

# Large-Scale Levee Setback Playbook

Based on the Missouri River L-536  
Levee Setback Project Partners' Experience



# Executive Summary

In March 2019, abnormal weather patterns in Nebraska, Iowa, and South Dakota caused record-setting flooding along the Missouri River, resulting in widespread catastrophic damage throughout the river valley. The Large-Scale Levee Setback Playbook (Playbook) documents how, after a historic flood, a multi-agency team worked together to complete a highly complex \$100 million levee setback after floodwaters destroyed most of the left bank of Missouri River Levee Unit 536 (L-536) in northwestern Missouri. The Playbook also serves as a guide for others to use in pursuing similar nature-based solutions that enhance flood resiliency.

The Playbook is organized in four distinct but complementary sections:

## **SECTION 1: The Story**

tells the story of the historic flooding in 2019 and provides an overview of the scope and benefits of the setback, the partners involved, and project milestones.

## **SECTION 2: The Challenges**

dives deeper into the L-536 setback project, identifying the challenges—big and small—that project partners encountered and overcame through collaborative problem solving.

## **SECTION 3: The Recommendations**

provides recommendations from the lessons learned during the L-536 setback regarding legislation, regulation, policies, and practices that can better support levee setbacks.

## **SECTION 4: The How-To Guide**

illustrates a process for levee sponsors considering or pursuing a similar project, as well as identifying helpful pre-disaster planning efforts.

The development of the Playbook was supported by The Nature Conservancy with experience-based contributions from project partners involved in the L-536 setback project, a nature-based solution to reduce flood risk to the community by reconnecting more than 1000 acres to the riverward floodplain and restoring more than 400 acres of wetlands.

### **L-536 Project Partners**

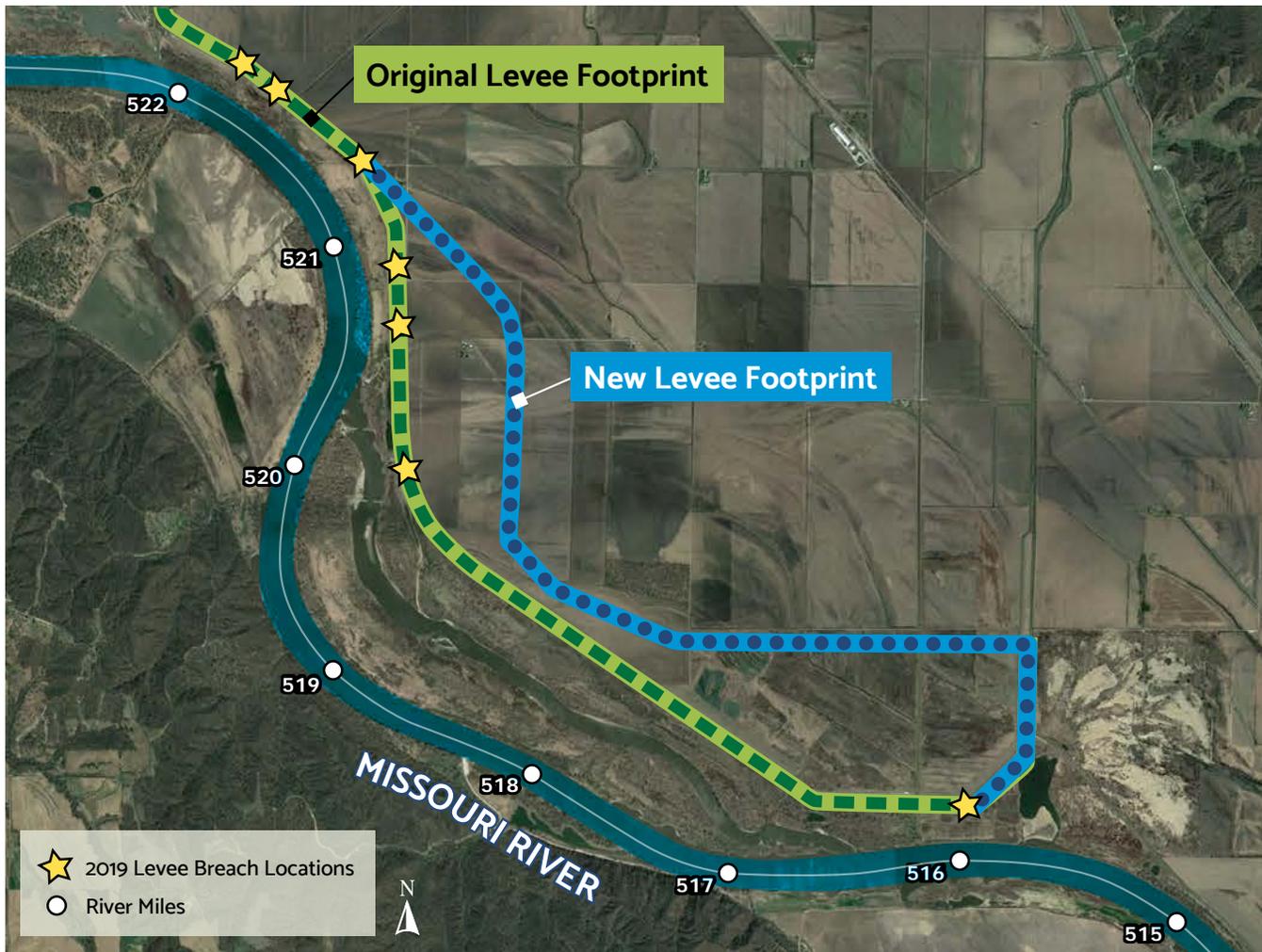
- Atchison County Levee District #1
- Headquarters U.S. Army Corps of Engineers
- Omaha District, U.S. Army Corps of Engineers
- Kansas City District, U.S. Army Corps of Engineers
- Missouri River Recovery Program
- USDA Natural Resources Conservation Service Missouri
- USDA Natural Resources Conservation Service, Headquarters
- Missouri Department of Conservation
- Missouri Department of Natural Resources
- Missouri State Emergency Management Agency
- Northwest Missouri Regional Council of Governments

