

Continental-scale research project thinks big about water quality

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We drink it, we bathe in it and we play in it. Water is essential to our everyday lives, yet water quality in streams and lakes can be profoundly influenced by the organisms that live in these habitats.

Scientists at Kansas State University and seven other collaborating institutions were recently awarded \$3.3 million from the National Science Foundation to conduct a large scale study of how stream organisms influence water quality across North America.

Kansas State University's Walter Dodds, university distinguished professor, and Keith Gido, associate professor, both from the Division of Biology, have developed the experiment "Scale, Consumers and Lotic Ecosystem Rates: Centimeters to Continents" with Kansas State University as the lead institution.

It is a continental-scale experiment encompassing streams from five different biomes, with experimental scales ranging from a few centimeters to entire [watersheds](#). In addition to evaluating water quality, scientists plan to assess whether the small-scale experiments can provide an accurate depiction of how aquatic life influences [water quality](#) in larger-scale streams and rivers.

"Our research will test if results from small-scale experiments can be generalized to predict how the system works at a large scale," Gido said. "We've done a lot of work on these smaller experiments, so we want to test if they are relevant on a larger spatial scale."

Scientists often use data collected from small areas to create models for larger areas. By conducting this research, Dodds and Gido aim to refine this process to represent larger streams and rivers more accurately.

"Just like sampling from a diverse population is needed for an accurate depiction of a political poll, sampling of diverse habitats should provide an accurate evaluation of environmental health," Dodds said.

Since the sampling will be so widespread across the continent, the experiment should provide a good representation of the diverse aquatic systems in North America, according to Dodds and Gido.

"Not only will this experiment help us design future research experiments but it also will help us understand stream ecosystems on the continental scale," Gido said.

The group of scientists will use the data from small-scale experiments to create models that predict ecosystem responses at larger scales. The responses that they are looking for are the presence of aquatic consumers, organisms that prey on smaller organisms. Then the models will be checked for their accuracy using data from samples across entire ecosystems.

"Understanding the role of consumers across multiple spatial scales and among different biomes will be very valuable, because freshwater biodiversity in general and predators in particular are in decline globally," said John Kominoski, a collaborator on the project from the University of Georgia.

"What you hope is that you can figure out a way to do the small-scale sampling to truly capture what's going on with the large scale -- so you have to do sampling on the small scale," Dodds said. "Statistically, that's the way it works."

Provided by Kansas State University

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