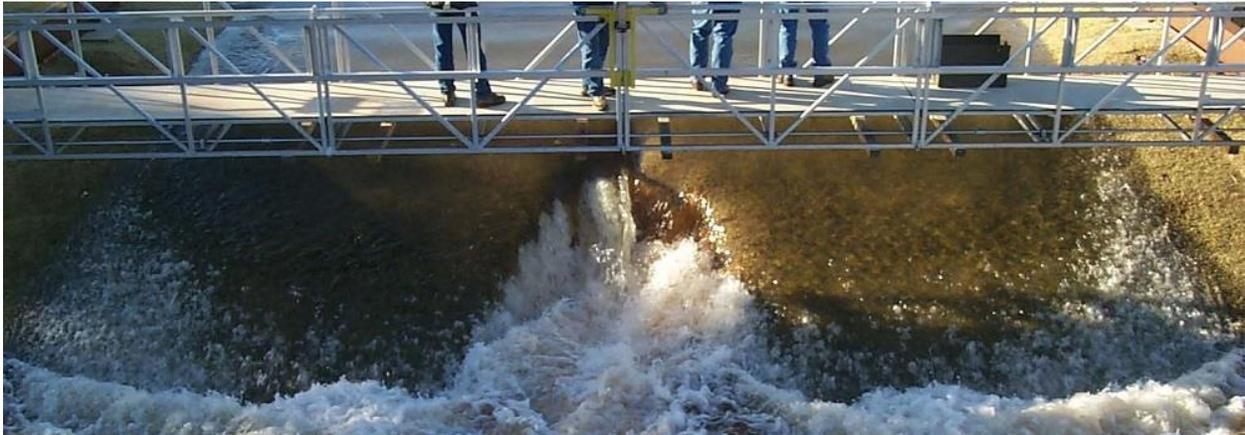


## USDA-ARS Hydraulic Engineering Research Unit is Improving Prediction Tools for Embankment Breach Processes



USDA-ARS Hydraulic Engineering Research Unit (HERU) scientists in Stillwater, Oklahoma are providing the knowledge and tools needed to better understand and predict the performance of embankment dams and spillways subjected to erosion during extreme weather events.

The aging of the nation's dams with associated filling of sediment pools and development in the watersheds increase the likelihood that vegetated auxiliary spillways will experience major flows and the possibility that earthen dams may be overtopped during extreme weather events. Although dams across the U.S. have had an excellent safety record, dams do fail, and when they fail, life and property downstream are potentially at risk.

Using the scientific discoveries of the erosion processes of vegetated auxiliary spillways as a spring board, USDA-ARS HERU scientists developed a research program to study, understand, and quantify embankment breach erosion processes caused by the two leading causes of embankment failure: overtopping and internal erosion. This program is intended to evaluate the potential erosion damage and the safety risk that overtopping and/or internal erosion presents. Specifically, research has been directed to evaluate the performance of vegetation or rock on the downstream slope of embankment dams and the erosion processes of the underlying soil materials by means of overtopping or internal erosion.

Today, research is focused to continue efforts in evaluating embankment breach processes of embankment dams with complex geometries (i.e. stability berms and embankment groin—intersection of the dam with the existing landscape) and zoned

embankment dams (i.e. non-homogenous soil materials). Through collaboration with NRCS and Kansas State University, this work has led to the development of a beta test version of WINDows Dam Analysis Modules (WINDAM) application software for use by engineers in the evaluation of the breach potential of existing dams. This tool is intended to assist engineers in determining the best use of limited resources in maintaining public safety.

The impact of this research is expected to lead to improved emergency action plans, flood warning systems, zoning regulations, and prioritization of dams for rehabilitation. The ARS research effort also includes cooperation with the NRCS, the US Army Corps of Engineers, Universities, the international scientific community, and other stakeholders in the evaluation of the software.



Bird's Eye View of Embankment Breach Research

Reprinted from the USDA-ARS Hydraulic Engineering Research Unit, Stillwater, Oklahoma web page: <https://www.ars.usda.gov/plains-area/stillwater-ok/hydraulic-engineering-research/docs/embankment-dam-breach-processes/>