St. Louis District
Esprit
Vol. 48, Number 1 U.S. Army Corps of Engineers June 2011

Flood Risk Management

Understanding the Risks, Sharing the Responsibility

US Army Corps of Engineers ®
St. Louis District

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ESPRIT is an unofficial publication authorized under the provisions of AR 360-1. It is published monthly, by contract, in 550 copies, by the Public Affairs Office, U.S. Army Corps of Engineers, St. Louis District. Views and opinions expressed in this publication are not necessarily those of the Department of the Army.

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ON THE COVER: Sign at Lake Carlyle conveys risk of proceeding. (Photo by Stephanie Vallett)

COMMANDER'S CORNER

Historic floods highlight importance of Corps mission

Historic, epic, biblical. Regardless of the term used, this year the Mississippi River made history. Waters rose to levels not seen in decades. Floodways were opened, homes were evacuated and cities were submerged as Mother Nature's fury and force rose along the banks of the river.

At Wapappello Lake, as a result of heavy rains, waters ran over the overflow spillway for the first time since 1945. The water removed materials to include a 400-foot section of State Route T, before re-entering the St. Francis River channel.

This year, like every year as flood season approaches and Mother Nature flexes her muscles, residents and businesses turn to the U.S. Army Corps of Engineers and ask what they should do in the event of a flood and how they can protect their loved ones and homes.

For the Corps, however, flooding is not a season or an event. Reducing flood risk and building and sustaining a flood risk management system that protects lives and property is one of our year-round missions.

This issue of the Esprit is dedicated to our Flood Risk Management program and the aspects of the program that are essential to reducing risk.

That mission of addressing the causes and impacts of flooding has evolved over the years from flood control and prevention to more comprehensive flood risk management.

These changes reflect a greater appreciation for the complexity and dynamics of flood problems: the interaction of natural forces and human development, as well as for the federal, state, local and individual partnerships needed to thoroughly manage the risks caused by coastal storms, heavy snow and rain.

O'Hara

> **For the Corps... flooding is not a season or an event. Reducing flood risk and building and sustaining a flood risk management system that protects lives and property is one of our year-round missions.**

It is important for everyone to remember that managing risk is a shared responsibility. It is not something that can be done only when the snow begins to melt or the rains set in. It is also not something the Corps can do alone.

We work actively with federal, state and local governments, as well as community leaders, local residents and other non-governmental organizations to reduce flood risk. Public safety is our greatest priority and we encourage the public to get involved and be informed.

While floods may not be preventable, by working together and looking at the Mississippi River watershed as one system, we can lessen the chance of serious flooding in the future.

Essayons!

Col. Tom E. O'Hara
MVS District Commander

Corps flood risk management system prevents 11 billion in damages, reduces risk to residents

By MARY MARKOS
MVS Public Affairs

For nearly a century, the U.S. Army Corps of Engineers has been charged with taming what is often called one of the Nation's greatest assets - the Mississippi River.

Uncontrolled, it is just as great a liability.

Congress authorized the Corps to design and construct projects for the control of floods on the "Mighty Miss" and its tributaries in 1928, following a costly and deadly flood the previous year.

The Flood Control Act brought with it one of the largest system of levees in the world to reduce the risk of flooding to residents and industry from the largest river system in North America.

While the components of the Act may have changed over time, the importance of the mission to the Corps has not.

"The Flood Risk Management mission is so important because of its protection of life and property. It is important for the public and residents to understand that flood risk management is about buying down risk," Susan Wilson, St. Louis District's flood risk management manager, said.

In the St. Louis District, what began with the Flood Control Act of 1928 is now comprised of three major components: multi-purpose reservoirs, urban levees or floodwalls and agricultural levees.

"The Corps flood damage reduction efforts range from technical assistance, to small, local protection projects, to major dams," Wilson said.

"As an agency, we have realized that floods cannot be fully controlled, nor can damages be prevented completely. For this reason, the Corps' mission is transforming into one of 'flood risk management.'"

The District manages that risk with five multi-purpose reservoirs and more than 700 miles of levees and flood risk reduction structures.

Together, they protect the District's more than 28,000 square-miles of land, with levees protecting more than 578,365 acres and preventing more than $11 billion in damages since 1960.

To continue to reduce risk, however, Wilson said it important for the public to not only understand their level of risk, but also understand what is necessary to continue to reduce that risk.

> **It is important for the public and residents to understand that flood risk management is about buying down risk . . . As an agency, we have realized that floods cannot be fully controlled, nor can damages be prevented completely.**
>
> **Susan Wilson**
> St. Louis District, Flood Risk Management Manager

"Our ability to continue to reduce floods to meet the needs of current and future generations is dependent upon adequate investments," she said.

"Such investments provide for the necessary investigations of problems and development of solutions, as well as the timely implementation of authorized projects, proper inspections of Corps and local projects, and preventative maintenance or facility modernization or improvement.

"Investments also allow for improvements to ensure the reliability and safety of projects, adequate data collection and improvements to increase operational efficiencies."

Flood Risk Management Links

- U.S. Army Corps of Engineers, St. Louis District's Flood Risk Management program, http://www.mvs.usace.army.mil/pa/FloodRiskMgmt.html
- Flood forecasts, www.weather.gov/weather
- U.S. Army Corps of Engineers Regional Flood Risk Management Team, www.mvs.usace.army.mil/pm/rfrmt/index1.htm
- Silver Jackets, www.nfrmp.us/state/about/cfm
- Federal Emergency Management Agency Flood Maps, www.msc.fema.gov
- Flooding and flood risk, www.floodsmart.gov

The U.S. Army Corps of Engineers breach the levee at Birds Point May 2 as part of the activation of the floodway.

USACE photos

Operation Watershed - complete watershed effort controls nation's Great Flood of 2011

By BOB ANDERSON
MVD Public Affairs Officer

Melting runoff from mountains of snow combined with rainfall ten times greater than average spread out over a 200,000 square-mile area within the Mississippi River's watershed produced the Great Flood of 2011, a flood that swelled our nation's mightiest river to historic levels.

Epic floodwaters require heroic responses to control flows surpassing the Great Flood of 1927. And the nation can ill afford a repeat of the 1927 calamity which claimed 500 lives, left 600,000 people homeless and spread its "chocolate tide" in a swath of destruction 80 miles wide and 1,000 miles long, inundating more than 26,000 square miles, or 16.6 million acres of land.

The epic response required using every flood control resource within the Mississippi River watershed, the 3rd largest in the world, to shave height from historic crest levels during the flood's most dangerous hours.

Reservoirs and lakes along the Ohio, Missouri, and Upper Mississippi rivers were filled to capacity and exceeded many historic levels to help keep the lower river's crests from overtopping the Mississippi River and Tributaries system's flood control structures.

"This is a complex system of waterways, rivers and lakes that USACE engineers must consider as a whole," said Maj. Gen. Michael J. Walsh, Commander of the Mississippi Valley Division and President of the Mississippi River Commission.

Still, the reservoirs were not enough to stem the steadily rising river and Maj. Gen. Walsh faced decisions that no engineer ever wants to make– the deliberate operation of inhabited floodways to save the integrity of the flood control system.

"Making these kinds of decisions was not easy or hard from an engineering perspective because smart engineers made these same decisions more than 70 years ago when the system was designed," Walsh said. "Essentially, the river tells us when it's time to operate the system as designed," he added.

"The decision to operate was grave though because it would lead to loss of property and livelihood, either in the floodway or in an uncontrolled area that was not designed to flood," Walsh said.

One of General Walsh's colleagues on the MRC, the Honorable R.D. James from Missouri, was personally impacted by the decision to operate the Birds-Point New Madrid Floodway.

