

Study reveals human destruction of global floodplains

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A University of Texas at Arlington hydrologist's study in the Nature journal *Scientific Data* provides the first-ever global estimate of human destruction of natural floodplains. The study can help guide future

development in a way that can restore and conserve vital floodplain habitats that are critical to wildlife, water quality and reducing flood risk for people.

UT Arlington's Adnan Rajib led the [study](#) "Human Alterations of the Global Floodplains," with key contributions from doctoral student Qianjin Zheng, in collaboration with EPA scientists, Texas A&M University-Kingsville, and The Nature Conservancy

"The bottom line is that the world is at greater [flood risk](#) than what we realized, especially considering what effect [human development](#) has had on floodplains," Rajib said. "In 27 years, between 1992 and 2019, the world has lost a dramatic 600,000 square kilometers of floodplains due to human disturbances, which include infrastructure development, industry and business construction and expansion of agriculture."

The team used satellite remote sensing data and geospatial analytics in studying 520 major river basins of the world, discovering previously unknown spatial patterns and trends of human floodplain alterations.

"Mapping the world's floodplains is relatively new. While there is increasing awareness to map floodplains accurately and understand flood risks, an attempt to map human disturbances in those floodplains at a global scale never existed," said Rajib, who also is the director of the UT Arlington Hydrology and Hydroinformatics Innovation Lab. "It's been done in smaller regions around the world and certainly in the United States and Europe, but not in data-poor regions of the world."

The study concludes that wetland habitats are in danger and that one-third of the total global loss of floodplain wetlands occurred in North America. Rajib said the magnitude of risk for floodplains is much larger than what was previously understood. He and the team examined satellite pictures of those floodplain areas taken over the past 27 years.

"We wanted to look at floodplains at the neighborhood level," Zheng said. "We wanted to see the impact of development on someone who lives adjacent to or near a floodplain. Some of the changes in these pictures are good, like when trees are planted or parks are built. But many of the pictures reveal disturbing outcomes. For instance, we saw a dramatic increase in the development of parking lots or the construction of buildings without adequate stormwater runoff allowances."

Kris Johnson of The Nature Conservancy, a co-author on the paper, said that "worldwide, floodplains are [biodiversity hotspots](#) that also provide a wide range of ecosystem services for people. We hope this study sheds light on this critical habitat we're losing as well as ways in which we can reverse the trend."

Melanie Sattler, chair and professor of the Department of Civil Engineering, said this study should give planners a vital tool to reduce flood risks for people.

"Rajib's work can be our lens to help guide future development in order to decrease susceptibility to floods in a changing climate," Sattler said. "And, in some cases, we hope this study can help us correct mistakes we've made through past development decisions."

More information: Adnan Rajib et al, Human alterations of the global floodplains 1992–2019, *Scientific Data* (2023). [DOI: 10.1038/s41597-023-02382-x](#)

Provided by University of Texas at Arlington

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