DAM BREACH INUNDATION MAPPING GUIDANCE AND SIMPLIFIED DAM BREACH MODELING AND MAPPING

The objective of this presentation is to provide an update on the Federal Emergency Management Agency's (FEMA) efforts to develop a new technical publication that provides guidance to State Dam Safety programs to assist in the consistent development of dam break inundation studies that can be used for dam safety, hazard mitigation planning, emergency management, consequence assessment and loss estimation.

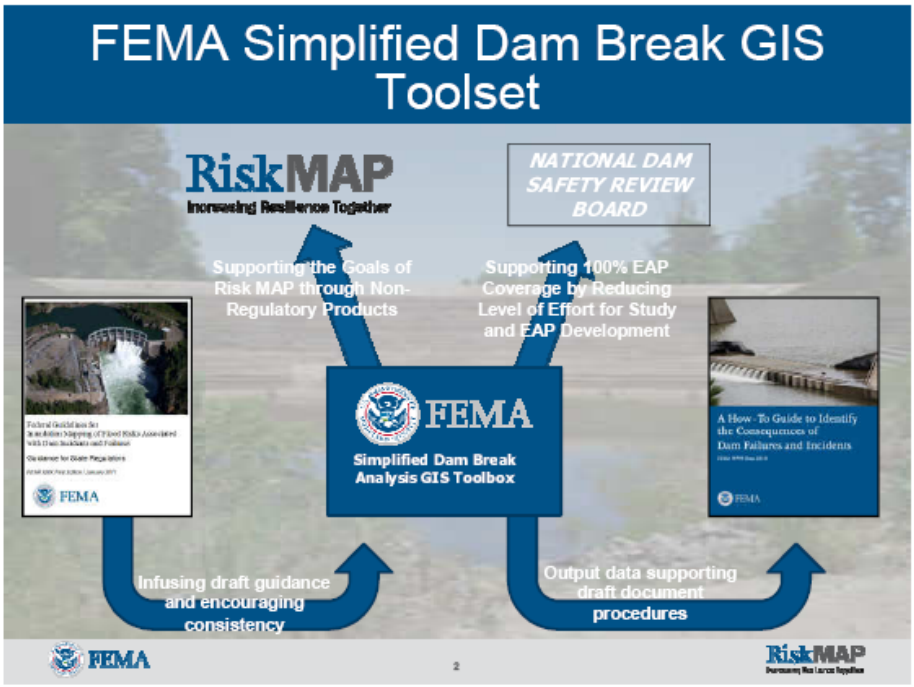
Inundation mapping is a critical component of an Emergency Action Plan (EAP) that provides valuable information to Emergency Managers and first responders to plan for and respond to catastrophic dam failures. Individual states have developed Dam Safety programs that include criteria and guidelines for the development of EAPs, of which dam breach inundation mapping in the downstream danger reach is the key component. The state guidelines generally rely on federal guidelines developed by the United States Army Corp of Engineers (USACE), Natural Resources Conservation Services (NRCS), National Weather Service (NWS), or the Federal Energy Regulatory Commission (FERC). The guidelines provided by the various federal agencies and state agencies are inconsistent and in many cases outdated as to how to model and map a hypothetical dam breach. By providing new guidance, FEMA's goal is to increase the number and consistency of dam breach inundation mapping for significant and high hazard dams such that the breach inundation mapping can not only be used for EAP's but also leveraged for use in hazard mitigation, flood warning and consequence and loss estimation efforts by dam owners and local governments.

A key component of the dam breach guidance will be a recommended digital modeling and mapping database structure and mapping standards that if used will provide a more standardized look to EAP studies and will also store the digital modeling and mapping in a format that be used to develop other breach inundation maps for hazard mitigation and consequence and loss estimation projects. The modeling and mapping guidance would also allow FEMA and local governments to leverage the EAP effort to produce enhanced flood risk communication products as part of the FEMA non regulatory products datasets.

In an effort to reduce the cost of producing a basic EAP and thereby increasing the number of EAPs developed for significant and high hazard dams, FEMA has commissioned URS as part of a joint venture team under FEMA's Risk Mapping, Assessment and Planning (MAP) program with reprogramming of the NWS simplified dam breach program (SMDBK) into a GIS mapping tool and the development of a semi automated EAP report. The new tool will include data entry screens for modeling the dam and breach geometry and a link to digital terrain provider by the modeler to create cross sections for routing the breach and automated mapping of the resultant breach inundation area. The semi automated EAP tool will prompt the user to input information that will be included directly into building a basic EAP report. Maps will be automatically generated to

a standardized paneling scheme and the user has the option to produce enhanced maps that are HAZUS (a geographic information system-based natural hazard loss estimation software package developed and freely distributed by FEMA) compatible and can be used for hazard mitigation planning, emergency evacuation planning, and for dam breach consequence evaluations.

EXAMPLES OF STANDARDIZED EAP MAPS AND RISK MAP PRODUCTS



The Simplified Dam Break GIS Toolset provides dam owners a cost effective way to produce EAP maps and provides RiskMAP HAZUS compatible digital products that can leveraged for use by communities for enhanced hazard mitigation via the non regulatory products. This produce links the Dam Breach Inundation Guidelines Task Order and the Dam Consequences Task Order to RiskMAP.