"My family's land lies within the floodway, and I could not displace from my mind what the decision would mean to my friends and neighbors who live and farm the floodway's 130,000 acres," Mr. James said.

"But when the National Weather Service issued a forecast of 63 feet on the Cairo, Ill., gage on May 2, I realized that a decision on activation was imminent.

As I sat with General Walsh throughout the day, my position as a member of the Commission weighed heavily on my soul. I knew the decision points of activation were a part of federal law and that decision lay with the MRC," James said.

"I know that General Walsh withheld his order to activate until the very moment there was no choice. When he gave the order, I prayed for the safety of all involved, and for all affected. I applaud his delayed and deliberate approach to giving that order and support him in doing so," James added.

Over a three-day period, activation of the Birds Point-New Madrid Floodway reduced the forecasted crest near Hickman, Ken., by 3.8 feet, and prevented the river from overtopping federal levees protecting cities and towns in Illinois, Kentucky, Missouri, and Tennessee.

As waters from the Upper Mississippi and Ohio rivers gathered below the confluence at Cairo, Ill., on May 3, the river grew to monstrous proportions with flows of more than 2.3 million cubic feet per second, equal to 25 times the amount of water flowing over Niagara Falls every instant.

The Corps' Memphis District, having worked around the clock preparing for operation of the Birds Point - New Madrid Floodway, were again fully engaged in their second district-wide flood fight in less than two months.

On May 10, the river crested at 47.87 feet in Memphis after setting new records at New Madrid and Caruthersville, Mo. "For the Corps of Engineers, the number one priority is public safety," said Col. Vernie Reichling, Memphis District Commander. "We have 150 people out on the levees, walking them, inspecting them and assisting communities," he added.

Along the swollen St. Francis River in Arkansas, a Mississippi River tributary, the Memphis District has operated the Huxtable Pumping Plant (the world's largest storm water pumping station) continuously for almost three consecutive months, threatening the plant's previous operational record set at 120 days of non-stop pumping.

Between May 3 and May 19, the river inundated 6.8 million acres of farmland in unprotected areas between Cape Girardeau, Mo., and the Head of Passes in Louisiana. Approximately 10,000 people evacuated due to backwater flooding.

Despite giving up some ground to allow the river to flex its power, the flood control system operated as designed and saved another 9.8 million acres, thousands of homes, more than four million people and billions of dollars in infrastructure from inundation.

During this same time period, two additional decisions were made to protect the integrity of the MR&T system between Baton Rouge and New Orleans – operation of the Bonnet Carré, La., and the Morganza, La., floodways.

Maj. Gen. Walsh ordered New Orleans District to open Bonnet Carré on May 9 to keep the volume of river flows passing New Orleans at 1.25 million cubic feet per second. The spillway protects the integrity of the levees and floodwalls that protect New Orleans.

Currently, 330 of Bonnet Carré's 350 bays are open with a flow of 316,000 cfs. Spillway gates may remain open until late June when river levels are predicted to drop below 1.25 million cfs passing New Orleans.

A more difficult decision soon followed when Maj. Gen. Walsh ordered the Moganza Floodway opened on May 14. The operation order called for the structure's deliberate and slow opening to spread the resulting inundation gradually over a one-week timeframe. Morganza is located 310 river miles above New Orleans and currently has 17 of 125 bays open with a discharge of approximately 170,000 cfs.

The operation of both Morganza and Bonnet Carré caused a 2.5-foot lowering of the river's forecasted crest at New Orleans and Baton Rouge, protecting a 200-mile-long corridor of levees and floodwalls. History was also made with the opening of Morganza because it represented the first time three floodways have operated simultaneous.

"By operating the MR &T system as designed, including the floodways, the value of this investment to our nation can be counted by what we haven't lost - lives, critical infrastructure for the energy industry and more than 50 billion dollars in damages to homes and businesses," said Col. Ed Flemming, Commander of the New Orleans District.

On My 19, the river crested in Vicksburg, Miss., setting a record at 57.1 feet. Fortunately, the river did not overtop the Yazoo backwater levees, sparing some 24,000 acres of rich farmland.

Although we passed the crest today, I believe we are only one-third of the way through this flood event," said Col. Jeff Eckstein, Vicksburg District Commander. "We must continue to remain vigilant and keep a close eye on the system until the danger has passed," he added.

Working closely with the U.S. Coast Guard, navigation is now constrained on the swollen river to ensure the integrity of flood control structures. Rightly so, because experienced towboat pilots describe the force of the river's currents as extremely treacherous.

Still, MR&T channel improvements are serving as a critical part of the flood control system in this historic event. Without river bend cutoffs, dikes and revetments, the ongoing flood would have overwhelmed levees and floodwalls and the communities they protect.

From Cairo to Baton Rouge, flood stage records have been broken, however, where channel improvements have been made – at Memphis, Helena, and Arkansas City – river crests have stayed well below prior record levels. This is despite flows near or above those experienced during the 1927 and 1937 floods.

The Corps has never claimed to tame the giant river as it rages toward the Gulf of Mexico, only shackle it within the confines of the MR&T system. All the MR&T's flood control features (floodways/spillways, backwater levees, channel improvements levees/floodwalls, gates, pumps, reservoirs and relief wells), are working in concert to pass historic flows while accommodating the natural tendencies of the mighty Mississippi River.

The MR&T system is performing as designed. If this same beast is to be caged during future floods, we must soon begin work to repair, rebuild and reinvest in the infrastructure that saved so much and so many in 2011.

The Army Corps of Engineers opened the Morganza floodway when the water flow reach 1.5 million cubic feet per second. 15 bays were open as of May 17.

Reservoirs help hold the line during high water events, augment low flows during drought

By GEORGE STRINGHAM
MVS Public Affairs

The five reservoirs (Carlyle, Mark Twain, Rend, Shelbyville and Wappapello) built and maintained by the U.S. Army Corps of Engineers in the St. Louis District are operated as multi-purpose dams.

While the primary purpose authorized by Congress is to provide flood risk reduction for areas below the reservoirs, other purposes include recreation, water supply, hydropower and environmental stewardship.

Corps reservoirs also maintain a summer pool to augment low flows during drought.

All Corps reservoirs are built to stringent engineering standards to ensure they will withstand record flood events. Each reservoir is under observation to ensure its structural integrity and safety.

During normal operating conditions, the Corps evaluates pressure on the dams on a regular basis. Reservoirs are visually inspected on a regular basis under normal operating conditions.

During flood events, visual inspections are more aggressive, in some cases, occurring several times a day.

Piezometers, permanently located at different elevations within the dam, are used at some locations. A piezometer measures hydrostatic pressures of the dam.

During flood events, piezometers are evaluated daily. Corps dams are designed to withstand enormous pressures and water levels.

All of our reservoirs are operated to conform to a strict, standard regulation plan that is coordinated by the Corps of Engineers with local, state and federal agencies with water resources responsibilities.

Periodically, the operating plan is reviewed by the Corps with our partner agencies and local interests.

Rain runoff throughout the year enters the reservoirs from large drainage areas above the dam. For example, Mark Twain Lake's watershed is 2,400 square miles.

In the spring, the reservoir pool levels are maintained to allow for rain runoff to prevent downstream flooding.

The pool levels will fluctuate to prepare for such runoff and rainfall predictions from the National Weather Service.

Pool levels are also maintained to ensure minimal bank erosion which contributes to sedimentation in the reservoir, adequate summer water supply, continued river flow below the reservoir, conservation purposes and recreational opportunities.

Under during normal conditions, Carlyle, Shelbyville and Mark Twain Lake release water through tainter gates located on the dam.

