



## FEMA Mitigation Leaves Bridge Standing Strong Through Repeated Flooding

### Full Mitigation Best Practice Story

#### *Reynolds County, Missouri*

**Reynolds County, MO** - Simple design improvements to a one-lane bridge in rural Reynolds County, Missouri have left the span standing while others around it have been damaged or destroyed by repeated flooding. The County Road 324 bridge over Sinkin Creek near Centerville was heavily damaged in a flash flood in Spring 2002. Ongoing storms and tornadoes in late April that year resulted in a presidential disaster declaration that included most of southern Missouri.



In the multi-million recovery effort that followed, the Federal Emergency Management Agency (FEMA) approved funds to rebuild specific public infrastructure to higher standards. The effort is known as mitigation – an effort to break the cycle of damage and repair and to reduce repeated losses and the financial burden of rebuilding again and again.

“We’ve had five or six major floods since,” said Don Warren, Reynolds County District Commissioner. “It’s held through all of them.”

One bridge, just a few hundred yards to the north on County Road 308, was washed out in June 2008, in the severe storms and flooding that resulted in another federal disaster declaration.

The County Road 324 bridge was one of several projects to receive mitigation funding following the 2002 disaster. Working with FEMA’s team of mitigation experts, the bridge replacement project included replacing about 200 feet of road, the bridge footings, and creating a concrete spillway in the streambed.

It also included several other unique features that have enabled it to withstand repeated flooding. Six 2 feet x 8 feet box culverts support the road over the bridge. Each has a specially-designed concrete riser that slopes up and out of the stream at about a 30-degree angle. During flooding, the risers let tree stumps, branches and other materials wash up and over the bridge without damaging the structure. While sand and gravel can migrate and clog the wide culverts during flooding, they are now much more easily cleaned, according to Commissioner Warren.

FEMA mitigation funding is provided as a component of its Public Assistance (PA) program, which reimburses local governments and certain nonprofits for disaster related costs for debris removal, emergency protective measures and repair or restoration of public infrastructure.

Generally, the PA program restores disaster-damaged infrastructure to pre-disaster conditions. However, where it is cost-effective and technically feasible, additional funding can be approved to restore the structure to a higher standard and make it more disaster resistant.

Commissioner Warren said the work was completed by his own road crew in the fall of 2002, and cost about \$64,000. FEMA provided 75 percent of the total; the remaining 25 percent – about \$16,000 -- was split as 10 percent and 15 percent by the state and county, respectively.

### Activity/Project Location

Geographical Area: **Single County in a State**

FEMA Region: **Region VII**

State: **Missouri**

County: **Reynolds County**

City/Community: **Reynolds**

### Key Activity/Project Information

Sector: **Public**

Hazard Type: **Tornado; Flooding**

Activity/Project Type: **Flood Control**

Activity/Project Start Date: **03/2002**

Activity/Project End Date: **12/2002**

Funding Source: **Hazard Mitigation Grant Program (HMGP)**

Application/Project Number: **UNKNOWN**

### Activity/Project Economic Analysis

Cost: **Amount Not Available**

### Activity/Project Disaster Information

Mitigation Resulted From Federal  
Disaster? **Yes**

Federal Disaster #: **1403 , 02/06/2002**

Federal Disaster Year: **2002**

Value Tested By Disaster? **Yes**

Tested By Federal Disaster #: **No Federal Disaster specified**

Year First Tested: **2003**

Repetitive Loss Property? **No**

### Reference URLs

No URLs were submitted

## Main Points

No Main Points were entered.



Commissioner Don Warren on County Road 324 Bridge over Sinkin Creek



Commissioner Warren on the bridge over Sinkin Creek