

# Risk Communication for Dams in Risk MAP

Risk communication can help increase knowledge, understanding, and awareness of dams and the risks they pose. While dams can serve many purposes, such as flood risk reduction, hydropower generation, water supply, and recreation, many people in communities near dams are unprepared to deal with the impacts of a dam failure or dam-related flooding. Dams are manmade structures built across a stream or river that impound water and may reduce flow downstream. Due to the nature of water storage, dams can pose a flood risk to nearby and downstream communities. Dam hazards include dam failure, a breach (an opening resulting in partial or total failure), inundation upstream of the dam in events greater than the design event, or a release from the spillway (a structure over or through which flow is discharged from a reservoir). It is important to be aware that risk can come from many modes of failure, or even from conditions in which the dam has not failed at all.

**Embankment Dam Diagram**

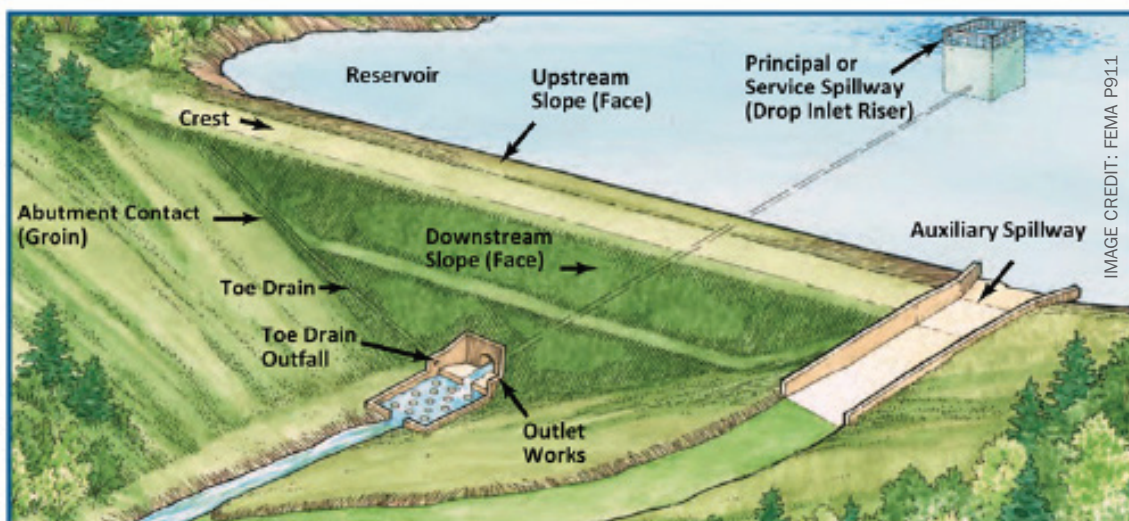


Figure 1 – Typical dam diagram showing common terms.

**RISK ASSOCIATED WITH DAMS:** Even if a dam is designed for flood control, no dam can eliminate all flood risk. Design flaws, age, poor maintenance, and a host of other issues can increase the risk from a dam.

Dam failure, such as a breach, is not the only risk posed by a dam. Failure can also occur at the spillway. In February 2017, damage to the principal/service and auxiliary spillways at Oroville Dam in California prompted evacuations of nearly 190,000 people downstream due to concerns the damaged spillway may deteriorate, causing a dam failure.<sup>1</sup> Also in 2017, floodwater was released from the storage of the Addicks and Barker reservoirs in Houston due to rapidly rising water elevations as a result of Hurricane Harvey.<sup>2</sup> Although the dams performed as designed, the releases revealed the residual risks faced by the communities downstream. It is important for dam operators to

communicate probable or scheduled spillway release scenarios to the community in at-risk areas, so that they may better prepare themselves in the event of an emergency. Whether the risk is posed by normal operation, large reservoir releases or a dam failure, effective and consistent communication between local officials and the public is essential.



<sup>1</sup> [Independent Forensic Team Report Oroville Dam Spillway Incident](#)

<sup>2</sup> [Corps releases at Addicks and Barker Dams to begin](#)

**TIPS FOR COMMUNICATING DAM RISK:** Local officials can employ key strategies around the Risk Mapping, Assessment, and Planning (Risk MAP) program to foster an informed and engaged community. The first is to engage communities early and often. It is important to let communities know as soon as possible about upcoming Risk MAP projects, and to hold meetings with a wide range of members of the community, as well as Federal and State partners. The topic of dam safety should be specifically placed on the agenda.

