

ORNL-led team recognized for impactful sustainability research

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A 2017 study from ORNL that shows the far-reaching impacts of U.S. cities' energy consumption on regional ecosystems has received the 2021 Sustainability Science Award from the Ecological Society of America. Credit: ORNL, U.S. Dept. of Energy

An analysis published in the [Proceedings of the National Academy of Sciences](#) and led by researchers from the U.S. Department of Energy's Oak Ridge National Laboratory has received the [2021 Sustainability Science Award](#) from the Ecological Society of America.

The Sustainability Science Award recognizes the authors of a scholarly work that make a substantial contribution to the emerging science of ecosystem and regional sustainability through the integration of ecological and social sciences. The researchers will be recognized during the society's annual meeting in August.

"This work exemplifies how ORNL's interdisciplinary research in environmental and geospatial science helps equip decision makers with the tools needed to move our nation toward a more sustainable future," said Stan Wullschleger, associate laboratory director for ORNL's Biological and Environmental Systems Science Directorate.

The team used high-resolution geospatial modeling to quantify the effects of land, energy and water infrastructures on the nation's rivers and streams. Using streamflow data from the U.S. Geological Survey, the researchers mapped changes to natural hydrology to assess how infrastructure development and competition over water resources affects the

environment at a national scale. The results indicate that urban land transformation and electricity production together affect seven percent of U.S. streams, which influence habitats for more than 60% of all North American freshwater fish, mussel and crayfish species.

Lead author Ryan McManamay, an aquatic ecologist and faculty member at Baylor University, was with ORNL's Environmental Sciences Division at the time of publication. Co-authors include ORNL's Sujithkumar Surendran Nair, Christopher DeRolph, the late April Morton, Robert Stewart, Matthew Troia and Budhendra Bhaduri; Northern Arizona University's Benjamin Ruddell; and the University of Tennessee's Liem Tran and Hyun Kim.

"It was a privilege to work with this team that spanned across multiple disciplines and institutions," said Bhaduri, an ORNL Corporate Research Fellow and director of ORNL's Geospatial Science and Human Security Division. "Given the impacts of climate change, there has never been a more pressing opportunity to address environmental sustainability. It's a tremendous honor to make this scientific contribution and to be recognized for it."