Figure 1 image to the right is an example format and layout of an EAP map as presented in the Inundation Mapping Guidance which could be applied to the results of the SMPDBK GIS Toolset to produce standard EAP mapping formats.

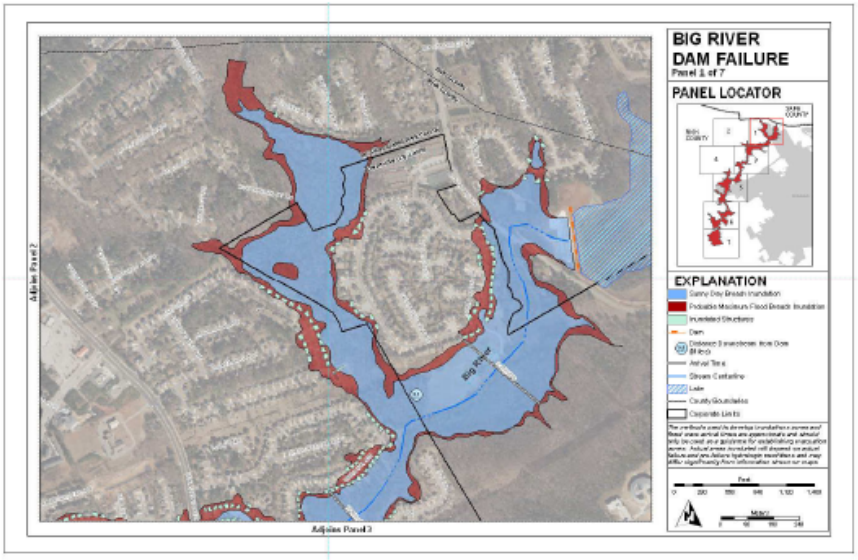


Figure 2 – Depth Grid

Figure 3 – Elevation Grid

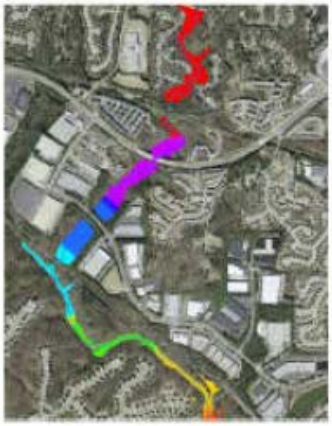


Figure 4 – Arrival Time Grid

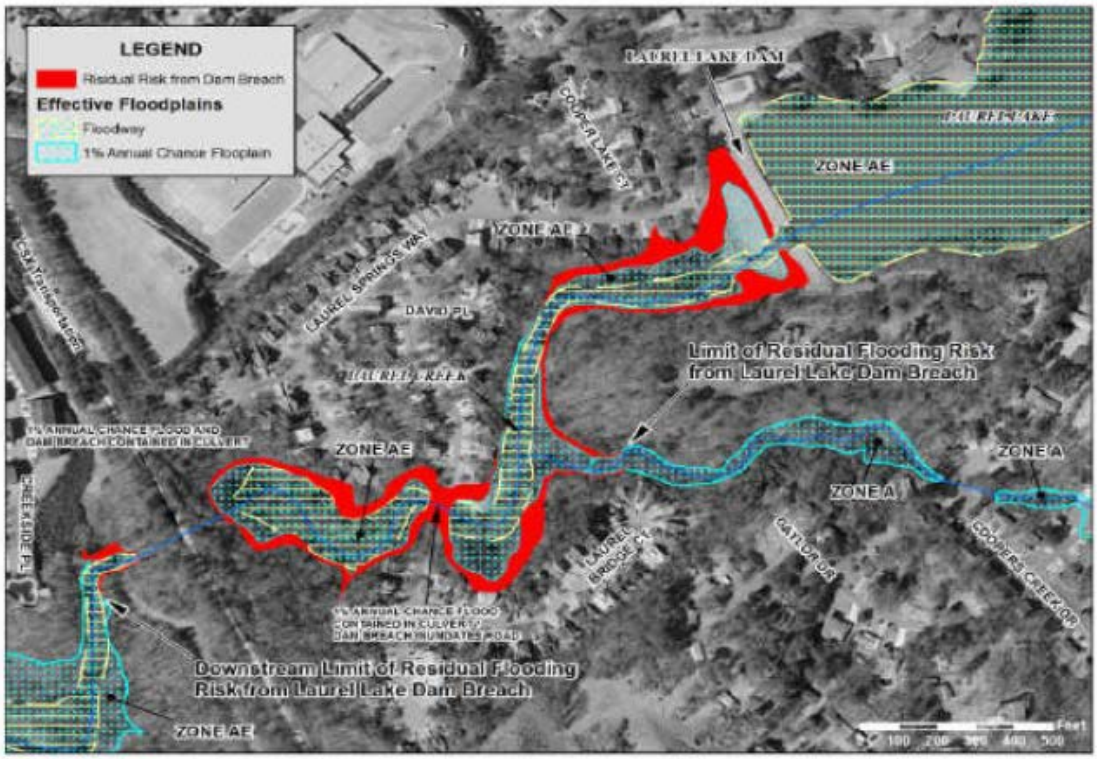


Figure 5 – Residual Flood Risk Identification

Figures 2-5 are images of enhanced hazard mitigation maps that can be produced via the non regulatory products. The Simplified Dam Break GIS Toolset creates the images that can be leveraged by FEMA for distribution and use by communities.