Mark Twain Lake can also release water through its hydropower plant. At Rend Lake, water is released at a constant rate of 30 cfs through the outlet works near the center of the dam.

When Rend reservoir's pool reaches an elevation of 405 feet National Geodatic Vertical Datum, water begins to flow through the spillway. At an elevation of 415 feet NGVD, water begins passing over the auxiliary spillway.

Wappapello only has a gated conduit for which it can make controlled releases. When the pool reaches an elevation of 394.74 feet NGVD, water begins to flow over the auxiliary spillway, adjacent to the main dam.

Auxiliary spillways are designed to pass excessive inflows when reservoirs exceed their flood-storage pools.

High reservoir water levels could cause overtopping of the dam and possibly cause erosion of the downstream side of the structure.

High reservoir water levels can also raise hydrostatic pressures behind the dam to unsafe levels.

During flood control operations, weather parameters are evaluated on an hourly basis to consider rainfall in the drainage area above the reservoirs; rainfall below the reservoirs; and National Weather Service rainfall predictions over a 24-hour period.

This information is used by the Corps to anticipate inflows to the reservoirs and make adjustments to release rates to conserve flood storage capacity and minimize both up-river and down-river flooding.

The Corps has secured the rights of private land owners above the reservoirs to operate the pool at a specific elevation. When the reservoir approaches that level, the Corps must release water to ensure property above that elevation is not flooded.

U.S. Army Corps of Engineers photo

Carlyle Lake is one of five reservoirs in the St. Louis Corps of Engineers District boundaries.

Floodwalls serve as effective alternative to levees

By GEORGE STRINGHAM
MVS Public Affairs

Flood risk reduction systems take on many different forms. Where room allows, an earthen levee is constructed.

However, some locations, like urban areas, don't have the necessary real estate available for the footprint a levee requires. In these cases, a floodwall is often constructed. A floodwall is more than just a vertical slab of concrete designed to protect what's behind it from flood waters. It's an engineered structure composed of concrete, steel, hardened rubber seals and expansion joints, just to name a few components.

Unlike coastal floodwalls that face a strong force of floodwaters, but over a short duration of time, floodwalls found throughout the St. Louis District have to withstand floodwaters for potentially prolonged periods of time.

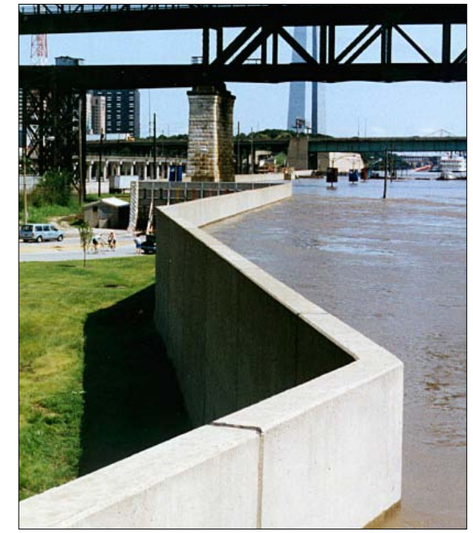
Mississippi River floodwaters were up against the floodwalls in downtown St. Louis in 1993 for three different periods, totaling 120 days. The longest single duration spanned 62 days and included the record stage of 49.58 feet on August 1.

Extensive studies to determine soil conditions where the levee is constructed are conducted in order to properly design the floodwall. These soil studies will help engineers determine the best type of floodwall that will meet the needs of the flood protection system.

Types of floodwalls

Although there are several different types of floodwalls, the two most common types are T-wall and I-wall.

The best type for each particular project is based on the function of the wall, the characteristics of the foundation soils and the proximity of the wall to existing structures.



The floodwall in downtown St. Louis held off rising waters for a total of 120 in 1993. The longest single duration spanned 62 days and included the record stage of 49.58 feet on August 1.

U.S. Army Corps of Engineers photo

T-Wall

A T-wall resembles an upside down T, where the cross bar of the T serves as a base and the stem (the vertical, above-ground portion visible) serves as the water barrier.

When the materials under the wall's base are earthen materials, a vertical base key is normally needed to increase resistance to horizontal movement.

If the wall is founded on rock, a key is usually not provided. Where required, the wall can be supported on piles. A sheet pile cutoff can be included to control underseepage or provide scour protection for the foundation.

I-Wall

The I-type floodwall consists of driven sheet piles and are capped with a concrete wall.

These types are most often used in connection with levee and T-wall junctions or for protection in narrow restricted areas where the wall height is not over 8 to 10-feet, depending on soil properties and geometry.

Floodwalls in the St. Louis area

Many floodwalls are obvious and one's like the St. Louis, East St. Louis and Cape Girardeau floodwalls immediately come to mind. In reality, though, floodwalls are scattered throughout the district. In many cases, streets and railroads cut through levees.

Where this happens, the earthen embankment is transitioned to a floodwall structure, typically an I-Wall type, in order to close off that section of the levee with a floodgate when needed.

BUILDING STRONG

The Inner Harbor Navigation Canal surge barrier floodwall is the Corps' largest-ever design-build civil works project.

At almost two miles long, this $1.3 billion project is being called the "Great Wall of Louisiana."

U.S. Army Corps of Engineers photo

June 2011

Understanding levee structure, stability measures necessary to reduce risk of flooding

By MARY MARKOS
MVS Public Affairs

From song titles and lyrics to the focus of movies and discussions, levees are prominent in today's society.

Yet, while many can sing along with Don McLean as he drives his Chevy to the levee, some in the U.S. do not understand the structures that dramatically reduce their risk of flooding.

Understanding the structure is the first step to reducing one's risk, Pat Conroy, the U.S. Army Corps of Engineers St. Louis District Geotechnical Design Section chief said.

"Levees are more complex than people often understand," Conroy said.

"A great deal of tests and analysis determine the soil type, moisture content, density, and most importantly, the shear strength of the soils in the levee and in its foundation.

"Engineers must determine the appropriate design parameters to be used for each soil type encountered in and below the levee, as well as the proper height, width and angle of the side slopes."

While the Corps of Engineers has over 2,000 levee systems in its portfolio, it is estimated that there are more than 100,000 miles of levees across the country, some of those owned and operated by other agencies or private parties.

Whether a federal levee (one typically designed and built by the Corps in cooperation with a local sponsor, then turned over to that local sponsor to operate and maintain), a non-federal levee or privately-owned levee, understanding the structure and stability can reduce one's risk of flooding.

Levee Facts

1) Flooding will happen - All rivers, streams and lakes will flood eventually.

2) No levee is flood-proof - Levees reduce the risk of flooding... they do not eliminate it.

3) Risks associated with flooding vary - Residents are responsible for knowing their risks and the threats they face from flooding.

4) Actions taken now will save lives and property - Residents can do a number of things before waters rise, from purchasing flood insurance, to developing an evacuation plan, to flood-proofing their home.

Levels of protection

Understanding a levee's level of protection is critical to understanding one's risk.

Often a 500-year and 100-year level of protection is misinterpreted by many as a calendar-year measurement– that the levees are statistically built so they will fail only once every *x*-number of years.

A levee's level of protection, however, is not a calendar-year, but a statistical chance of failing in any year.

A 500-year level of protection means there is two-tenths of one percent chance – or .2% chance – of a levee failing in any given year.

It theoretically could happen in two consecutive years.

A 100-year level of protection describes a levee that has a nominal one percent chance of happening in any given year. The 1 percent flood is dependent on the combination of the history and statistical probability at a given location, and with new information, it can change.

A flood event depends on how much water is entering the river system, how it travels through the river system and how fast it is moving out of the river system.

