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The Gravity of Water

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Fort Dodge
Thomas Agran

THE GRAVITY OF WATER

I grew up in northern Indiana, among wetlands and small glacial lakes.

I came to Kansas for the first time in late 2008 to interview for a graduate position at Kansas State University. I arrived at Konza Prairie late on a mid-November evening. A room had been reserved for me in the Hulbert Center, a sturdy rectangular limestone ranch house with dark stained-wood floors and trim. The air was crisp and filled with the smell of autumn, that earthy, organic scent of plants preparing for dormancy.

The sky was clear, and the gentle hills were still visible in the dusk, and when I looked up, I saw too many stars — more than I had ever witnessed further east where light pollution runs rampant. I had never experienced the prairie or plains before. I knew from the moment I stepped into the tall grasses surrounding small, intermittent streams that this was the place I belonged.

I embarked on my journey to explore and understand water in a more intentional way almost 20 years ago, though I knew at the age of eight I wanted to be an aquatic scientist. I spent most every day with my bare feet in the lake, netting fish and snails and, to my mother's horror, sometimes snakes. These Kansas streams, flashy and meandering, are the veins running through the prairie. I have read many books, conducted studies of my own, spoken to countless individuals with impressive knowledge, and while I know more now than I did then, I often feel like I won't ever know enough.

The prairie is humbling. I can't help but notice the myriad connections. Each element contributes to the delicate balance of our world. The importance of the riparian area as a transition

between land and water; the tiny fish that must swim hundreds of kilometers to spawn; the intermittent headwater stream that feeds important nutrients into a mighty river. We know that all our land, water, organisms, habitats, choices and activities directly (and indirectly) affect our world. I find it breathtaking but frustrating, as I am unable to know or understand it all, an effective argument for interdisciplinary collaboration to address complex and complicated problems.

I lived briefly in a tiny one-room cabin near Tuttle Reservoir. On the rare day that the winds were still and the water like glass, the reservoir reflected the vast expanse of prairie sky. The absence of trees allowed me to better appreciate sunrises and sunsets. Lakes in the Great Plains, especially in Kansas, exist as man-made reservoirs for flood control. Now, they are also vital for recreation and for sustaining aquatic life. They serve as refuge for waterfowl, a critical component of the migratory patterns that crisscross the Midwest.

The number of lakes across the state has increased drastically over time. There are few, if any, studies addressing how this change from free-flowing streams to standing bodies of water might impact the species and community assemblages, though I would imagine the answer is “substantially.”

The Great Plains have undergone consequential changes associated with climate and human activity patterns. The lakes and rivers and reservoirs that traverse the state tell a story of adaptation and resilience, though the growing list of threatened and endangered species reminds me that when we look out into the expanse, we see only the winners of this ecological war that has been waged for tens of thousands of years.

To view the massive change that we know has taken place on our planet in a timeframe humanity could truly grasp would be revelatory. If I were to describe the Kansas River I see today, perhaps from the Kansas Highway 177 bridge just outside of Manhattan where I can seine up a shovelnose sturgeon every time without fail, I would look down at this powerful river with its dynamic eddies and sand or gravel bars, and describe its waters as a murky, silty mud-brown, the exact shade depending on recent precipitation.

Snorkeling in these shallow waters, I can see the flashy shiners and topminnows, or the mosquitofish along the margins, or the catfishes and centrarchids congregating in slow areas surrounded by logs, even though visibility is low — typically less than a foot.

Intensive agricultural production and cattle grazing have altered the Flint Hills landscape, and the rivers have responded



Kansas Tidal
Thomas Agran

in kind. We see the evidence today that replacing American bison with cattle increases river sedimentation. We see that dams impact water quality and clarity and fish movement, that land use affects stream habitat and organisms. We see that whatever happens in those tiny headwaters can merge into large rivers and potentially exacerbate already chronic issues. Historical records and anecdotal evidence suggest the visibility of Great Plains rivers has varied over time.

Rivers like the Poplar, Yellowstone, Arkansas, Canadian, Washita, upper Canadian and Missouri were described by explorers and travelers in the 1800s as transparent, turbid, red and muddy, muddy red or impregnated with earth. But even these accounts are recent in terms of human interaction within the environment.

While scientific study methods help us understand what our waters looked like before there was more consistent documentation or photography, most of these studies focus on the sediment properties and biota instead of attempting to describe the water itself to quantify and depict it in such a way that one can

visualize it: the clarity, sinuosity, power and color. Most ancient environment studies have been conducted in lakes or reservoirs, and I am unaware of any studies using present-day information to explain water clarity in Kansas stream waters.

The tallgrass prairie stretches far and water weaves through it in a flowing tapestry of life. The Flint Hills region, known for its undulating terrain and dynamic ecosystem, plays a crucial role in shaping the landscape and supporting the rich biodiversity of the area. The health of these waters reflects not only the ecological vitality of the region but also the collective responsibility of its inhabitants to be stewards of this remarkable landscape. Our waters are a reflection of ourselves and now is the time for dedicated restoration; if we wait for certainty, we will wait forever.

As I reflect on my journey through the Flint Hills, I am left with a deep appreciation for the intricate web of life woven by water — a force that shapes the past, present and future of this unique and irreplaceable ecosystem.

Erika Martin is a mother and an associate professor at Emporia State University. She holds a bachelor's degree in aquatic biology, a master's degree in physics, and a doctorate in biology. Her expertise is in aquatic ecology, biostatistics and biology education. She is the expert science correspondent for the podcast "Fish Nerds" and editor for the peer-reviewed journal "Transactions of the Kansas Academy of Science."



Great Bend
Thomas Agran