

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

THE PROJECT

The Missouri River experienced severe flooding in 2019 breaching 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 breached in 7 locations and significantly damaged.

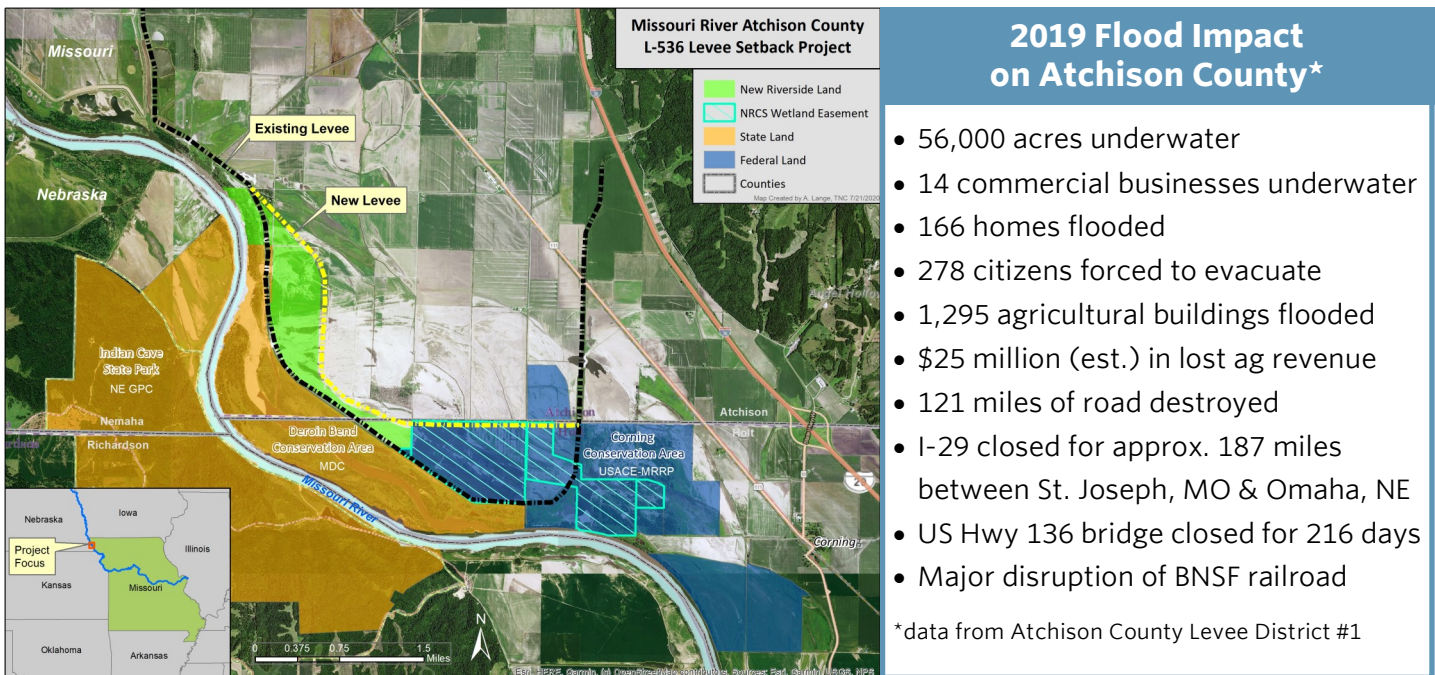
The 70-year-old levee could have been at risk for future breaches if reconstructed in the same alignment. The Atchison County Levee District #1 (ACLD) in consultation with the impacted landowners, determined that a levee setback, moving the levee inland to allow more room for floodwater conveyance, combined 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 U.S. Army Corps of Engineers Omaha District (USACE NWO), this project was made possible by a robust partnership of state and federal agencies and non-profit organizations. All partners contributed time, resources, expertise and funding.

Levee L-536 is enrolled in the USACE's PL 84-99 program responsible for emergency repairs post disasters. After the severe damage in 2019 the ACLD consulted with the USACE on repair options including requesting analysis of a levee setback. The USACE levee repair alternative analysis determined construction of a levee setback was approximately \$3M less expensive than repair of the levee in line with its original footprint.

Real estate was the responsibility of the ACLD and had to be secured prior to USACE awarding a construction contract for the levee setback work. Real estate included the new levee footprint, buying out willing landowners that did not want to own land on the riverside of the new levee, and lands 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.



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

Levee Design: 5:1 ratio (5ft lateral for every 1ft high)

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 – March 2021

Cost total: \$61+ M

Levee Construction: \$56.5M (USACE)

Real Estate: \$4.5M

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 – land for new levee footprint construction, new riverside land for ecosystem benefits and borrow pits for habitat development



*The construction of the new levee footprint
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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.)

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 during high water
- Fish and aquatic life in the floodplain during highwater are food for birds and mammals
- Increased groundwater recharge
- Floodplains improve water quality by retaining nutrients deposited during floods waters

Project Contacts

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