Overtopping

A flood that exceeds the specific flood level for which the levee was designed may "overtop."

Overtopping is seen when water flows over the top of the levee. An overtopping breach is seen when a rupture, break or gap in the levee results from overtopping.

Water flowing over a levee is one risk. Water flowing under a levee is another risk that brings great concern.

Underseepage

Hydraulic engineers expect water to move under earthen levees, especially during floods when water is high on one side of the levee and resulting hydrostatic pressures are greater.

One common problem seen in levees across the nation is piping. Piping is the movement of soil from under the levee.

Called underseepage, levees weaken when water seepage pulls soil materials with it. Left unchallenged, such underseepage can become uncontrolled.

If underseepage is undetected and not controlled, eventually enough soil can be pulled from the levee foundation to compromise it or even cause its failure.

Sand boils

An indication of underseepage and piping is visible with in sand boils.

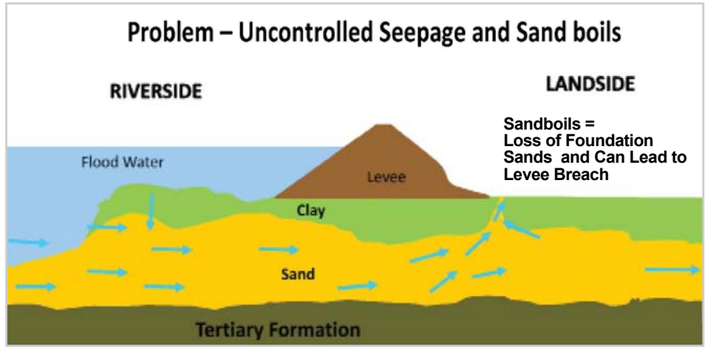
Sand boils look like sand or dirty water "boiling" out of the ground.

At first a sand boil may only be a few inches in diameter and look like a small crater with water and an occasional bit of soil flowing from it.

Left unchecked, flows may increase with more and more material moved, weakening the levee.

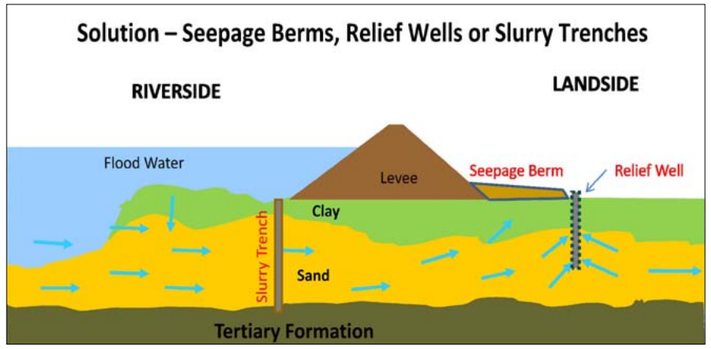
Levee slide

When levees are too weak, a levee slide can occur. A levee slide is seen when the strength of the soils in the levee are not strong enough to hold the weight of the soils in the levee.



A common problem with levees across the United States is seepage and sand boils. The U.S. Army Corps of Engineers works closely with levee sponsors and owners to find the best solution to levee stability issues.

U.S. Army Corps of Engineers graphics



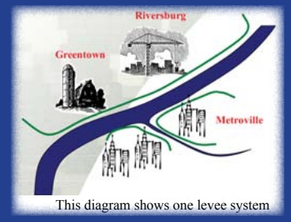
Sand boil - when water passing under a levee eruptsthrough the ground surface on the land-side in the form of a bubbling spring

Gravity Drain- device used to channel water

Relief well- device used to control underseepage by reducing excess hydrostatic pressure

Seepage berm- a thick blanket of dirt located adjacent to the landside slope of the levee

Levee failure resulting from a sand boil



Levee system- all features which collectively reduce the probability of flooding to a defined area

Levee inspection program identifies deficiencies, informs residents of risks associated with system

By MARY MARKOS
MVS Public Affairs

Just as individuals visit the doctor once a year for an annual checkup, engineers from the U.S. Army Corps of Engineers St. Louis District inspect levees yearly to ensure their healthy and stability.

This year, the St. Louis District engineers will complete inspections of approximately 755-miles of levees in the District's boundaries. The levees are enrolled in the Corps' Levee Safety Program.

"Levee inspections are an opportunity for levee districts and sponsors to see what aspects of the levees need improvement," Jamie McVicker, the District's Levee Safety Program manager, said.

"It is like a full examination that reveals the dangers or problems with the levee, especially the periodic inspection, which goes into great detail and looks at many aspects of the levees."

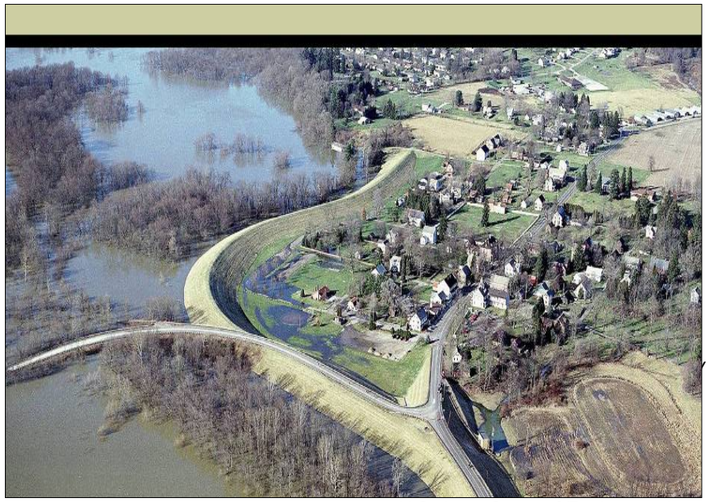
Typically, the District completes routine inspections of levees every year, with a more-detailed periodic inspection every five years.

Many of the inspections completed this year were accelerated with funding through the American Recovery and Reinvestment Act of 2009.

With $4.4 million in ARRA contracts, the Corps will complete inspections on 33 levee systems within the District by the end of 2011, including systems in Missouri and Illinois.

Inspections are conducted by local engineering firms selected under the Corps' levee safety criteria. Additional inspections in Missouri and Illinois are being conducted by Corps' staff.

Inspections and assessments provide continuous feedback about levee systems and their reliability and are a critical part of the Corps' Levee Safety Program. The Corps has authorities for approximately 2,000 levee systems.



U.S. Army Corps of Engineers photo

The U.S. Army Cops of Engineers, St. Louis District Levees will complete inspections of approximately 755-miles of levees in the District's boundaries. Engineers emphasise that levees provide flood risk reduction but do not eliminate risk.

Levee inspection results determine a levee system's eligibility for federal assistance under Public Law 84-99 if damaged in a flood or storm event.

USACE graphic

General Items for All Flood Damage Reduction Segments / Systems
For use during all inspections of all Flood Damage Reduction Segments / Systems

Rated Item	Rating		Rating Guidelines
1. Operations and Maintenance Manuals		A	Levee Owner's Manual, O&M Manuals, and/or manufacturer's operating instructions are present.
		M	Sponsor manuals are lost or missing or out of date; however, sponsor will obtain manuals prior to next scheduled inspection.
		U	Sponsor has not obtained lost or missing manuals identified during previous inspection.
2. Emergency Supplies and Equipment (A or M only)		A	The sponsor maintains a stockpile of sandbags, shovels, and other flood fight supplies which will adequately supply all needs for the initial days of a flood fight. Sponsor determines required quantity of supplies after consulting with inspector.
		M	The sponsor does not maintain an adequate supply of flood fighting materials as part of their preparedness activities.
3. Flood Preparedness and Training (A or M only)		A	Sponsor has a written system-specific flood response plan and a solid understanding of how to operate, maintain, and staff the FDR system during a flood. Sponsor maintains a list of emergency contact information for appropriate personnel and other emergency response agencies.
		M	The sponsor maintains a good working knowledge of flood response activities, but documentation of system-specific emergency procedures and emergency contact personnel is insufficient or out of date.

