

# Suburban ponds are a septic buffet

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A new study shows that human waste accounts for a high percentage of nutrients consumed by some animals and plants in suburban ponds.

Researchers at Yale University and Portland State University found that residential, suburban land use is altering the dynamics of the food chain, as well as where nutrients originate and how they move through pond ecosystems.

The findings appear in the *Canadian Journal of Fisheries and Aquatic Sciences*. They build upon an extensive body of Yale research into the effects of fertilizers, lawn treatments, and human populations on suburban ponds.

"It suggests that tadpoles and other [pond](#) organisms are made up of human waste," said Meredith Holgerson, a research fellow at Portland State who conducted the research at 18 Connecticut ponds when she was a Yale Ph.D. student.

The researchers looked at the nitrogen stable isotope composition of different members of the [food web](#) at suburban ponds. They found that most parts of the food web got their nitrogen from septic wastewater when ponds were surrounded by more suburban neighborhoods.

Wood frog tadpoles, for example, received as much as 70% of their nitrogen from septic wastewater in some cases. The researchers also found that wood frog tadpoles shifted their diet from mainly fallen leaves in forested ponds to mainly algae in suburban ponds, indicating a transformed food web.

"A lot of these changes would go unnoticed if you were simply measuring nutrient concentrations or species diversity in the ponds," Holgerson said. "These changes indicate fundamental ecosystem differences."

The senior author of the paper is David Skelly, the Frank R. Oastler Professor of Ecology at Yale and

director of the Yale Peabody Museum of Natural History. Co-authors of the paper are Yale graduate student Max Lambert and Yale research scientist and lecturer Kealoha Freidenburg.

"These effects are all the more remarkable because these are wetlands that appear outwardly to be in good shape," Skelly said. "This study shows that cryptic, transformative effects on wetlands may be a widespread byproduct of residential development."

Co-author Lambert noted that residential land use is often considered more innocuous than land use in cities or agricultural areas. "Our study highlights that, by choosing to live in and landscape particular places, human neighborhoods are creating fundamentally unique ecosystems by changing how water and food move around, and even what kind of [food](#) is available. Suburban animals behave, look, and function differently because of this," he said.

Provided by Yale University

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