FLOODWAY OPTIMIZATION ALGORITHM FOR STREAMS IN GEORGIA

Tien Yee and Huidae Cho

Floodway boundaries are essential limits within a floodplain used to outline the area in which encroachment should be severely restricted. This boundary is important to regulating agencies and engineers as it provide valuable information to help in decision making, planning and management of floodplain development activities. An ideal floodway is constructed from a set of left and right encroachment extents that cause surcharges equal to or less than a permissible limit, usually 1-ft in the state of Georgia, at every cross section within the reach. Additionally, encroachment should not be applied partial to just one side of a waterways. HECRAS is the standard software accepted by FEMA for flood modeling and therefore many effective floodway boundaries are created using HECRAS. Typically, floodway boundaries are produced manually through iterative trial and error procedure where the left and right encroachment limits are varied within HECRAS to produce the target surcharge of 1-ft or less in all cross sections along a reach. The quality of the encroachment limits obtained through the trial and error process varies between modelers and is dependent upon a modeler's experience level, engineering judgements and is thus bound to subjectivity and sometimes subconscious preferences and biases. Further, optimal floodways are not required for flood mapping purposes and therefore some effective floodways may have been left unoptimized. This work introduces a computer model that automates the production of HEC-RAS encroachment limits and is therefore able to mitigate biases and subjectivity from a modeler. In addition, the algorithm outputs floodway footprint that are reach-wide minima. The algorithm will be applied to two different streams in Gwinnett County, Georgia. Results obtained from the floodway optimizer will be presented and the potential of the model for future applications will be discussed.

Program reference: 6.5.2