# Developing Risk-based Metrics for Flood Resilience to Support Community Investment Strategies

Homeland Security
Science and Technology

## RISK-BASED METRICS OF FLOOD RESILIENCE

Flooding is one of the most common and costly natural hazards in the United States. However, despite a wide range of flood risk and resilience efforts, there have been few, if any, methods or tools available to evaluate flood resilience based on the flood risk and resilience characteristics of a community.

The Department of Homeland Security (DHS) Science and Technology Directorate (S&T)'s Flood Apex Program focuses on efforts to define the factors that make communities resilient to floods, define a broad set of resilience metrics, and develop standard procedures and a web-enabled decision support tool for communities to apply resilience indicators to local decision making and planning.

## THE INTERSECTION OF RISK AND COMMUNITY CHARACTERISTICS

Communities across the United States have been tasked with enhancing their resilience, but few possess the tools necessary to support risk-based, data-driven investments.

Although two communities may both experience flood risk from a local river, one may be at risk primarily due to the location or height of a major transportation route across the river, while the other is primarily at risk because a large percentage of community housing is in the flood plain. The most critical investments for these two communities are based on a combination of their flood risk and resilience characteristics.

To best prioritize investments in resilience, a community must be able to assess its flood risk relative to the relevant resilience characteristics. This project is the first to provide a method and toolkit to support this assessment.

## PUTTING DATA IN THE HANDS OF COMMUNITY-LEVEL DECISION MAKERS

A decision support dashboard, built on the method to be developed in this project, will directly support the resilience investment decisions required of communities. A series of user guides will ensure these methods are immediately accessible to communities, providing ready access to the best available data and analysis tools to assess flood risk and compare that risk to the relevant characteristics of their community.

Levee break animation created by the U.S. Army Corps of Engineers Hydrologic Engineering Center's River Analysis System inundation mapping model.

## PRIORITIZE AND MEASURE THE RELATIVE VALUE OF RESILIENCE INVESTMENTS

Each community will be able to assess resilience enhancements in a way that is immediately relevant and specific to the risk faced, thereby increasing the effectiveness and long-run value of those investments. The results of the project will also help evaluate and prioritize investments, while providing the first risk-based method and tool to measure expected value and success of resilience investments.

## UPCOMING MILESTONES

By summer 2017, this project will have produced:

- Data-driven method to measure community-level resilience to floods
- Measurable and actionable flood risk resilience indicators
- User guides on how to implement the method and measure indicators at the community level
- Framework for an online decision support dashboard for community-level decision makers

## PERFORMERS/PARTNERS

In close collaboration with all members of the Flood Apex Program at DHS S&T, this effort will be led by Talus Analytics, LLC of Boulder, Colorado.