

Trevor Grout

There are two situations when inundation mapping may be required on a state-wide basis: 1) When large-scale rain events produce widespread flooding, potentially threatening many dams that may not have dam breach inundation maps; in these cases there may not be sufficient time to develop the needed inundation maps should a dam failure prove imminent. 2) When the original inventory of dams classified as Low Hazard has not been re-evaluated in many years and new development has occurred downstream of them.

In 2016, South Carolina found itself in the first situation in the wake of Hurricane Matthew when over 8 inches of rainfall fell over one-third of the state. The Dam Safety Programs in Mississippi, Oklahoma, and Arkansas found themselves with the second situation - all needed an inexpensive and relatively fast way to perform a hazard class reassessment of the Low Hazard dams within their states.

The cost of performing detailed hydraulic analyses and mapping dam breach inundation areas for each dam is usually prohibitively expensive. However, this presentation will describe a cost-effective simplified method using GIS that produced over 400 dam breach inundation maps in a matter of a few hours for the dams in South Carolina, and was also implemented on over 8,500 dams for assisting with hazard class assessments in the states of Arkansas, Mississippi, and Oklahoma.

The tools and procedures created allow for breach inundation areas to be produced for any existing or proposed dam anywhere in the world in less than two minutes. This presentation will show the comparisons of inundation maps based on the procedure and detailed hydraulic analysis, describe the semi-automated procedure developed by FTN, and show results of applying the procedure (automated outputs to common formats such as Google Earth KML and ESRI Shapefiles are produced showing estimated maximum flood heights, flooding depths, and estimated arrival times).

By having these maps ahead of a disaster, safety officials can better, and more safely, manage disaster situations from single dam failures to region-wide dam failure situations.

Or, the procedure can be used to reassess hazard classifications on a state-wide basis to help prioritize dam safety efforts.