



Risks and Hazards of Dam Failures

National Watershed Coalition www.watershedcoalition.org

Like many man-made structures flood control dams have the risk of failure. This risk increases with the conditions that develop as a dam ages. Understanding the risk and hazards of each dam is important to be able to manage a dam, keep it safe, and prepare for a possible dam failure.

Hazards and Risks Increase as Dams

Age

Many of the watershed dams that were constructed by local watershed project sponsors with the assistance of the USDA Natural Resources Conservation Service (NRCS) Watershed Program were constructed over 50 years ago using the safety standards at the time. Conditions of these dams and the surrounding areas are often quite different than when the dams were constructed.

Engineering standards have changed considerably in the past 50 years. An example is the consideration of possible effects of earth quakes which may not have been considered a threat at the time of construction.

Risks of dam failure can be both natural and those caused by human activity.

Risk is determined by what is downstream and the effect a dam failure would have on people and property. Dams classified as "High Hazard" have the greatest risk due to the possible loss of lives and property downstream if a dam failed.

Emergency Action Plans are usually required by states for these dams because of that risk.

Natural Hazards

- Construction flaws and weaknesses that were unaccounted for or have developed or worsen with age
- Floods
- Earthquakes
- Landslides

Hazards from Human Activity

- Vandalism – Damage to primary spillway or embankment
- Damage of vegetative cover by overgrazing, cattle trails, vehicle tracks, and lack of repair of eroding areas.
- Building fences or buildings or placing other things in the auxiliary spillway that impedes water flow
- Construction of homes or other structures downstream in the breach zone increases the risk for loss of lives or property damage with a dam failure

Kinds of Structural Failure

Most dam failures result from:

- Overtopping of the dam by floods
- Foundation defects
- Piping and Seepage

Overtopping of the dam can be caused by an inadequate spillway design or a blockage in the auxiliary spillway by debris or some man-made structure.

Piping and seepage can be caused by faults in the embankment or by animal tunnels or tree roots.

The hazards for dam failure and the risk that a dam failure could occur makes it even more important for project sponsors do make regular inspections of dams, keep up to date on operation and maintenance issues and to develop and keep current emergency action plans on high hazards dams.