

# LARGE-SCALE LEVEE SETBACK ON THE MISSOURI RIVER (L-536 – A Case Study)

## THE PROJECT

The Missouri River experienced severe flooding in 2019 breaching and overtopping over 100 levees, inundating 1.2 million acres, damaging infrastructure including farms, railroads, Interstate highways and closure of approximately 470 roads. Missouri River levee L-536, in northwest Missouri in Atchison and Holt Counties, was partially or fully breached in 7 locations and significantly damaged.

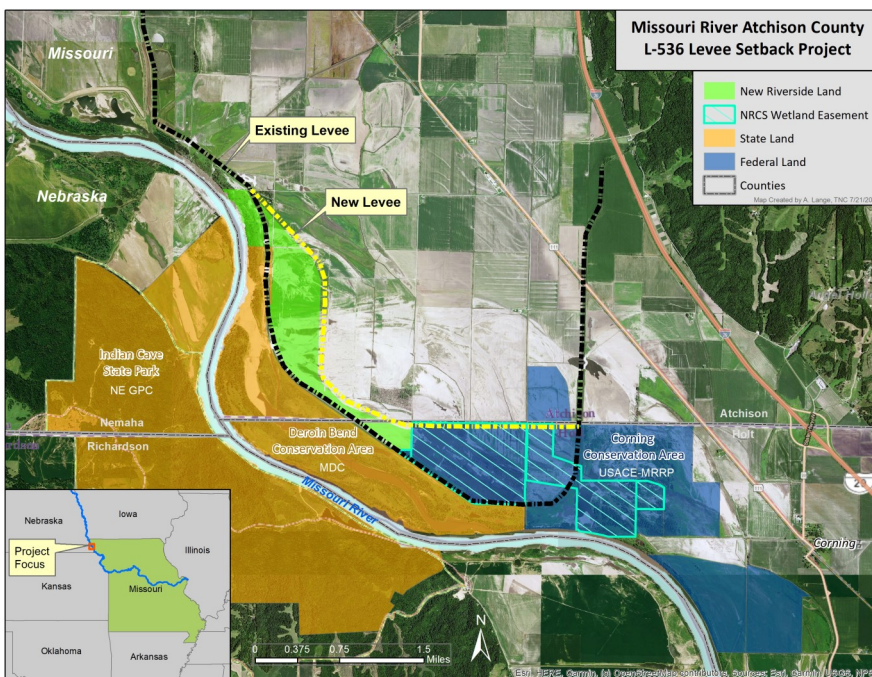
Having suffered repeated flooding in past years, the Atchison County Levee District #1 (ACLD) in consultation with the U.S. Army Corps of Engineers Omaha District (USACE NWO) and the impacted landowners, determined that a levee setback, moving the levee inland which allows more room for floodwater conveyance, combined with a modern design, was in the best interest of their community now and for future generations.

## THE PROCESS

Led by the ACLD and the USACE, this project was made possible by a robust partnership of state and federal agencies and non-profit organizations. All partners contributed time, resources, and expertise.

Levee L-536 is a federally constructed levee active in the USACE's Public Law 84-99 program for levee rehabilitation. The USACE levee repair alternative analysis determined construction of a levee realignment (commonly called a setback) was the least cost alternative when compared to repair of the levee in line at its original location.

Real estate for the new levee footprint was one major responsibility of the ACLD under PL 84-99 and had to be secured prior to USACE awarding a construction contract. In addition, since the landowners did not want to own land on the riverside of the new levee, the ACLD determined that providing compensation to the landowners for this real estate was essential. Land was also required to compensate for construction impacts to a preexisting Natural Resources Conservation Service (NRCS) conservation easement. The partnership developed a creative combination of real estate funding sources.



## 2019 Flood Impact on Atchison County\*

- 56,000 acres underwater
- 14 commercial businesses underwater
- 166 homes flooded
- 278 citizens forced to evacuate
- 1,295 agricultural buildings flooded
- \$25 million (est.) in lost ag revenue
- 121 miles of road destroyed
- I-29 closed for approx. 187 miles between St. Joseph, MO & Omaha, NE
- US Hwy 136 bridge closed for 216 days
- Major disruption of BNSF railroad

\*data from Atchison County Levee District #1

## THE PARTNERS

Atchison County Levee District  
U.S. Army Corps of Engineers  
USDA Natural Resources Conservation Service\*  
MO Department of Natural Resources  
MO Department of Conservation

MO Department of Economic Development  
State Emergency Management Agency  
Northwest Missouri Regional Council of Governments  
The Nature Conservancy

# THE STATS

## SITE INFORMATION:

**Location:** Atchison & Holt Counties, MO (L-536)

**Project length:** 5 miles

**Updated levee design:** 5:1 landward side slope (significantly reduces erosion during over-topping)

**Reconnection of floodplain:** 1,040 acres

**Flood reduction:** up to 0.83 feet flood water surface elevation for the 100-year flood

**Protected area:** 20 square miles

## PROJECT INFORMATION:

**Project lead:** Atchison County Levee District #1

**Construction & management:** USACE NWO

**Construction timeframe:** Aug. 2020-Summer 2021

**Cost total:** ~\$103.5+ M

Levee Construction: ~\$100M (USACE)

Real Estate: ~\$3.5M

## Real estate funding support:

**ACLD** – real estate and related expenses

**State of Missouri** - new levee footprint (State Emergency Management Agency and Dept. of Economic Development)

**NRCS** – Emergency Watershed Protection Program – Floodplain Easements (federal disaster dollars following the 2019 floods) for private landowners on the riverside of the new levee

**The Nature Conservancy** – riverside lands of the new levee after enrollment in the NRCS easement program and lands to compensate for impacts to a preexisting NRCS easement

**Missouri Department of Conservation** – riverside lands of the new levee after enrollment in the NRCS easement program and lands to compensate for impacts to a preexisting NRCS easement

**MO Department of Natural Resources** – real estate process expenses

**Missouri River Recovery Program** –new riverside land for ecosystem benefits and borrow pits for habitat development



# THE BENEFITS

## Hydrologic and geologic benefits:

- Decreased flood velocities and reduced erosion and scour
- Levee relocated to more suitable ground (higher elevations, better foundations, broader construction ratio, etc.)

## Potential economic benefits:

- Reduced levee repair, rehabilitation and replacement activities, reducing levee operation and maintenance costs
- Reduced damage to transportation and other infrastructure
- Less frequent need for emergency operations and flood-related activities

## Indirect ecosystem benefits:

- Floodplain habitat for fish and wildlife
- Spawning and nursery areas for many fish species when there is water on the floodplain
- Fish and aquatic life in the floodplain are food for birds and mammals especially when there is water on the floodplain
- Increased groundwater recharge
- Floodplains improve water quality by retaining nutrients deposited during floods

## Project Contacts

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