# Executive Summary

## KEY TAKEAWAYS

### Section 1: The Story

- L-536 experienced five full and two partial breaches and significant crest damages over 10 miles of levee during the record-setting Missouri River flooding in March 2019.
- Atchison County Levee District (ACLD) had maintained and operates its levee systems to U.S. Army Corps of Engineers (USACE) standards, making L-536 eligible for rehabilitation assistance under Public Law 84-99.
- A large-scale levee setback was determined to be the least cost, technically feasible rehabilitation alternative to restore flood protection per USACE criteria.
- The additional hydrologic, geologic, environmental, and economic benefits associated with the setback were instrumental in bringing partners together, providing ACLD much needed real estate and funding support.
- Reconnected more than 1000 acres of floodplain and 400 acres of new wetlands providing high value habitat for fish and wildlife.
- Construction of the L-536 setback was substantially completed in summer 2021.



### The L-536 Rehabilitation Includes:

- An in-line repair of inlet breach of 400 linear feet
- An in-line repair of a partially breached section of 1,800 linear feet
- An in-line repair of 4,700 feet of erosion to the crest, slopes, and berms
- A new 25,400-foot portion of the levee setback approximately 5 miles long to eliminate four breaches in the levee
- Drainage structure replacements
- Relief well abandonments and levee ramp construction
- Reconnected and restored over 1000 floodplain acres

# Executive Summary

## KEY TAKEAWAYS

### Section 2: The Challenges

- The leadership and dedication of ACLD board members to the levee setback rehabilitation alternative was essential to the project success.
- L-536 project partners demonstrated the power of multi-agency collaboration, working together to overcome a variety of challenges in pursuit of a shared vision. The trust established, adaptability, and problem-solving skills of project partners proved to be keys to success from the project start through construction.
- Real estate requirements, and associated funding needs, were the most complex and time-intensive components of the project.
- USACE utilized a flexible construction contract that ensured flood protection would be restored, regardless of whether real estate could be secured for the setback footprint. The base contract was awarded for in-line repairs to the existing levee (both beyond and within the planned setback), with an option to construct the setback if real estate was secured.



# Executive Summary

## KEY TAKEAWAYS

### Section 3: The Recommendations

- Recommend USACE clarify existing policy or seek new legislation to facilitate construction of levee setbacks, such as tracking repetitive loss data, allowing real estate acquisition for levee setbacks under PL 84-99, and emphasizing levee setbacks for flood risk management that create sustainable flood risk management projects in an era of changing climate and increasingly severe flooding.
- Recommend NRCS improve its ability to support levee setbacks through its Emergency Watershed Protection Program - Floodplain Easements and Wetland Reserve Easement programs by early collaboration with USACE on identifying potential setback locations, ranking and prioritizing levee setbacks, as well as incorporating flexibility in easement administrative actions and easement approval processes.
- Recommend additional project efficiencies through inter-agency processes, such as establishing cooperative agreements between federal agencies, supporting levee sponsor real estate requirements, and developing and maintaining regional memorandums of understanding between the USACE and NRCS for implementing the emergency provision for joint interest in the same project location.
- Recommend incentives in the form of increased funding for federal and state participation in levee setback projects, as well as crop insurance premium discounts and discounted lending rates for participating landowners to increase and support participation in future setback projects.