Routine Inspections

Routine inspections focus on the operation and maintenance of the levee. These annual or bi-annual inspections verify the levee sponsor is operating and maintaining the levee to achieve the maximum benefits the levee was designed to provide.

Routine inspection items include vegetation, encroachments, closure structures, erosion, animal burrows, pump operation, culverts and relief wells.

Routine inspections result in an "Acceptable," "Minimally Acceptable" or "Unacceptable" rating and affect the project's eligibility for federal rehabilitation assistance under Public Law 84-99 if damaged in a flood or storm event.

Periodic Inspections

The periodic inspection is the next level in the levee safety program and is conducted by a multidisciplinary team, led by a professional engineer.

It includes a more detailed, comprehensive and consistent evaluation of the condition of the levee system and will usually be conducted every five years.

Activity under the periodic inspection includes routine inspection items; verifying proper operation and maintenance; evaluating operational adequacy, structural stability and, safety of the system; and comparing current design and construction criteria with those in place when the levee was built.

The final periodic inspection rating is based on routine inspection items, and includes an Acceptable, Minimally Acceptable or Unacceptable rating.

The Corps shares additional periodic inspection information with levee sponsors, including the identification of components and features that require monitoring over time.

Inspection Results

Inspection results determine a levee systems' continued eligibility for the Corps' Rehabilitation and Inspection Program.

The program is the Corps' authority to provide federal assistance for repairing levees damaged by floods or storms.

Systems rated Unacceptable or "U" do not meet Corps levee safety criteria and will most likely be ineligible for Federal aid in repairing flood or storm damage to levees until their deficiencies are corrected.

The Corps will continue to provide flood fighting assistance for all systems, regardless of Rehabilitation and Inspection Program status.

A "U" inspection rating does not mean the Corps has decertified the levee for the National Flood Insurance Program. That decision is between the Sponsor and the Federal Emergency Management Agency.

If rated Minimally Acceptable or "M", or Acceptable, or "A," the system retains eligibility for federal rehabilitation assistance if damaged in a flood or storm event.

An "M" or "A" inspection rating does not mean the Corps has certified the levee for the National Flood Insurance Program.

Certification documentation is the responsibility of the levee sponsor and the Federal Emergency Management Agency.

"Residents need to understand the results of their levee inspection so they understand the risks associated with living and working behind their levee," McVicker said.

"Understanding these risks will help them make informed decisions about their safety and take appropriate action."

While residents need to understand their personal risks, McVicker added that it is important to remember that levees do not eliminate risk.

LEVEE INSPECTION FAQS

Why is a levee inspection program necessary?

There is always a level of risk for those who live behind a levee. A levee safety inspection program is necessary to inspect, monitor and record inspection results and ensure stakeholders are doing what is necessary for levee stability. Inspection results notify stakeholders of deficiencies that, once fixed, will reduce the flood risk to those behind the levee.

Is there enough Recovery Act money to do the periodic inspections annually?

Congress passed the American Recovery and Reinvestment Act to help stimulate the economy in 2009. The federal funds were used for many inspections. We will return to our regular 5-year, detailed inspections in addition to our annual inspections. It is important to remember, we were able to use some of that money to help the local economy while gathering more data on the condition and performance of the levees that we normally could collect between periodic and 5-year inspections.

What is the levee inspection process?

The process takes place in a number of steps:

1- Engineering contractors provide an independent inspection and evaluation of the levees.

2- After consulting with the engineering contractors and analyzing levee information, the inspection team provides a recommended rating and finding. The District levee safety officer is responsible for determining the final inspection rating

3- The Corps of Engineers provides the inspection results to the local sponsor. If deficiencies are found, the levee district has 60 days to present Corps with plan to fix or justification for not fixing.

4- The levee district has two years to fix deficiencies.

What does an unacceptable rating mean?

An unacceptable rating means that one or more items that make up the levee system would prevent the system from performing as intended. It may also mean that a serious deficiency noted in past inspections (which had previously resulted in a minimally acceptable system rating) has not been corrected within the established time frame, not to exceed two years.

What are the consequences of an unacceptable rating?

An unacceptable system rating places the levee system in an "inactive" status under the Corps Rehabilitation and Inspection Program (or PL 84-99 program). The levee system will no longer be eligible for federal rehabilitation funds to repair the levee system if it is damaged in a flood or storm event.

When do the deficiencies have to be corrected by?

"U" rated items that contribute to an overall system designation of "Minimally Acceptable" will need to be addressed by the local sponsor/ USACE-MVS within a two year time frame. If these "U" items are not addressed within the two-year limit, the system will then be considered Unacceptable. The local sponsor should develop a plan to address the unacceptable rated items and implement that plan within the two-year time frame.

Will the Corps of Engineers help fix the deficiencies found?

If the levee is not a Corps of Engineers levee system, the Corps will inspect the levees and report the findings to the local sponsors. The deficiencies found must be addressed by those sponsors. Operation, maintenance, repair, rehabilitation and replacement activities are also local sponsor responsibilities. Subject to the findings and authorities, the local sponsors will decide on options to pursue, which may include work with the Corps or other partners.

More information on the Corps levee safety program can be found at www.mvs.usace.army.mil.

June 2011

Students from Shawnee High School gather with state and U.S. Army Corps of Engineer officials Dec. 18, 2010 at the Southern Illinois Levee Summit.

Photos by George Stringham

Student project leads to national dialogue on levee safety, shared responsibility for repairs

by MIKE W. PETERSEN
MVS Public Affairs Officer

A class project by students at a rural Illinois High School has brought much-needed attention to the state of Southern Illinois levees on a national scale.

Students of history teacher Jamie Nash-Mayberry at Shawnee High School in Wolf Lake, Ill., created YouTube videos and wrote letters to their members of Congress over concerns in the local area at the condition of levees protecting their communities.

Upon receiving the students' letters, Illinois Senator Dick Durbin, Congressmen Jerry Costello (IL-12) and John Shimkus (IL-19) organized a Southern Illinois Levee Summit, held at the school and hosted by the St. Louis U.S. Army Corps of Engineers.

The Dec. 18, 2010, meeting included a workshop in which subject matter experts answered questions from levee districts and the public. Reps. Costello and Shimkus provided comments, as members of Sen. Kirk and Sen. Durbin's offices.

A panel on the region's flood protection systems was held with leaders from three Corps of Engineers districts and Federal Emergency Management Agency's national headquarters.

"Most of the levees we are talking about today are the responsibility of the local levee and drainage districts. However, we also recognize they do not have the resources to make the necessary repairs that are going to have to be made for the future of these levees," Costello said.

"There's no question it's going to take a shared responsibility on part of the local, state and federal government to make these repairs."

The summit provided the status and responsibilities associated with levees in the region, as well as initiated the discussion of a way forward to improve the levees and reduce flood risk.

A second summit was requested by Costello and arranged through the Delta Regional Authority which addressed the potential assistance the Corps of Engineers could provide.

With no appropriation for projects on the Southern Illinois levees in the President's Budget for fiscal year 2012, more immediate avenues of support were discussed.

Col. Tom O'Hara, commander, St. Louis District, addressed the attendees of the second summit and fielded questions about the potential impact of the levees being removed from the Corps' Levee Rehabilitation and Inspection Program

"If there is an unacceptable risk, we no longer have flexibility to do anything but remove a district from the program.

