



LEVEE SAFETY CONNECTIONS

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UNDERSTAND YOUR RISK *There is always some risk of flooding for those living or working behind a levee. Levees are designed to reduce the risks of flooding, but as we have seen this summer, larger flood events can cause them to be overtopped or fail. Levees also decay and deteriorate over time. When levees do fail, they can fail catastrophically — the cumulative damage to the area behind the levee may be more significant than if the levee wasn't present. If you live or work behind a levee, you should (1) be aware of your risk; (2) have a plan in case of flooding; and (3) stay informed with up-to-date information from local authorities and be ready to act.*

2011 Mississippi & Missouri River Floods: Lessons for a National Levee Safety Program

The floods experienced this spring and summer on the Mississippi and Missouri Rivers and their tributaries highlight the importance of the recommendations of the National Committee on Levee Safety.

The levees along the mainstem Mississippi River reflect, in a regional scale, many of the recommendations for a National Levee Safety Program:

- The levees and other flood control structures were designed, and are managed as, a system.
- There is detailed information on the levees' location, recent inspection information, and a good understanding of the risk and consequences of levee failure for most of the levees in the system.
- There is a dedicated source of funding for the operations, maintenance, and rehabilitation of the Mississippi Rivers & Tributary (MR&T) project levees – the backbone of the lower Mississippi River's levee system.
- The Mississippi River Commission provides for regional leadership, and includes both federal and non-federal members.
- The significance of the levee system for flood control is well understood throughout its region, and communities along the river are informed and involved.



Aerial photo of Minot, N.D., flooded from the Souris River, June 28, 2011. (USACE / Clay Church)

However, for those same reasons, the Mississippi River levee system is atypical. Most American rivers with levees are not designed as a complete system, and the levees themselves are not as robust or well understood as the MR&T. Further, management of the levees is fractured across multiple levee owners, states, and Corps districts.

On the Missouri River, many of the levees that failed were not engineered levees: they were temporary flood fighting measures that were not removed after previous floods or private levees created by bulldozing dirt and clay into a berm.

The contrasts between the 2011 Missouri and Mississippi River floods demonstrate that:

- A complete inventory of levees and their condition in the National Levee Database is crucial for planning and floodfighting.

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TEST YOUR LEVEE IQ

The median length of time homeowners maintain their flood insurance policies is:

- a. 1 year
- b. 2-4 years
- c. 10 years
- d. 30 years

Find the Test Your Levee IQ answer on our redesigned website: www.leveesafety.org

LEVEE SAFETY CONNECTIONS
A Publication From The National Committee On Levee Safety

For more information or to provide an idea for an article, please e-mail contact@leveesafety.org.

What We Are Hearing: NCLS releases summary of stakeholder feedback

In March 2010 the National Committee on Levee Safety (NCLS) began hosting a series of nine regional stakeholder outreach workshops to explain and solicit feedback on its recommendations to Congress for a National Levee Safety Program. Nearly 600 representatives from federal, state, local, and tribal governments as well as non-governmental organizations, private sector companies, and individuals participated in one of the workshops.

In plenary and small group discussions, participants shared their ideas, support, trepidation, and advice with the NCLS. This feedback has been summarized in a new document available on the leveesafety.org website, *What We Are Hearing: A Summary of Stakeholder Feedback*.

The NCLS is committed to sharing the feedback it receives with members of Congress, the Administration (including USACE and FEMA), interested state agencies, and others engaged in levee safety that could move forward the recommendations for a National Levee Safety Program. The NCLS is also using the feedback to refine certain recommendations and clarify how they fit into the implementation of a National Levee Safety Program.

Detailed summaries of feedback and questions from each stakeholder workshop are also posted on leveesafety.org.

Announcing NCLS Website Redesign

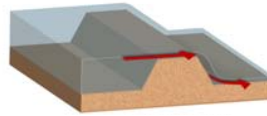
Are you looking for a short summary of the recommendations or a summary of a workshop you attended? Do you know how to contact the National Committee on Levee Safety? Or find the copy of Levee Safety Connections that you deleted from your email?

All of this and more can be found on the completely redesigned and updated www.leveesafety.org.

In addition to information about the NCLS and its recommendations for a National Levee Safety Program, the redesigned website has a new – and growing – About Levees section with resources and information about levees and levee safety in the United States.

