

# Aging Levees & Residual Risk



*"Let no one believe that because you are behind a levee, you are safe."  
Brig. Gen. Gerald Galloway*

There are levees throughout Nebraska. Some are shown on Flood Insurance Rate Maps (FIRMs) to provide protection. The Federal Emergency Management Agency (FEMA) is reviewing all levees shown to provide protection. Here is some information about this process.

## What Is Residual Risk?

FEMA defines a levee as "a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to...provide protection from temporary flooding." Few levees anywhere in the nation are built to more than a 100-year flood protection rating, and the areas behind them may still be at risk for flooding. This threat is called "residual risk." In some states, residual risk areas can extend up to 15 miles back from a river.

Although the probability of flooding may be lower because a levee exists, the consequence to personal safety and property is much higher should a levee overtop or fail. With lives and property at risk behind levees, and with no fully articulated national policy or program ensuring the safety of those levees, there is a need for action.

## Why Is There Residual Risk?

Engineers and hydrologists agree that despite significant improvements in levee construction, a fail-safe levee is still not a reality. Residual risk is always present due to:

1. **Overtopping:** When a large flood occurs, water can flow over a levee. Called overtopping, the stress exerted by flowing water can cause rapid erosion.
2. **Seepage and Saturation:** If flood waters sit up against a levee for a long period, the levee may become saturated and eventually collapse.
3. **Erosion:** Most levees are constructed of sand or soil which erodes easily under high-velocity flood waters.
4. **Piping:** Levees are often built over old stream beds. Flood waters will follow these subgrade channels causing a levee to erode internally thereby allowing flood waters to rupture the levee structure.
5. **Structural Failures:** Lack of regular maintenance is a key reason levees fail at gates, walls or closure sites.

## What Is FEMA Doing?

Following the Great Flood of 1993, a commission headed by former Brig. Gen. Gerald Galloway, studied levees and determined:

1. Many levees are poorly sited and will fail again.
2. There is a need for better outreach to notify residents behind levees.
3. The purchase of flood insurance should be required behind levees.

FEMA, as part of its Flood Map Modernization Initiative, is no longer assuming that a previously certified levee still meets current criteria when issuing a new FIRM. FEMA is requiring all levees to be re-evaluated before crediting them with protection on new FIRMs. Should FEMA determine a previously certified levee no longer meets its certification criteria, the levee will be discredited.

### **Accredited Vs. Non-Accredited**

FEMA considers a levee accredited if it meets requirements in 44 CFR 65.10. Floodplain areas behind an accredited levee are not designated as special flood hazard areas on a FIRM because it is assumed the flood risk has been removed. Mandatory flood insurance is not required, and new development can be constructed without restriction.

Levees that do not meet FEMA's criteria are considered non-accredited. Areas are then noted behind these levees, and mandatory flood insurance and floodplain regulations are required.

### **What Is a PAL?**

A Provisionally Accredited Levee, or PAL, designation is an interim step which gives the levee sponsor and communities protected by the levee up to two years to provide documentation to FEMA that a levee meets the requirements to be accredited. While a PAL is in place, FIRMs will be revised, but must contain wording that notifies homeowners and potential developers of a levee's provisional status. Levees must also meet certain requirements to be PAL eligible.

### **What Can Floodplain Administrators Do?**

**Local Floodplain Administrators with levees in their jurisdiction should take the following steps to protect their citizens.**

- 1. Identify levee failure breach zones.**
- 2. Notify citizens who live in these areas of the potential risk.**
- 3. Encourage the purchase of affordable flood insurance.**
- 4. Prepare Emergency Action Plans to protect your citizens if a levee fails.**

### **Why Is This Important?**

After Hurricane Katrina, people miles from identified flood hazard areas who thought they were safe were flooded and lost everything. This storm made it clear there are many types of flood risks. Catastrophic events do happen. People should be informed of their risk. Had such areas been identified on FIRMs, homeowners could have made a decision to purchase flood insurance or take other protective measures.

The issue is exactly the same behind levees. While these areas may be protected from flooding during some storms if the structure is built and maintained to protect from the 100-year flood, the reality is that should the levee overtop, fail or be compromised in any way, while infrequent, the results could be catastrophic.

#### **For More Information**

Floodplain Management  
Nebraska Department of Natural Resources

402.471.2363  
<http://dnr.ne.gov>

*This flyer was made possible through financial support provided by the Federal Emergency Management Agency through a cooperative agreement with the Nebraska Department of Natural Resources. The information contained in this flyer does not necessarily reflect the view of the Federal Emergency Management Agency.*