"That doesn't mean we won't work with those districts to find fixes and work with them in flood fight scenarios to protect the levees," O'Hara said.

"We will continue to stay engaged with levee districts to get them back in the program. The reality is that we don't have the funds based on the provisions of the program."

Laurie Farmer, strategic initiatives coordinator addressed the summit on available support the Corps, from the traditional civil works process and technical support the Corps can offer, as well as opportunities for assistance other agencies can offer.

"[A reconnaissance study] is not something we can push forward for you all. This is often the result of stakeholder and potential nonfederal sponsors working together to push issues forward," said Farmer.

"It's very difficult to get a new start in the federal budget. The current trend is that, through normal federal budget process, we have not gotten a new start in past couple years. It's a competitive process and these are viewed from a national perspective."

Though initiating a Corps study to address the problem in the short term isn't a realistic option, Farmer provided information on other possible ways to pursue levee repairs.

The Illinois Department of Commerce and Economic Opportunity receives funds through Housing and Urban Development for grants to small Illinois Communities for economic development, to include levee work.

Another potential source of assistance Farmer addressed was the National Resources and Conservation Service.

While NRCS can't provide assistance on mainline levees, it may be able to provide assistance for tributary levees through its Emergency Watershed Protection Program.

"The community needs to look at all those are sources of revenue and others, so you can leverage all those sources of revenue together to go after these repairs," O'Hara said.

St. Louis District's Matt Hunn addressed the summit on the availability of Corps experts in pursuing levee repairs at the local level.

"Under Public Law 84-99, if levee districts want to do some of the work themselves, we're not going to walk away. We're there with you, shoulder-to-shoulder, not only during a flood fight, but after," Hunn said.

"We will work side-by-side to make sure work is done right, no-cost. We can also provide a scope of work."

For a local perspective on addressing levee problems, Les Sterman, chief supervisor of construction and works for the Southwestern Illinois Flood Prevention District, spoke at the second summit.

Sterman was executive director of the East-West Gateway Council of Governments when FEMA informed the local governments that their levees would be de-accredited.

The Metro East levees consist of 74 miles of mainline levees along the Mississippi River protecting 174 square miles, 150,000 residents and major industry like Conoco Philips.

As the local governments dug into the issue, they discovered the federal civil works process wouldn't address the problems quickly enough to avoid the economic impacts of being placed in a special flood hazard zone.

"This isn't a project that takes years. It takes decades. It was a wake-up call that said 'you're on your own; you need to take responsibility for this project locally,'" said Sterman.

"The federal Government provides some assistance. Certainly the folks at the Corps and FEMA have provided their expertise and have been exceptional partners in all of this but the primary responsibility is local. We may not like it, but that's the reality."

Three Illinois counties agreed on a quarter-cent sales tax in May 2008 to create a revenue source for funding the levee repairs.

The three counties pool the tax revenue and fund a regional organization to carry out the project.

The Southwestern Illinois Flood Prevention District started work in July 2009.

Sterman stressed that the issue of repairing aging levees was greater than any single levee district could handle.

Though it took a great amount of collaboration at state and federal levels, the impetus for action came from the locals.

"We've got to figure out how to bring all of these entities together to work as a unit to solve the problem," Sterman said. "If you really want to get the problem solved and protect your assets, you're going to have to roll up your sleeves and be the catalyst that gets this going."

The DRA is expected to provide a report detailing the issues, public comments and possible ways forward to Congress in the coming months.

The St. Louis District continues to work with the communities living behind levees, providing technical expertise to the local levee districts.

Through the levee summits, students have ensured levee safety is getting critical attention from local, state and federal partners.

Attendees of the Southern Illinois Levee Summit visit information stations regarding levee inspections Dec. 18, 2010 at Shawnee High School.

Congressmen John Shimkus (left) (IL-19) and Jerry Costello (IL-12) discuss the shared responsibility of levee repairs Dec. 18, 2010 at the Southern Illinois Levee Summit.

Federal government, partners provide short-term, long-term options for levee repairs

By MIKE W. PETERSEN
MVS Public Affairs Officer

There are numerous ways levee districts can pursue federal assistance in funding levee repairs, ranging from a full scale U.S. Army Corps of Engineers Civil Works project to technical assistance in local efforts.

With the critical importance of levee safety and maintenance, levee owners and the public have multiple ways to work toward reducing risk in their communities.

Corps project

Through the federal civil works process, a levee project is authorized and funded by acts of Congress. A project can include new systems, as well as repairs and improvements to existing projects.

Seeking a new Corps project is a long-term approach to addressing a local sponsor's water resources and flood risk problems. From a sponsor identifying the need to completion of construction takes years and can involve considerable investment of time and resources from the sponsor.

For the last several years, the President's budget has not included new starts for flood infrastructure projects in St. Louis District.

"The process is fairly long and takes a significant amount of funds to get there," Col. Tom O'Hara, St. Louis District commander told levee owners at the Southern Illinois Levee Summit in March.

"Just because long-term projects are going to take more time and funding doesn't mean there aren't other things the Corps can do."

Advanced Measures Assistance

Advanced Measures Assistance is available to provide temporary measures against an imminent threat of unusual flooding (as determined by the National Weather Service or the Corps) that will threaten life or improved property.

Advanced Measures Assistance is intended to complement the maximum efforts of state and local authorities. Some examples include temporary levees, raising or reinforcing existing levees. A Corps district may provide technical assistance upon receipt of funds from USACE headquarters. Advance Measures projects or direct assistance requires HQUSACE approval.

Other criteria for Advanced Measures include:

- Work must be able to be completed in time to prevent damages.
- Work must be technically feasible and economically justified.
- Removal or upgrades must be performed by sponsor at no cost to USACE.
- Completion of a Project Information Report to include economics, cost estimate and environmental considerations

Rehabilitation under Public Law 84-99

For levees in the Corps' Rehabilitation and Inspection Program (PL84-99) damaged by a flood or coastal storm, federal assistance is available to rehabilitate those levees.

Following a request by the local sponsor, the flood system would be restored to its pre-disaster status at no cost to a federal system owner, and at 20 percent cost to the eligible non-federal system owner.

All systems considered eligible for PL 84-99 rehabilitation assistance have to be in the Rehabilitation and Inspection Program prior to the flood event.

Acceptable operation and maintenance by the public levee sponsor are verified by levee inspections conducted by the Corps on a regular basis.

The Corps has the responsibility to coordinate levee repair issues with interested federal, state, and local agencies following natural disaster where flood control works are damaged.

For a system to be eligible for PL84-99 rehabilitation:

- It must be inspected by the USACE to ensure that the flood control work meets engineering and maintenance criteria.
- It must have a public sponsor.
- It must be regularly maintained.
- Required repair work must have a benefit-cost ratio greater than one, and exceed the scope of the sponsor's maintenance responsibility.

Other federal partners

National Resources and Conservation Service – Emergency Watershed Protection Program (PL 81-516 and PL 95-334)

The National Resources and Conservation Service may be able to provide assistance for tributary levees through its Emergency Watershed Protection Program.

EWP Program assists in relieving imminent hazards to life and property from floods and products of erosion created by natural disasters that cause sudden impairment of a watershed.

Levees and other flood control works are eligible for repair under the EWP Program when there is a potential for loss of life or property without the repairs, the benefits associated with repairing the flood control work exceed the cost of repair and other flood control work-dependent costs and the owners agree to meet NRCS eligibility requirements for engineering and maintenance.