Coordinating with other programs within the community is another effective way to spread awareness about Risk MAP and dam safety. Many communities have existing improvement programs, and adding dam and flood safety awareness as a topic of discussion and action is an effective way to increase awareness. Ask community leaders about existing groups focused on emergency management or hazard planning. Inviting dam owners or operators to meetings is an effective way to ensure that dam safety topics are addressed. Proactive media outreach, another crucial step in informing the public about Risk MAP, can also generate wide awareness of dam safety.

**WHO TO CONTACT:** Dam safety is a shared responsibility. While dam maintenance and operation are the responsibility of the owner, awareness and preparedness are the responsibility of local officials and the public. An Emergency Action Plan (EAP) identifies potential emergency conditions at a dam and specifies preplanned actions for the dam owner to follow to reduce property damage and loss of life. The EAP should be integrated into the

State and local Emergency Operations Plans (EOP). Generally, the EAP and inundation maps are the responsibility of the dam owner, while the EOP and evacuation maps are the responsibility of State and local emergency managers. Contact the local emergency management agency or floodplain administrator for more information regarding EAPs, EOPs, and how to be better prepared.

**SHARING RESPONSIBILITY:** The State is typically responsible for regulating and overseeing inspections of dams within their authority. Per the Association of State Dam Safety Officials (ASDSO), State governments have regulatory responsibility for 70 percent of the dams within the National Inventory of Dams (NID). Of the 90,000+ dams in the NID, about 27,000 are located where a failure could result in significant damage to property, utilities, businesses, and homes. More than 15,000 of those dams would likely result in fatalities in the event of a failure. State and local Emergency Managers should understand the risk and implications of dam failures and incorporate dam risk into their hazard mitigation plan, EOP, or similar documents, even if a dam is outside their community but would impact them during a failure. The Percy Quinn dam incident in 2012 involved a dam in Mississippi that would have potentially impacted communities in Louisiana if it had catastrophically failed, requiring the two States to work together to implement the EAP and EOP.<sup>3</sup> In general, State and local officials, including emergency managers, planners, and executives, share the responsibility for conveying this information to the public through outreach, training, and education appropriate and applicable to their jurisdictions.

## REFERENCES:

[FEMA P-1090 Hurricane Matthew in North Carolina Dam Risk Management Assessment Report \(2017\)](#)

[FEMA P-1069 National Dam Safety Program Fact Sheet \(2015\)](#)

[FEMA P-1025 Federal Guidelines for Dam Safety Risk Management \(2015\)](#)

[FEMA P-64 Federal Guidelines for Dam Safety \(2013\)](#)

[FEMA Guide for All-Hazard Emergency Operations Planning](#)

[FEMA DR-SC-4241 South Carolina White Paper on Dam Risk \(2015\)](#)

[FEMA Be Aware of Potential Risk of Dam Failure in Your Community Fact Sheet \(2016\)](#)

[FEMA Community Engagement Fact Sheet \(2016\)](#)

[FEMA Flood Insurance Study Tutorial \(2003\)](#)

[USACE I-O-20150612 Best Practices in Dam and Levee Safety Risk Analysis \(2015\)](#)

[FEMA Dam Safety Fact Sheets 1, 3, and 4 of 4 Tk DW\[a\] &](#)

[FEMA Dam Safety Fact Sheet Series \(8 fact sheets total\)](#)

[FEMA Technical Advisory 1: Risk Reduction Measures for Dams - North and South Carolina; Hurricane Matthew DR-4285 and DR-4286](#)

[FEMA Technical Advisory 2: Risk Exposure and Residual Risk Related to Dams - North and South Carolina; Hurricane Matthew DR-4285 and DR-4286](#)

[FEMA Technical Advisory 3: Dam Awareness - North and South Carolina; Hurricane Matthew DR-4285 and DR-4286](#)

<sup>3</sup> [Hurricane Isaac And Percy Quin Dam: An Almost Tragedy](#)