

Levees

Hazards Caucus Alliance Fact Sheet

www.hazardscaucus.org

A levee is a natural or artificial slope or wall used to protect an area from flooding. A levee is typically earthen, often parallel to the course of a river and usually has a broad base that tapers to a flat top. Sandbags and other temporary barriers can be placed on a flat top to provide additional protection. Artificial levees require more engineering. All levees must be properly maintained in order to be effective. In addition, because levees can affect the flow of a river, consideration of the climatic and hydrologic environment over time should be included in planning, design and maintenance.

Levees are generally classified as being either:

- **Urban= Protection for residential, commercial, and industrial areas.**
- **Agricultural= Protection for agricultural land.**



A levee in West Memphis, Arkansas. Photo by Jocelyn Augustino and courtesy of FEMA.



Agricultural levees built along the Feather River north of Sacramento, California. Photo by Michael Collier and courtesy of AGI.

Levees Are Everywhere

The U.S. has thousands of miles of levee systems and millions of people live on low-lying areas protected by levees. The main branch of the **Mississippi River** and the **San Joaquin-Sacramento Delta** in California have the highest concentration of levees in the U.S.

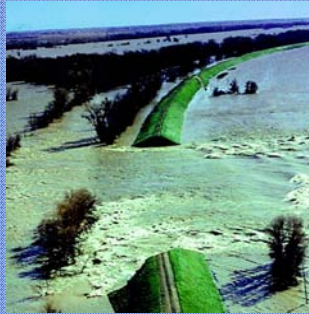
- **In 1927, the Great Mississippi Flood breached levees and flooded 27,000 square miles, killing 246 people in seven states and displacing 700,000 people.**
- **In 2005, Hurricane Katrina breached and overtopped levees in New Orleans, flooding 80% of the city and killing**

Levees Protect Property

From 1991-2000, property damage from floods totaled \$45 billion. Levees and other flood damage reduction measures constructed by the Army Corps of Engineers prevented \$208 billion worth of damage.

Levees Fail in Multiple Ways

- **Breach:** When a part of the levee breaks away, leaving an opening for water to flow through
- **Overtopping:** When flood waters reach a level higher than the levee crest
- **Bank erosion**
- **Slope instability**
- **Seepage of water through soils** beneath the levee



*A levee breach, left, and an overtopped levee, right.
Photos courtesy of David Simpson of the URS Corporation.*

Hurricane Katrina

Levee failures in New Orleans in the aftermath of Hurricane Katrina were largely due to overtopping. There were also three major breaches caused by failure of the soils underlying the levees.

There were multiple evaluations of the failures:

- American Society of Civil Engineers: <http://www.asce.org/files/pdf/ERPreport.pdf>
- NSF-funded UC-Berkeley team: http://www.ce.berkeley.edu/~new_orleans/
- Army Corps of Engineers: <file:///C:/DOCUME~1/lmb/LOCALS~1/Temp/welcome933-2.htm>
- Team Louisiana Forensic Levee Investigation: <http://www.publichealth.hurricane.lsu.edu/TeamLA.htm>



*17th Street Canal levee breach in New Orleans in the aftermath of Hurricane Katrina.
Photo Courtesy of Team Louisiana*

Levee Enhancement

Several developments can improve the competence of levees. These include:

- Increasing the levee height to prevent overtopping
- Armoring the levee with boulders to prevent bank erosion



*Rocks are added to the sides of levees to strengthen them.
Photo courtesy of David Simpson.*

For more information on levees:

- FEMA: <http://www.fema.gov>
- Army Corps of Engineers: <http://www.usace.army.mil>
- USGS: <http://www.usgs.gov/>

Role of Involved Groups

- **Army Corps of Engineers:** Designing and constructing levees
- **FEMA:** Establishing flood insurance risk zones and minimum levee design, operation, and maintenance criteria
- **Communities where levees are built:** Maintaining the levees

The **Congressional Hazards Caucus** is co-chaired by Senators Mary Landrieu (LA), Ben Nelson (NE), and Lisa Murkowski (AK) and Representatives Dennis Moore (KS), Jo Bonner (AL) and Zoe Lofgren (CA). The goal of the Caucus is to provide ways to help individuals, businesses, and communities better prepare for and mitigate the costs of disasters. The Caucus seeks to foster an important dialogue on steps that government and citizens can take to lessen the severity of these disasters. For more information visit www.hazardscaucus.org.