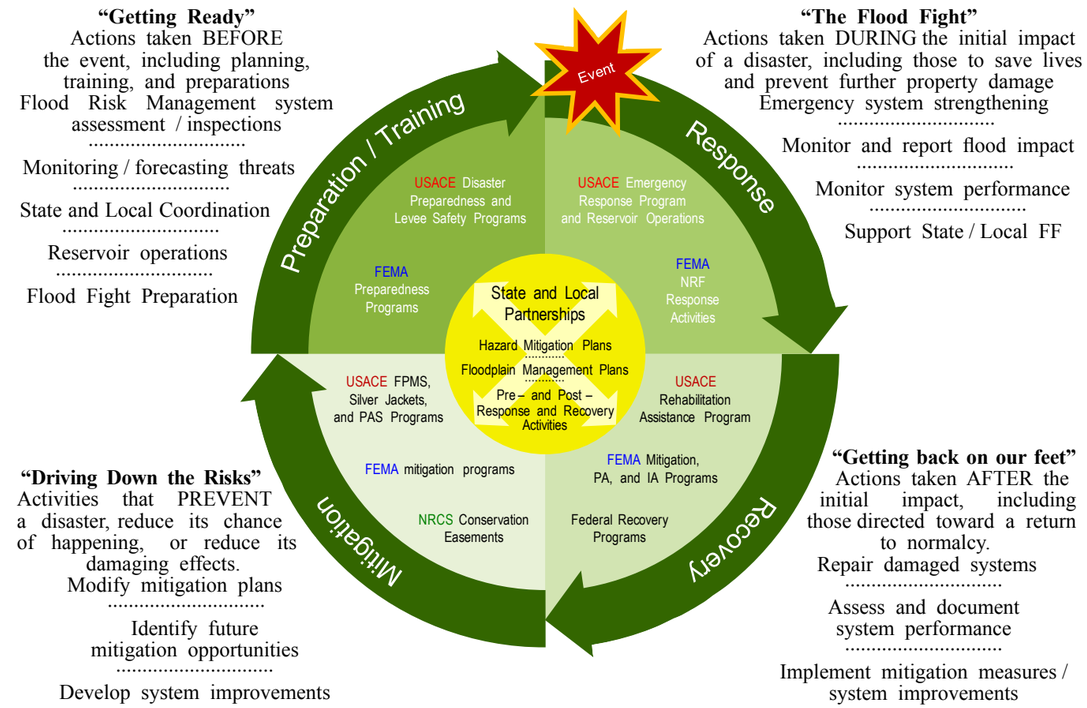
Stafford Act/FEMA assitance

Water control structures (including earthen levees) that are ineligible to join the USACE programs or receive assistance from the NRCS may be eligible for emergency protective measures under section 403 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

The Federal Emergency Management Agency can fund emergency work when assistance is essential to meet immediate threats to life and property. Under an emergency declaration, FEMA tasks another federal agency to perform the emergency work.

Agency performing the work will be reimbursed by FEMA if acting under the Stafford Act rather than its own statutory authority. The state remains responsible for applicable non-federal cost share.

For more information on St. Louis area levees, visit www.mvs.usace.army.mil.



Corps, partners unite to manage flood risk life-cycle

By MARY MARKOS
MVS Public Affairs

In August 1993, the Mississippi River's peak discharge measured 485 million gallons per minute at St. Louis - a rate sufficient to fill Busch Stadium every 65 seconds.

For 144 days, "Cardinal Nation" measured above flood stage - Cardinal fans held hostage by water.

The Great Flood of 1993 broke records, took lives and cost residents along the Mississippi billions. Measuring slightly greater than a 100-year flood event, such a "great flood" has a 1 percent chance of occurring in any year.

In a joint-effort to learn from past flood experiences and find new and innovative ways to prepare the public for future flood events, the U.S. Army Corps of Engineers has partnered with federal, state and local government agencies, as well as non-governmental organizations to form the Mississippi Valley Regional Flood Risk Management Team.

The team, Scott Whitney, the Corps Mississippi Valley Division Regional Flood Risk Manager said, works collaboratively to accurately convey risk and the responsibility organizations and citizens have to reduce that risk.

"Responsibility of managing the Nation's flood risks does not lie exclusively with the Corps of Engineers or any other single Federal or non-Federal entity," Whitney said.

"Rather, responsibility is shared across multiple Federal, State and local government agencies, with a complex set of programs and authorities, and private citizen choices and actions. All stakeholders have a part in reducing risk to a tolerable level."

To understand how to reduce risk, those living on and around the watershed must first understand the "life-cycle" of the flood risk management.

The mitigation planning, preparation, response and recovery life-cycle ties together the team's partner-activities and programs.

"At its heart, RFRM will provide necessary structure and formality to collaboration and communication intended to provide awareness, education and action necessary to make informed decisions and policies that serve to reduce risk to deleterious and costly flood damages," Whitney said.

The team is currently taking actions at all stages of the life-cycle to reduce and convey risk.

These actions include:

- Providing the public and decision makers with current and accurate flood risk information at the national, watershed, state, tribal, and local levels
- Identifying and assessing all flood risk management infrastructure hazards
- Improving public awareness and understanding of flood related hazards and risks
- Implementing collaborative watershed /system risk management strategies with federal, state, local, and tribal partners
- Improving capabilities to collaboratively deliver and sustain flood risk management services at the national, watershed, state, local, and tribal levels
- Coordinating regional flood risk management policies, programs, activities and information with federal, state, and local partners

Actions taken prior to high-water event reduce personal flood risk, damages to home

By ROMANDA WALKER and MARY MARKOS
MVS Public Affairs

With more than 2 million sandbags on hand, the St. Louis District U.S. Army Corps of Engineers is prepared for a high-water or flood event. The District, like many living along the water, knows that preparations for a flood event must start long before waters begin to rise.

"We know flood risk can never be eliminated entirely, but we have a shared responsibility to do what we can to reduce our risk," Lt. Col. David Bitner, deputy commander of the St. Louis District, said.

"Long before a flood happens our teams are already working with state and federal agencies and reaching out to local levee districts, ensuring that they are as ready as they can be for a potential event. Residents have the same responsibility to take actions before a flood to reduce their risk and help decrease flood damage."

U.S. Army Corps of Engineers photo

Residents fight rising waters in 2008 in the St. Louis area. Actions taken prior to flood events can help prevent or reduce flood events in the future.

Reduce risk through preparation

Residents can take the following steps to reduce their risk of flooding prior to a high-water event.

- Learn which local agency is responsible for notifying residents of flooding, so you'll know where to turn for relevant information in an emergency
- Determine if local agencies have a flood warning system and an emergency response plan in place. Learn how this information will be broadcast (radio, television, Internet, etc.), so you'll know how to access it
- Store insurance papers, deeds, and other important records in a safe-deposit box or other secure location
- Prepare an emergency kit that is easily accessible and includes at least one large flashlight, a battery-powered radio, spare batteries, candles, waterproof matches and other items you'll likely need in the event of a power outage
- Find out where you can get sandbags

> **We know flood risk can never be eliminated entirely, but we have a shared responsibility to do what we can to reduce our risk.**
>
> **Lt. Col. David Bitner**
> St. Louis District Deputy Commander

Prepare Your Home

- Elevate your furnace, water heater, and electric panel if they are susceptible to flooding
- Install "check valves" in sewer traps to prevent floodwater from backing up into drains and seal basement walls with waterproofing compounds to avoid seepage
- Keep family heirlooms and other priceless possessions on an upper level, if possible, or in locations within your home that are least likely to flood

Prepare for an Evacuation

- Make a list of items to take with you in case of an evacuation (for example, clothing, cash and credit cards, prescription medications, eye glasses, mobile phone, etc.). Keep this list in a handy location
- Learn if your area has a predetermined evacuation route you should take in the event of an emergency
- Learn where official shelters are located and plan your route to the nearest shelter or other safe area. Consider whether any locations along your planned route might flood. Also consider what to do with pets, as shelters may not allow animals.

