

Regional

Climate, humans pose consequences for water

The world's water supply has become a huge issue of late from environmental, economic and political viewpoints. Professors from universities around the world study this growing concern, including Southern Illinois University Edwardsville's own Adriana Martínez.

A native of Eagle Pass, Texas, she obtained her bachelor's degree in environmental geosciences at Texas A&M University, her master's degree in geography also from Texas A&M and her doctorate in geography from the University of Oregon. Today she is an assistant professor in the department of geography at SIUE. For Martínez, becoming a college professor was a natural extension of a long family tradition.

"My parents both work at elementary schools and they have all my life," she said. "My sister now works at a junior high school. My dad's entire family works for the school district. So teaching was always something that was really important. Education was always important. They always had the goal for us to go to college, which isn't typical in the community that I grew up in. I got through my undergraduate degree and decided to do my master's and became interested in teaching at the college level." Her eventual interest in studying water began with a fascination with landscapes.

"I was really interested in landscapes and how landforms are formed," Martínez said. "I initially became interested in landforms. Then I took a coastal geomorphology class, thinking about how water moves over sand and what kinds of features it creates, how wind moves over sand and what kind of features that creates, and I got really interested." Then she started to look further into other issues involving water and the environment.

"I began to think about how river water moves over its own landscapes and the features it creates there," she said. "There was a professor at A&M already working in that specialty and I kind of latched onto her in thinking about how rivers form different features." But landforms are not the only thing shaped by water – cultures are as well.

"I grew up on the Rio Grande and it's the



Photo by Isolde Belien

Dr. Adroama Martínez.

border between Mexico and the U.S., but it's not a very rigid border," she explained. "We have a very interesting relationship with our sister city, Piedras Negras in Mexico. Even in high school I did projects on the river. We went out and did water quality sampling. We looked at the amount of water that the river has, how much do we use per year and how much are we expected to use with the expected population growth."

A major modification that humans have made on water is the building of dams,

from the very small to behemoths. It is not hard to imagine that with these dams come huge and multiple ecological changes.

"First, there is the hydrologic effect," explained Martínez. "You're changing the timing of floods when you build a dam. You're holding back that water and then you regulate when you want that water to be released or when you don't want it to be released. Typically in areas of agriculture they will hold the water back during the non-growing season then release it during

the growing season." Another effect is the increase of sediments, which produces less water flowing in the downstream part of the river. And less water means there is less power to move sediment.

"Any sediment that is left in the river is typically going to stick around and not be flushed down like it normally is if there wasn't a dam in that area," she said. "And then ecologically we are really changing the habitat. Vegetation can begin encroaching on the sides of those channels. Habitats

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for birds can change because previously before a dam was put in, water was causing islands to be formed in the middle of rivers. But as soon as we decrease that water the islands become connected to the sides of the channel. Birds that previously used to nest on these islands are impacted by predators that have access to these islands so it changes their nesting patterns and resting habits."

Another big environmental issue that affects water regimes is climate change. Just a few weeks ago the results of a poll were released showing that for the first time the majority of people in politically conservative states believe that climate change is real. So, what can we expect will happen to our rivers due to climate change?

"The biggest thing, which was particularly important in Oregon when I was there, was the change in snowfall," Martínez said. "With increasing temperatures we are going to have less snowfall and more rain. That means that the precipitation is no longer going to be stored as snow on the banks of rivers or in watersheds. It is now going to make its way straight into the river much more quickly than if it stuck around and melted over time." The conclusion, according to Martínez, is obvious. Larger floods will occur almost immediately after precipitation, and water will not be available at other times when needed.

"It can have a significant impact on when we're going to need that water for human consumption and for when fish are going to need it," she said. "Certain species are very picky about what temperature they want their habitat to be – especially salmon – so that will be another big issue."

Aldemaro Romero Jr. is the Dean of the College of Arts and Sciences at Southern Illinois University Edwardsville. His show, "Segue," can be heard every Sunday morning at 9 a.m. on WSIE, 88.7 FM. He can be reached at College_Arts_Sciences@siue.edu.