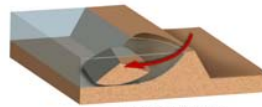
We invite you to visit the site and let us know how we can make it a better tool for you. Email your comments and suggestions to contact@leveesafety.org.

Common Causes of Flooding Behind Levees

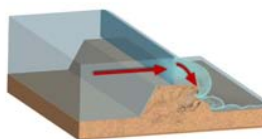


When a levee is **overtopped**, the level of the flood water is simply higher than the height of the levee, and water flows over the top. Up-to-date surveys of the height of the levee relative to its surroundings and awareness of any low areas at the top of the levee are important in reducing unexpected overtopping. During a flood event, the top of the levee may be raised temporarily by sandbags to prevent overtopping.

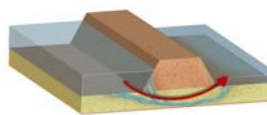
Flooding due to overtopping is generally predictable and local emergency managers and homeowners have an opportunity to prepare, floodfight, and evacuate if necessary. When a levee collapses or breaches, creating a rapid flow of water behind the levee, the situation for those on or behind the levee can change in the blink of an eye.



There are a number of factors that can cause a **breach**, or break in a levee, allowing the water to flow to the landward side. A breach may be caused by erosion on the water side of the levee through wave action or scouring. A breach may also result if the levee slope becomes unstable and slides down and away from the rest of the levee. Or, a levee breach may occur when an object on the levee, such as a tree or building, falls and pulls part of the levee out with it, destabilizing the structure. A levee whose structure has been compromised by any of those factors may later breach if the remaining levee section is too small or too low to resist the force of water on it.



If land side of the levee is not armored or reinforced, waters overtopping the levee can undercut the structure and cause it to collapse or breach – creating an **overtopping breach**. Examples of levee armoring include specific grasses, pavers or bricks, and in cases of emergency, plastic sheeting.



Water flowing through or under a levee, is called **through seepage** or **underseepage**, respectively. In sufficient quantity, both can weaken the levee and cause flooding on the land side. Seepage can flow through animal tunnels, along channels in the soil left by root systems, through poorly compacted soils, or sandy or gravelly soils within or under the levee. If enough soil particles are moved from the levee or its foundation by the seepage, the levee can collapse and result in a breach. “Sand boils” landward of the levee are an indication of underseepage that is moving soil particles.

SPOTLIGHT ON LEVEE SAFETY

State of Kentucky

The State of Kentucky is making strides in levee safety on a number of fronts.

The Kentucky Silver Jackets working group, composed of professionals from local, state and federal governments, including the City of Frankfort/Franklin County, Louisville Metro, KY Division of Water, KY Division of Emergency Management, KY Department for Local Government, KY Transportation Cabinet, KY Office of Homeland Security, U.S. Army Corps of Engineers,, Federal Emergency Management Agency, U.S. Geological Survey, National Weather Service, and the Natural Resources Conservation Service, has been underway for approximately a year and the state has proposed a pilot project on the levee-related evacuation needs of Metro Louisville.

Working closely with FEMA's RiskMAP program, the state is developing a "Risk Communication toolbox," addressing a wide range of natural hazards topics with videos, brochures, PowerPoint presentations, and outreach via Facebook (<http://www.facebook.com/KyRiskMAP>) and Twitter (<http://twitter.com/#!/KYRiskMAP>). The Toolbox will soon will have two new segments on levees: Levee PAL (Provisionally Accredited Levees) process and Levee Engineering process.

"We wanted to use existing information and resources to develop something specific for our state," said Carey Johnson, Cooperating Technical Partner Program Manager, KY Division of Water. "We hope it is a model for other states as well. Understanding and quantifying residual risk behind levees is a huge issue and using social media has been a boon to getting out the word."

All of these efforts build on a day-long "levee summit" held in 2010 that was hosted by the KY Division of Emergency Management with support from the KY Division of Water, U.S. Army Corps of Engineers – Louisville, Huntington, Nashville and Memphis Districts, and levee owners and operators.

In addition to working with those at home in the state, Kentucky also has an active member on the National Committee on Levee Safety, Marilyn Thomas, PE, CFM, who works with the Dam Safety Program in the Kentucky Division of Water.



