

Algorithm finds that thousands of artificial levees are missing from US database

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Levees are constructed to protect riverside towns from flooding, but they can also prevent natural processes important to river health. Credit: Infrogmaton of New Orleans/Wikimedia, CC BY-SA 2.0

Over the past 300 years, humans have dramatically altered rivers through mining, draining, dredging, levee construction, and other activities. Artificial levees, for instance, provide a barrier between rivers and their floodplains to prevent flooding, but can stand in the way of important

natural processes.

To better understand how artificial levees affect modern rivers in the United States, it is important to have a reliable, updated database of levee locations. However, the existing National Levee Database developed in 2006 by the U.S. Army Corps of Engineers fails to capture many of the nation's smaller structures. In a new study, Knox et al used machine learning to detect the artificial levees that are missing from the database.

To create their [algorithm](#), the team tried out several different machine learning models and variables taken from the National Elevation Dataset, National Land Cover database, and National Hydrography Dataset. After several trials, they developed an algorithm that was 97% accurate at detecting artificial levees.

They found 113,222 miles (182,213 kilometers) of potential levees, or areas that may be artificial levees but are not identified by the database, across the 100-year floodplains of the United States are not included in the current database. This finding suggests that the existing [database](#) contains just one fifth of the country's actual total [levee](#) count, and most of these areas were located in the upper and lower Mississippi and Missouri basins.

In their study published in *Water Resources Research*, the researchers conclude that with the addition of the levees found by the new model, 2% of the country's [rivers](#) are modified by levees, though larger streams are modified up to 35% of their length. Such extensive modifications could have implications for the health of these river ecosystems.

More information: R. L. Knox et al, Identification of Artificial Levees in the Contiguous United States, *Water Resources Research* (2022). [DOI: 10.1029/2021WR031308](https://doi.org/10.1029/2021WR031308)

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