

Isolated wetlands have significant impact on water quality

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Geographically isolated wetlands play an outsized role in providing clean water and other environmental benefits even though they may lack the regulatory protections of other wetlands, according to an article by Indiana University researchers and colleagues.

Given those benefits, the authors argue, decision-makers should assume that isolated wetlands are critical for protecting aquatic systems, and the burden of proof should be on those who argue on a case-by-case basis that individual wetlands need not be protected.

"Geographically isolated wetlands provide important benefits such as sediment and carbon retention, nutrient transformation and [water-quality](#) improvement, all of which are critical for maintaining water quality," said lead author John M. Marton, assistant scientist at the IU Bloomington School of Public and Environmental Affairs. "We demonstrate that continued loss of these wetlands would likely cause serious harm to North American waters."

The article, "Geographically Isolated Wetlands Are Important Biogeochemical Reactors on the Landscape," will appear in *BioScience*, the journal of the American Institute of Biological Sciences, and is available online. Co-authors include Christopher B. Craft, the Janet Duey Professor in Rural Land Development with SPEA at IU Bloomington, along with researchers from the U.S. Environmental Protection Agency, the University of Western Ontario, the University of Waterloo, the University of Florida and the University of South Florida.

Geographically isolated wetlands are formed by natural forces that create depressions in the landscape, resulting in conditions suitable for wetland plants and soils. They include the prairie potholes of the upper Midwest, the playas of the Southwest, vernal pools in New England and California, and the Carolina Bays.

Citing research literature, the authors say geographically isolated wetlands are highly effective "biogeochemical reactors" that improve water quality. They often retain water longer than protected waters, such as streams and wetlands that are directly connected to navigable water. And they have a higher ratio of perimeter to area, allowing more opportunities for reactions to take place.

While scientists are only starting to map the extent of isolated wetlands, it is estimated that the U.S. has lost approximately half of those that were present before European settlement. And losses have been especially heavy in some regions.

The authors estimate that the loss of wetlands in the prairie pothole region of the U.S. and Canada has resulted in an increase of 5 million to 150 million tons per year of sediment entering surface waters. The loss decreased the carbon sequestered by the [wetlands](#) by about 1 million to 14 million tons per year, they estimate.

Their calculations, they write, "reveal that even rudimentary estimates of lost potential for water-quality protection are huge."

Provided by Indiana University

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