

Study finds that proactive home buyouts provide financial benefits, reduce flood damage, and protect homeowners

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Damages from flooding cost hundreds of millions of dollars annually.

Compounded by a changing climate, by 2080 the frequency of these major events is expected to increase by 20 times.

A case study of the record-breaking and devastating flooding of Middle Tennessee in May 2010 and an evaluation of Nashville's existing home buyout [program](#), led by research associate professor of civil and environmental engineering Janey Camp, has found that the program—in which residential properties are purchased for fair market value and removed from risk while reducing areas that worsen flooding—currently presents a localized benefit to cost ratio of approximately 3 to 1. That means that an estimated \$1 in flood mitigation costs would lead to \$3 in benefits for the city.

The findings were published online in the journal *Anthropocene* on May 23.

Nashville's home buyout program was first initiated by Nashville Metro Water Services (MWS) in 1977. The program focuses on identifying and purchasing properties that experience substantial and costly damage from repetitive flooding. Historically the program kicks into high gear following a major flooding event like the one the city experienced in 2010 rather than as a mitigating process. Buyouts are an international practice, and in Nashville, they are often funded by a combination of federal, state, and local dollars. The Federal Emergency Management Agency's Hazard Mitigation Grant Program (HMGP) covers 75% of the buyout cost and the remaining 25% is split by the state and local government. In a few cases, MWS has fully funded the buyout of some homes.

From 1977—2009, MWS spent \$9.6 million to buy 56 properties. From 2010—2016, MWS spent \$34.2 million to buy 246 properties. The damages from the 2010 flood are estimated to total \$2.9 billion, including costs of relocating displaced residents and volunteer labor for

[cleanup efforts.](#)

Camp, along with former graduate student and current assistant professor of nature-society interactions at Kansas State University Kate Nelson, used the study to quantify the major impacts of proactive home buyouts in both increased monetary benefits and secondary and non-monetized benefits, often not included in calculations. Non-monetized benefits include avoided damage and stormwater management-related costs, creation of public green space to help with natural flood reduction and improve residents' quality of life, and protected populations.

The analysis of the 2010 data reveals that proactive home buyout programs, while not a comprehensive solution to flood mitigation efforts, are the most cost-effective mechanism for protecting land and the people who live on it. Had all identified, known at-risk properties been purchased before the 2010 flood, more than \$33 million in total flood damage-related [costs](#) would have been avoided. This scenario also would have protected 1,000 people from flooding, and 17 new acres of green space would have reduced stormwater by nearly 875,000 gallons.

"These results suggest that proactive implementation of buyout programs have the potential to make them even more cost-effective damage reduction mechanisms," commented Camp. "Often, disaster events serve as motivation for flood mitigation and adaptation activities, but it is quite interesting to think about the multiplier effect of how far local benefits like the ones created by proactive home buyouts can reach into the community."

Examination of the Nashville Metro Water Services (MWS) buyout program suggests that buyout programs do provide substantial benefits, but Camp is careful to mention that they are not a failsafe for protection against [flood](#) damage entirely. The calculations do not consider the more frequent and treacherous weather events that we are anticipated to

experience, or Nashville's steadily rising housing market. Complementary solutions recommended in the paper include development restrictions, the preservation of existing tree canopy, and green space that keeps people and property safe for the long-term.

More information: Katherine S. Nelson et al. Quantifying the Benefits of Home Buyouts for Mitigating Flood Damages, *Anthropocene* (2020). [DOI: 10.1016/j.ancene.2020.100246](https://doi.org/10.1016/j.ancene.2020.100246)

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