National Flood Insurance Program

Anywhere it rains, it can flood. Each year, more homes in the U.S. are damaged by floods than any other natural disaster.

People who live near water are not the only ones who experience flooding. Just a few inches of water in a home can cause thousands of dollars of damage.

Heavy rains or a rapid accumulation of rainfall, an overtopped levee, new construction and development and outdated or clogged drainage systems are some factors that can result in a flood or high-water.

Since most standard homeowners insurance policies don't cover floods, Congress created the National Flood Insurance Program in 1968, as a means for property owners to financially protect themselves from flooding.

"The NFIP is administered by the Federal Emergency Management Agency, which works with private insurance companies and agents to offer flood insurance to property owners and renters which is backed by the government," Matt Hunn, St. Louis District Readiness Branch said.

Nationwide there are more than 20,000 participating communities who agree to adopt and enforce regulations to reduce the risk of flooding.

Hunn said a common misconception is that flood insurance is available only for homeowners. "Most people who live in NFIP participating communities are eligible to purchase flood insurance, including renters and condo unit owners," Hunn said.

FEMA provides flood hazard information to communities nationwide in the form of Flood Insurance Rate Maps. FIRMs show communities the locations of high-risk, moderate-to-low risk, and undetermined-risk areas.

Approximately 25% of the counties FEMA has mapped contain levees. The St. Louis District has authority for over 755 miles of levee systems.

The Engineering and Design US Army Corps of Engineers process for the NFIP Levee System Evaluation (EC 1110-2-6067) establishes the procedures for the Corps of Engineers to evaluate levees for the NFIP.

The Corps may evaluate a levee for NFIP mapping purposes if it:

- Operates or maintains the levee system (such as the Mississippi River & Tributaries levees);
- Has an active levee design/construction project underway (such as New Orleans); or
- Is requested by the local sponsor, who provides funding and demonstrates USACE is uniquely equipped to perform the evaluation and that such services are not reasonably and quickly available through ordinary business channels.

Even with the collaborative efforts of USACE and FEMA, there is still a risk for levee failure. Levees do not eliminate flood risk. The possibility exists they can be overtopped or breached by a larger event, and the flood damage can be catastrophic.

The "100-year flood" isn't a safety standard for levees. It was established as a minimum requirement for flood insurance.

Like the standard for a "100-year flood," the hazards associated with flooding change over time.

Climate change, the rate of storms and changes in the watershed will affect a resident's risk. As part of the shared responsibility to reduce risk, residents, the Corps and local levee sponsors must reevaluate the risks of flood regularly.

Wappapello Lake maintains performance at historic levels

By GEORGE STRINGHAM
MVS Public Affairs

The U.S. Army Corps of Engineers in St. Louis reported Wappapello Lake's pool elevation crested May 2 at just over 400.0 feet.

That elevation sets a new record, nearly a foot above the previous record of 399.09, set in April 1945.

The water releases of 30,400 cubic feet per second were more than three times the maximum that's released through the gate structure on the dam.

"We are dealing with historic or near historic events, not just here at Wappapello, but across this part of the country," St. Louis District Command Tom O'Hara said. "This is just one example of the value of these reservoirs and other elements of our flood risk reduction systems have on the region and how they are working."

The lake's waters began overtopping a temporary rock berm that was constructed across the lake's overflow spillway May 11. The berm was constructed to divert water through the gatehouse at an elevation of 397.3 feet but rain events pushed the lakes waters beyond that level.

Wappapello Lake began overtopping a temporary rock berm that was constructed across the lake's overflow spillway May 11

Photo by George Stringham

Water over the spillway posed no risk to the dam structure, but Highway T across the dam was destroyed, along with the fiber optics and water lines going across the dam.

The Corps, community partners and local law enforcement carried out an early warning plan to provide accurate and updated information to people living downstream of Wappapello Lake. The Corps also held daily conferences with agencies, county officials, community leaders, and stakeholders to provide the latest information about flood conditions, and has provided regular updates through local media, telephone and internet resources.

On April 24 and April 25, Wappapello Lake experienced near-record inflows approaching 88,000 cubic feet per second. Inflows of 80,000-90,000 cfs were experienced again May 11.

As a flood damage reduction project, Wappapello has performed as it was designed. Without it, the historic amount of rainfall in the basin would have moved downstream unchecked while other, high water events were already occurring.

Corps of Engineers remain prepared for flooding, relay critical information through social media

By ROMANDA WALKER
MVS Public Affairs

Flooding is the most common, costly and deadly natural disaster in the United States each year. One of the Corps of Engineers' main missions is providing assistance when natural disasters or other emergencies strike.

Emergency preparedness and response is primarily a state and local responsibility, but the Corps of Engineers is authorized to assist communities in pre-flood preparedness, during-flood and post-flood response.

The St. Louis District's Emergency Operations Center is constantly making preparations in the event a flood should happen within the District.

"The District works with our local communities to ensure they are all prepared," said Linda Werdebaugh, Natural Disaster Program Manager in the District's Readiness Branch. "During the month of March, the District holds a series of flood preparedness workshops for local levee and drainage districts to address any concerns or issues that they may have."

The Flood Preparedness Workshops are designed for the National Weather Service to present the spring outlook and for the Local and/or County Emergency Management Agency, State Emergency Management Agency, Federal Emergency Management Agency and the Corps discuss their roles in flood fight response and recovery efforts," Werdebaugh said.

In addition to the flood preparedness workshops, the District's Public Affairs Office uses social media as an avenue to distribute flood awareness information and resources to the public.

Tips on how to create a flood preparedness kit, links to river and reservoir levels and videos on how to fill a sandbag were posted, "tweeted," and uploaded.

Many people have already adopted social media into their day to day activities, but during times of emergencies, one of the first places many people tend to turn to is social media.

"People have come to expect organizations to make information available through social media," Mike Petersen, chief of Public Affairs said.

During the most recent flood event at Wappapello Lake, social media became an important communication tool for the public. The District's Facebook, Twitter, Flickr, YouTube and Flood Fight webpage became a primary source of information for both the public and the media. The District was able to disseminate "real time" updates around the clock to a world-wide audience before local television, radio or newspapers could. Pictures and videos were posted almost immediately from Wappapello Lake, often from locations the public or media could not access.

In addition, the public played a unique role in helping to distribute information as events unfolded.

The public was helped others by sharing various types of information that they had such as road closings and emergency shelter information.

The Corps' social media sites also played a significant role in rumor-control. Using Facebook and Twitter, the District was able to extinguish rumors as they began to circulate. A message that gets out from someone who is not informed has the potential to turn into "fact" spreading like wildfire especially in times of high stress.

Correcting rumors with facts helped the Corps to ease some of the anxiety the public had. The St. Louis District received numerous comments thanking Corps personnel for all of their hard work and dedication during the flood event.

"My husband and I took the tour this morning at Wappapello, and we wanted to say, THANK YOU…until you see it, you cannot fully comprehend the damage that has been done. Keep up the good work, we know it's going to be a long road ahead…no pun intended…," one follower wrote.

Social media serves as a powerful communication tool to get information out to a large audience quickly and effectively. When the public turns to the District's social media, they will find a resource they can come to for timely and accurate information.

Follow the St. Louis District Corps of Engineers at:

Webpage: http://bit.ly/aN1pxV
Facebook: http://bit.ly/amG6Gw
Twitter: http://bit.ly/hidNK7
Flickr: http://bit.ly/eHAWgv
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