



# Dam Safety Awareness

Increased awareness of dams and the risks they pose is an important part of dam risk management. Hazards from dams can be triggered by severe weather events, improper operation of the dam, or regular or emergency releases of water downstream.

## Embankment Dam Diagram

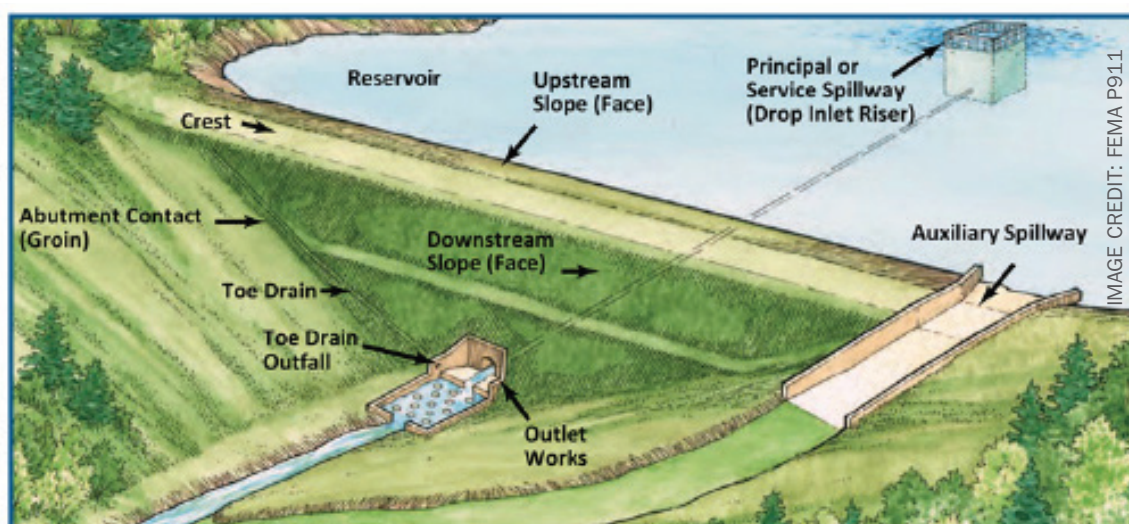
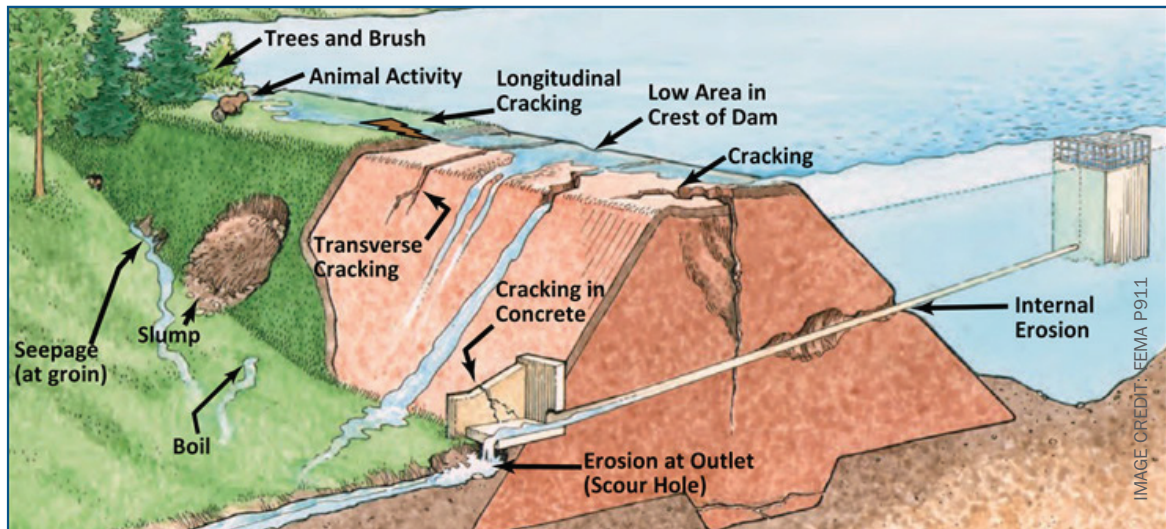


Figure 1 – Typical dam diagram showing common terms.

