

## ABSTRACT

Sangwan, Nikhil. M.S.C.E., Purdue University, Dec 2013. Floodplain mapping using Soil Survey Geographic (SSURGO) database. Major Professor: Dr. Venkatesh Merwade.

Floods are the most damaging of all natural disasters, adversely affecting millions of lives and causing financial losses worth billions of dollars every year across the globe. Flood inundation maps play a key role in assessment and mitigation of the potential flood hazards. However, there are several communities in the United States for which the flood risk maps have yet not been published, as the current flood inundation mapping methods are typically very expensive and time consuming. The objective of this study is to develop and examine an economical alternative approach to floodplain mapping using widely available soil survey data. In this study, floodplain maps were developed for the entire state of Indiana, and some counties in Washington, Minnesota, and Wisconsin by identifying the flood-prone soil map units based on their attributes recorded in the SSURGO database. For validation, the flood extents predicted by these maps were compared with the extents predicted by other floodplain maps viz.: Federal Emergency Management Agency (FEMA) issued Flood Insurance Rate Maps (FIRM), flood extents observed during past floods, and other floodmaps derived using Digital Elevation Models (DEMs). In general, SSURGO based floodplain maps were found to be largely in agreement with the other flood inundation maps. They were as effective as floodmaps derived using DEMs in their predictions of flood extents. Although there was comparatively greater agreement between the FEMA maps and the observed flood extents, SSURGO floodplain maps could also predict most of the observed flood extents with 70% accuracy. Thus, albeit with a slight loss in

accuracy, SSURGO approach offers an economical and fast alternative for floodplain mapping. In particular, it has potentially high utility in the areas where no detailed flood studies have been conducted yet.