing of minor structural control measures, such as levees. The inundation depths are classified in equal intervals of 0.5 meter and the study area is restricted to a small section of the Illinois River floodplain, but the processes developed in this study are flexible so that others can employ the model for other flood estimates using different class intervals, and could extend the work to the entire Emiquon floodplain and beyond.

The steps that I have followed demonstrate that GIS can be a significant adjunct to the field of water resources in general and floodplain mapping in particular. This study can serve as a model for engineers, planners, and resource managers who want to improve and expedite hydraulic modeling and the completion of projects.