**BE PREPARED:** Information and communication are key to preparing for a flood or dam failure. An Emergency Action Plan (EAP) identifies potential emergency conditions at a dam and specifies preplanned actions for the dam owner to follow to help reduce property damage and loss of life. Contact your local government to learn if an EAP is in place. The EAP should be integrated into the State and local Emergency Operations Plans (EOPs), which is the emergency plan used by State and local emergency managers. Generally, EAPs 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. For more information on identifying the risk from dams in your community, refer to the FEMA Dam Safety Fact Sheet 1 of 4, *Dam Considerations in Flood Mapping Studies*, and for dam safety information, EAPs, or EOPs, refer to the FEMA Dam Safety Fact Sheet 3 of 4, *Risk Communication for Dams in Risk MAP*. For additional information or assistance regarding flood hazard mapping or the National Flood Insurance Program, visit [www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/](http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/).

**CONSEQUENCES OF PAST FAILURES:** By 2029, over 85 percent of the dams in the United States will be more than 50 years old, according to the National Inventory of Dams (NID). Older dams may not have been constructed to modern engineering standards and structural weakness or inadequate spillways could lead to failure. One needs only to look at past dam failures within Region IV to see the destructive effects they can have on a community. The 1977 failure of the Kelly Barnes Dam in Georgia resulted in 39 fatalities and an estimated \$30 million in damages. In 2015, flooding in South Carolina led to 51 dam failures. The following year, flooding led to 20 dam breaches in North Carolina and 25 breaches in South Carolina. Some of these failures caused damage to roads and property.

## Noteworthy Observations at an Embankment Dam



**IMPORTANCE OF COMMUNICATION:** Clear, consistent communication between dam operators and the public are critical for dam safety. Any opportunity to provide citizens additional notice during an emergency would likely greatly reduce loss of life. In a 2011 Dam Hazard Consequences Assessment, a 60-minute and 180-minute flood warning system were evaluated for a Georgia dam.<sup>1</sup> The 60-minute system modeled a reduction in the probable number of fatalities from 133 to 33, a 75 percent decrease, and the 180-minute system further reduced this number to 1, an over 99 percent reduction in probable fatalities.

**PARTNERS IN DAM SAFETY:** FEMA is the coordinator of the National Dam Safety Program (NDSP), a partnership of States, Federal agencies, and other stakeholders, that encourages and promotes the establishment and maintenance of effective Federal and State dam safety programs to reduce the risks to human life, property, and the environment. The FEMA Administrator has delegated many authorities for dam safety to the FEMA Regions to increase regional dam awareness. The Regional Dam Safety Program acts as a liaison between FEMA and Federal, State, local, and private partners, and is working with these partners to identify which dams are at high risk. The Regional Dam Safety Program also works to coordinate consideration of dam risks into multi-hazard planning, exercise planning and execution, and emergency operation planning.

State regulatory agencies regulate tens of thousands of dams designed and constructed over the decades to various standards. These agencies are essential for ensuring that State-regulated dams are properly designed, constructed, rehabilitated and maintained, among others. State Emergency

Management Agencies work with State and local emergency managers to assess preparedness and develop mitigation plans, evacuation maps, and State EOPs in collaboration and coordination with the State Dam Safety Program. State and local emergency management agencies can play a vital role in reviewing EAPs, developing local EOPs, collaborating with community land use planners, floodplain managers or others as needed, related to dams impacting their jurisdictions. Identifying and assessing high and significant risk dams enables FEMA to assist partners, such as State and local governments and other impacted stakeholders, as they develop community and regional preparedness, response, and recovery plans, among others as needed. These in turn will help to develop mitigation strategies to reduce those risks and improve resilience to building and property owners, whether private or public.



<sup>1</sup> Homeland Security Dams Sector - Estimating Loss of Life for Dam Failure Scenarios (2011)





## REFERENCES:

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

[FEMA P-911 Pocket Safety Guide for Dams and Impoundments \(2016\)](#)

[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 \(2003\)](#)

[DHS Draft Interagency Concept for Community Resilience Indicators and National-Level Measures \(2016\)](#)

[DHS Estimating Loss of Life for Dam Failure Scenarios \(2011\)](#)

[DHS Estimating Economic Consequences for Dam Failure Scenarios \(2011\)](#)

[USGS Kelly Barnes Dam Summary \(1977\)](#)

[MEMA Percy Quinn State Park Summary \(2012\)](#)

[National Inventory of Dams Website](#)

[Association of State Dam Safety Officials \(damsafety.org\)](#)

[Association of Dam Safety Officials – Lessons Learned \(damfailures.org\)](#)

[FEMA National Dam Safety Program Page](#)

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

[FEMA Dam Safety Fact Sheets 1, 2, and 3 of 4 by Region IV](#)

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

*This Dam Safety Fact Sheet was developed by FEMA Region IV.*