USU scientist explores 'big picture' of hydrologic modeling for water resources management

Sarah Null is a 2017 NSF CAREER Award recipient

UTAH STATE UNIVERSITY

IMAGE: UTAH STATE UNIVERSITY SCIENTIST SARAH NULL IS A 2017 RECIPIENT OF A PRESTIGIOUS NATIONAL SCIENCE FOUNDATION FACULTY EARLY CAREER DEVELOPMENT 'CAREER' AWARD. THE NSF'S HIGHLY COMPETITIVE GRANT PROGRAM FOR JUNIOR... **view more ›**

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LOGAN, UTAH, USA - Like ripples emanating from a single drop, diversion of rivers, lakes and other waters yields broad and sometimes unexpected effects. Utah State University scientist Sarah Null stands ready to probe the broader impacts of dams, and removal of dams, on critical waterways of the American West. To highlight these changes and build public awareness, she'll employ science and art.

An assistant professor in USU's Department of Watershed Sciences and the USU Ecology Center, Null is a 2017 recipient of a prestigious Faculty Early Career Development 'CAREER' Award from the National Science Foundation. The NSF's highly competitive grant program for junior faculty, CAREER awards recognize demonstrated excellence in research, teaching and the integration of education and research. Null's award provides a five-year grant of $510,000.

"Most water resources models consider flow volume and timing, but I want to look further," says Null, who serves with the statewide iUTAH water project and USU's newly formed Climate Adaptation Science graduate program. "My research aim is to explore water management effects on ecosystems and ways to improve aquatic ecosystem representation in water resources models."

Using water resources systems analysis and physical geography, Null is developing mathematical models to explore processes and interactions of both built and natural water systems. Her research also includes field studies.

"With undergraduates and graduate students, our team will collect data on multiple aquatic habitat parameters, including temperature, dissolved oxygen, gradients and stream flow on the Intermountain West's Weber and Bear Rivers," she says. "We'll develop mathematical models to estimate processes and interactions of human and environmental water resources objectives and test them with field data."

Such analysis, she says, will enable her team to quantify water supply, hydropower and aquatic habitat trade-offs to support water resource decision-making.

"Further, we can use models to predict climate change effects on hydrology, water quality and aquatic habitat," Null says. "Such information helps us identify promising adaptation and management strategies that are robust to change."

Her team's models will be applicable to other water systems around the world.

To share her findings with the public, Null is enlisting help from USU colleague Carsten Meier, assistant professor in USU's Department of Art + Design. A photographer and collaborator with Null and others on the 2016 book, Dam, Meier will prepare imagery using visible, thermal infrared drone LiDAR topography data collected on rivers by the research team.

"My students and I will write scientific interpretations of the images for a museum exhibition Carsten is creating," Null says. "The images are colorful, dramatic and invoke curious responses. We're excited to engage the public with our findings."

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