

A wave of new legislation to hold back future flooding

"The roar of the crevasse drowned all sound. It carried up and down the river for miles and carried inland for miles. It roared like some great wild beast proclaiming its dominance. Men more miles away felt the levee vibrate under their feet and feared for their own lives."

This year marks the 90th anniversary of the Great Flood of 1927. After months of intense rains throughout the Mississippi River drainage basin, which covers a significant portion of the United States, the Mississippi and its tributaries were swollen with more water than they had ever before carried. In April that year, after several more inches of rain, Arkansas received the brunt of the cataclysmic flood waters, as levees were breached all along the White River and the Arkansas River, spilling as much as 15 feet of water across 2 million acres of land. More than 350,000 Arkansans were affected by the inundation.

There has not been a flood near the same magnitude in the Mississippi River Valley since the devastating 1927 flood, but there have been several floods in recent years that have nevertheless been destructive. Just this year storms in late April dumped several inches of rain in Arkansas, ultimately causing the flooding of nearly 1 million acres of farmland, taking nine lives statewide, and costing more than \$13 million in damage across the state. The Black River in particular crested at almost 29 feet and broke through nine sections of the Running Water levee near Pocahontas, inundating the surrounding area.

Levees provide the main method of flood control in Arkansas and the rest of the Mississippi River Valley. Levees are typically mounds of earth built upon either bank of a river to help contain the river during a flood event. The use of levees to control flooding dates back thousands of years: "Babylonians leveed the Euphrates. Rome leveed the Tiber and Po." In the 1700s, Europeans built levees along the Danube, the Rhine, and the Volga, among others. The use of levees in the Mississippi River Valley became widespread in the 1800s. By 1858, there were more than 1,000 miles of levees along both sides of the Mississippi River, some as high as 38 feet. As levees were being constructed, levee districts were formed to manage them. As witnessed during the epic 1927 flood and during the many floods Arkansans have observed since then, problems occur when the levees are not able to withstand the rising flood waters.

How Levees Break and How They Can Be Fixed

There are four primary ways levees may fail: seepage,

instability, erosion, and deficient height. Seepage occurs when water saturates the levee and slowly works its way to the other side, through the levee's foundation. The flow of the water seeping through the foundation typically gets wider and stronger until an entire section of a levee gives way. A break in the stability of the levee occurs when the pressure of the water against the levee is so great that part of the levee sloughs off into the water. Erosion happens over time as the river current scours away the foundation of the levee, weakening it to the point of collapse. Deficient height means the water level rises higher than the levee was built to withstand and simply pours over the top of the levee.

To prevent or mitigate levee failure, levees require a certain amount of maintenance and repair over time. The U.S. Army Corps of Engineers (USACE) has come up with different solutions for each type of levee failure. If a levee is failing because of seepage, USACE recommends constructing a seepage cutoff wall, which requires digging a deep trench in the middle of the levee and filling it with clay, concrete, or some other type of impermeable layer to stop the flow of water. If a levee is suffering because of a break in the stability, USACE says it is best to build the levee wider and flatter to fortify its structure. If the foundation of the levee is eroding, USACE suggests adding a layer of rock or concrete to the foundation to prevent the river from washing it away. If a levee has a deficient height, USACE advises building the levee higher or installing a flood wall at its apex.

The Nature of the Problem in Arkansas

Sometimes local officials and levee districts can do everything right to maintain their levees, but Mother Nature overcomes their efforts. The 8.7-mile Running Water levee system near Pocahontas was constructed in the early 1900s by USACE. In the 1930s, USACE turned maintenance of the levee over to a local levee district. In the 1960s, however, the levee district disbanded, and the levee fell into disrepair. After more than 40 years of no maintenance on the levee, the levee district was re-formed in late 2010. The new levee district took out a \$1.2 million loan and assessed residents 50 cents per acre to help cover the cost of rebuilding the levee to its original, post-1927 flood design, at 28 feet. As the

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erty owners are not paying their assessments. This is an ongoing issue in Pulaski County. The Bill and Hillary Clinton National Airport owns 95 parcels, or just about 10 percent of the property in the Pulaski Drainage No. 2 Improvement District. The airport does not pay property taxes, and claims the Federal Aviation Administration (FAA) prevents it from voluntarily paying improvement assessments, revenue that helps cover the costs of operating and maintaining a 7.2-mile levee and its pumps on the Arkansas River. While the Arkansas Constitution Article 16 § 5 exempts public entities from taxation, the Arkansas Supreme Court has said the revenue collected by improvement districts from those who benefit from the improvement is considered an assessment, not a tax, so the airport would not necessarily be exempt from improvement assessments. Airport representatives contend that even so, FAA regulations pre-empt state law on this issue. If the airport paid the assessments, it likely would go a long way in helping the levee district cover its costs, considering that last year the board dipped into its reserve funds to cover budget deficits.

Levee district board members may also weigh their funding options by conducting a cost-benefit analysis. They may ask themselves whether it is worth the expense to repair a levee or increase its height to certain specifications. Take the Running Water levee as an example. The levee district recently took out a \$1.2 million loan to build the levee to 28 feet. Would it be worth it to build the levee to, say, 30 feet, if this year was the first time on record the river has crested at 28.95 feet? What are the chances the water would rise to that height again?

Where do we go from here?

In some ways it is difficult to figure out where we go from here. Many of the issues that plague levees and levee districts are not within the control of local, state, or federal governments. We cannot control flooding events. We cannot always secure state or federal funding. We cannot change the fact that the history of levee districts in Arkansas has resulted in a quilt-like assemblage of levees and levee districts. I was told at a retail job I worked once that it is not about the things you cannot change, it is about the things you can change. For example, after the last several legislative sessions, there are new provisions offering mayors and county judges several ways to keep track of their levee districts and to fill vacancies to promote continuity of levee boards. As long as there are people in place to monitor the levees, the likelihood decreases that the levees will fall into disrepair. Ultimately, the levee districts in Arkansas have some room for improvement, but

the legislation passed in recent years should help by putting in place better safeguards for levee maintenance and levee district management.

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