Preparing for rising waters in Pierre, SD (USACE / Harry Weddington)

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Where there was data available, the Army Corps of Engineers was able to share it with levee owners, communities, state emergency managers, and other federal agencies to create up-to-date inundation maps, effective evacuation plans, and prioritized floodfighting efforts.

- National standards are needed to ensure that levee reliability has some minimum level and is consistent across the U.S., with consideration given to the hazard potential.
- Communication just prior to and during both these floods was excellent and demonstrated the value of well-informed and engaged local communities. However, it will take a sustained effort to promote risk reduction, shared responsibility and change behaviors.

The 2011 floods reminded us that the risks to the nation of major floods are significant, and growing. The nation cannot afford to address levee risk only through disaster relief and recovery. A comprehensive, coordinated approach to addressing levee safety nationwide will benefit communities, states, and the nation.

NCLS Members on the Road

Members of the National Committee have recently shared their recommendations for a National Levee Safety Program with the following organizations:

- Association of State Dam Safety Officials National Conference (September)
- Northwest Regional Floodplain Management Association Annual Conference (September)
- Indiana Association for Floodplain and Stormwater Management Annual Conference (September)
- National Tribal Environmental Council Annual Meeting (August)
- U.S. House of Representatives Transportation & Infrastructure Committee Briefing on the 2011 Mississippi and Missouri River Floods (July)
- Texas Water Conservation Association Conference (June)

If your organization would like to hear from the NCLS, please contact Terry Zien at contact@leveesafety.org.

OPT IN — BE LEVEE AWARE

The NCLS has created an **opt-in electronic mailing list to distribute Levee Safety Connections and information on the NCLS and its activities, as well as information on other levee-related activities. To sign up, follow the link on the "Contact Us" page on the website.**

TEST YOUR LEVEE IQ: ANSWERS

In the last issue of *Levee Safety Connections*, we asked:

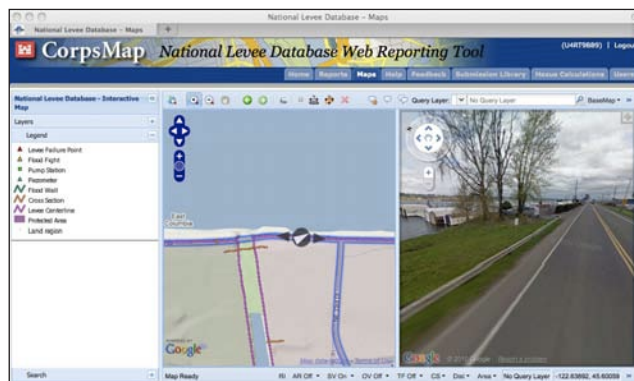
The average age of levees in the U.S. is:

- a) 21 years
- b) 54 years
- c) 90 years
- d) **Nobody knows.** Although the average age of levees in the US Army Corps of Engineers National Levee Database is 54 years, this accounts for only 14,600 miles of an estimated 100,000 miles — or more — of levees in the United States.

For the answer to this issue's and previous Test Your Levee IQ questions, please visit our redesigned website: www.leveesafety.org

FEDERAL AGENCY UPDATE

For a National Levee Safety Program to be successful, existing federal programs must be aligned toward the promotion of levee safety. This section provides descriptions of some of the federal activities currently addressing levee safety.



National Levee Database Opens to the Public October 27

On October 27, 2011, the U.S. Army Corps of Engineers (USACE) will officially open the National Levee Database (NLD) to the public.

The NLD is a living, dynamic database that, for the first time, allows visualization and the ability to search nationally the location and condition of levee systems. Currently the NLD includes information on more than 14,600 miles of levee systems in the USACE program. USACE is currently working with the Federal Emergency Management Agency to include information on levees participating in the National Flood Insurance Program.

The goal is to expand the database to include all levees constructed and/or operated by other federal agencies as well as non-federal levees. When information on all federal and non-federal levees is included, the NLD will provide a single comprehensive source for users, will allow those flood-fighting to identify areas of concerns, and will allow residents to become more informed about the levees in their neighborhood.

If you have signed up for the NCLS electronic mailing list, you will receive the announcement of the public webinar of the launch, updated links for the database, online manuals and guides for the NLD and call-in help desk information.