

The ecosystem engineer: Research looks at beavers' role in river restoration

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When engineers restore rivers, one Kansas State University professor hopes they'll keep a smaller engineer in mind: the North American beaver.

Beavers are often called ecosystem engineers because they can radically alter stream or valley bottom [ecosystems](#), said Melinda Daniels, an associate professor of geography who recently studied the connection between beavers and river restoration. Beaver dams create diverse river landscapes, she said, and can turn a single-thread channel stream into a meadow, pond or multichannel, free-flowing stream.

"Our argument is that the restoration target for streams with forested riparian zones has got to acknowledge the diversity brought to river systems by active beaver populations," Daniels said.

Daniels and three researchers from the University of Connecticut co-authored "The River Discontinuum: Applying Beaver Modifications to Baseline Conditions for Restoration of Forested Headwaters." The article, led by Denise Burchsted at the University of Connecticut, appears in a recent issue of *BioScience*, the journal of the American Institute of Biological Sciences.

While the research involves observations of several watersheds in northeastern Connecticut, the results are applicable to any forested stream, which typically have large beaver populations. Beaver populations have rebounded in recent years, Daniels said, after coming

close to extinction in the early 19th century by hunters for their fur.

The ultimate goal of the research, Daniels said, is to help restore [rivers](#) in an efficient way that acknowledges ecosystem diversity and doesn't destroy it.

"A lot of rivers are in trouble and need work and restoration, but it's amazing how little we know about the systems we're trying to fix," she said. "We know they're broken, but we don't exactly know what they should look like because we know so little about how many of our river systems function."

Current restoration projects often don't consider the role of beavers as ecosystem engineers, and instead focus on creating continuous free-flowing streams, Daniels said. Such restoration can be expensive because it usually involves completely tearing down small 19th-century milldams and re-engineering an entire valley bottom.

Rather than tear down the whole milldam and radically change the surrounding ecosystem, the researchers recommend river restorers only remove part of it. This allows some ponded water to remain and mimics the role of beavers. Daniels said that in many cases if an old dam breaks and forms a gap, [beavers](#) may build their own dam to patch the gap and recreate the ecosystem that previously existed.

The researchers plan to continue river observations and collect more data to provide river restorers with insight for maintaining river ecosystem diversity.

"You can use these natural analogs to produce an ecosystem that looks a lot more like the one that was there before the colonists arrived," Daniels said. "We can restore rivers in a way that mimics the naturally diverse beaver streams, and we can save a lot of money in the process."

Provided by Kansas State University

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