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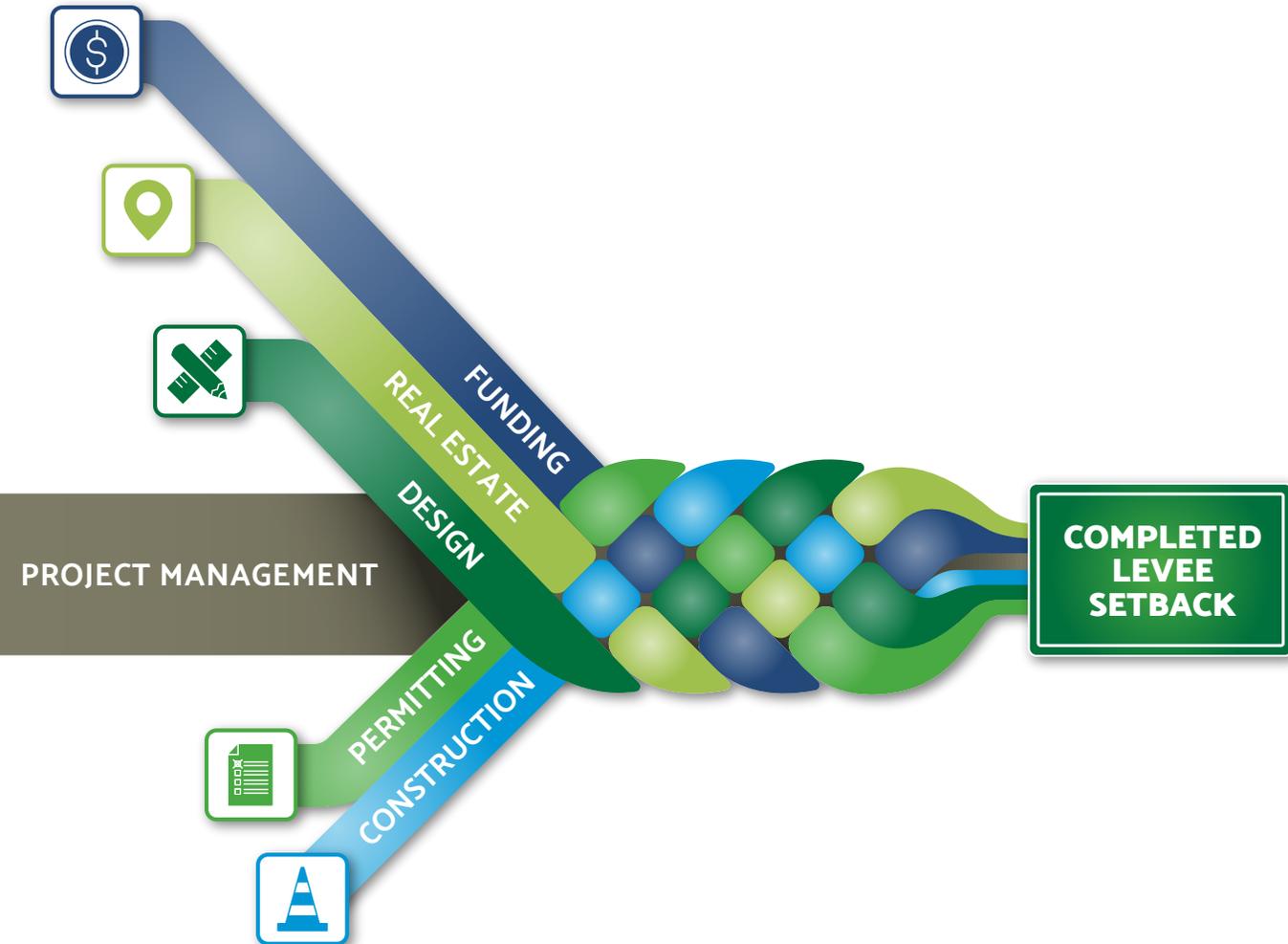
## KEY TAKEAWAYS

### Section 4: The How-To Guide

- The how-to guide provided in this section is based on the L-536 experience, documenting the actions taken and providing tips and best practices for those pursuing similar efforts.
- There is tremendous value in pre-disaster planning because any activities that can be done pre-disaster enhance coordination efforts, save time when time is of the essence post-disaster, and may facilitate securing critical funding resources.



- Post-disaster recovery efforts are not a linear, step-by-step process; rather, things happen simultaneously and seemingly out of order as compared to a traditional USACE civil works project.
- A large-scale levee setback is a complex effort, but it is achievable when project partners work together to pursue a shared goal.





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