



RECONNECTING THE MISSISSIPPI RIVER FLOODPLAIN

A CASE STUDY OF THE L-550 LEVEE

SUMMARY

The services that nature provides—filtering water, providing food, cycling nutrients, and more—provide a lot of value. This value is not usually quantified financially, but by estimating the economic value of ecosystem services, we can more accurately compare options for managing infrastructure that intersects with nature.

Restoring the floodplain of the Mississippi River Basin can help reduce flooding impacts, add natural habitat, improve water quality, provide recreation space, and so much more.

In a project funded by the Walton Family Foundation, the Institute for Resilient Infrastructure Systems at the University of Georgia (UGA IRIS) carried out a “valuation” of the costs and benefits of a potential floodplain reconnection via a 1000 meter **levee setback** of the L-550 levee along the Missouri River near Brownville, Nebraska. This setback would restore over seven thousand acres of floodplain around the Missouri River.

According to our estimates, this floodplain reconnection has the potential to provide benefits worth millions of dollars: \$3 million annual flood damages averted, between \$6 and 11.5 million in benefits from restored ecosystem services, and **over \$360 million total benefits** over 50 years.

WHAT IS A LEVEE SETBACK?

A levee setback is a floodplain reconnection strategy where a levee, a human-made embankment, is moved further away from the water’s edge. This extra space between the levee and the river or coastline provides area for floodwaters to spread out instead of pushing up against the levee.

When levees are too close to a riverbank, it can exacerbate flooding risks by forcing water to concentrate and potentially overwhelm the levee. The increased floodplain space not only provides improved flood protection, but can enhance water quality, improve habitat for fish and wildlife near the river, and reduce maintenance stress for the levee itself.

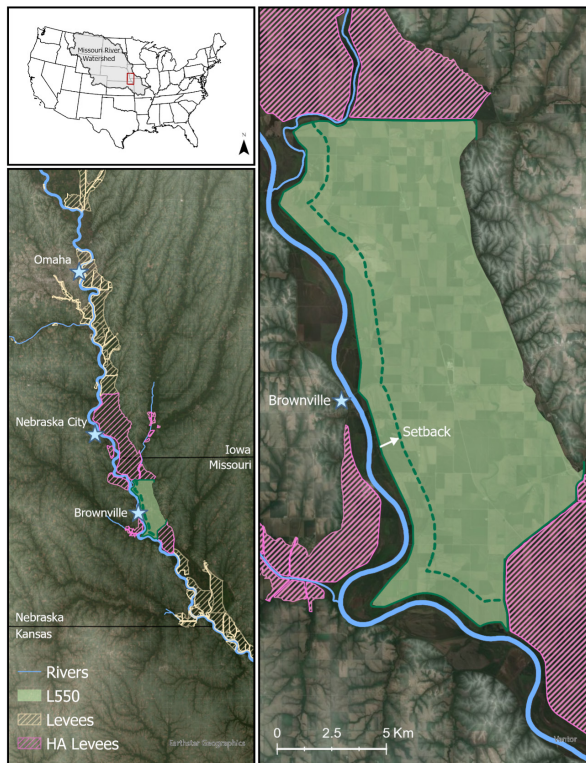


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OUR ASSESSMENT



About the L-550 Setback

Our study evaluated multiple setback options, with distances ranging from 250 to 2000 meters. We calculated the flood risk for a range of rainfall events, and compared the damages they would be likely to experience with the existing levee and with each setback distance.

The levee encompasses ~40,000 acres of floodplain. The setback distances we evaluated would restore between 5–35% of this area, with our 1000-meter recommendation restoring about 19%.

Appraising for Ecosystem Services

We utilized the benefit transfer method to estimate the economic value of ecosystem services, a well-established method for this type of evaluation. It's similar to a housing appraisal: the value of a property, or a piece of wetland, is estimated based on the similar properties in the area.

We used key ecosystem indicators as well as demographic and economic data to estimate the value of the restored wetland area. The total benefits of the restoration across 50 years include approximately:

<i>Averted damages</i>	\$268.9 million
<i>Habitat and biodiversity</i>	\$15.1 million
<i>Tourism and recreation</i>	\$11.1 million
<i>Carbon storage</i>	\$43.2 million
<i>Water quality improvement</i>	\$31.1 million
Total 50-year benefit value	= \$369.4 million
<i>Benefit-cost ratio (benefit value divided by cost)</i> 2.6 – 3.2	

Every \$1 spent on floodplain reconnection results in a return of over \$3 in benefits.



Learn more about our work at www.iris.uga.edu.



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