Efforts to mitigate the potentially harmful effects of fracking have traditionally been divided along two fronts—those that primarily focus on protecting the environment and wildlife, and those that focus on protecting humans and domestic animals.

But it doesn't have to be that way. In a March 30 commentary in *Bioscience*, a trio of public health experts, ecologists and environmental scientists urge adoption of a more holistic approach when evaluating the impact of unconventional gas and oil production operations such as fracking. They also lay out a framework for future transdisciplinary collaboration and integrated decision-making, which they say will lead to more just and comprehensive solutions that protect people, animals and the environment.

"Researchers and policymakers tend to focus on only one domain, when they really are interconnected," said Nicole Deziel, Ph.D., the paper's lead author and an associate professor of epidemiology (environmental health sciences), environment and chemical and environmental engineering at Yale University. "This paper provides strategies to promote approaching oil and gas extraction industries and their impacts in a more holistic, interdisciplinary way."

Joining Deziel on the paper are Liba Pejchar, Ph.D., a professor in the Department of Fish, Wildlife and Conservation Biology at Colorado State University and the study's senior author; and Bhavna Shamasunder, Ph.D., associate professor, chair of the Department of Urban and Environmental Policy and co-chair of the Department of Public Health at Occidental College.

The interdisciplinary collaboration on the paper, entitled “Synergies and trade-offs in reducing impacts of unconventional oil and gas development on wildlife and human health,” came about during a workshop on the community impacts of oil and gas development that Deziel attended several years ago. She was fascinated by Pejchar's and Shamasunder's presentations and discussed the crossovers in their perspectives during a long bus ride to a fracking well pad. That impromptu interaction, Deziel said, highlights the value of conferences that include representatives of different disciplines, one of the paper's recommendations.

Hydraulic fracturing, more commonly known as fracking, is a method for extracting gas and oil from shale rock. The process involves injecting water, sand and chemicals into bedrock at high pressure, which allows gas and oil to flow into a well and then be collected for market.

Used extensively in the U.S., fracking has led to heightened concerns about its impact on the environment and human health. The process
creates vast amounts of wastewater, emits greenhouse gases such as methane, releases toxic air pollutants and generates noise. Studies have shown these gas and oil operations can lead to loss of animal and plant habitats, species decline, migratory disruptions and land degradation. They have also been associated with human health risks. Studies have reported associations between residential proximity to these operations and increased adverse pregnancy outcomes, cancer incidence, hospitalizations and asthma. Some fracking-related operations have been located near lower-resourced communities, worsening their cumulative burden of environmental and social injustices.

In their paper, the authors describe how past protection measures, however well-intended, have sometimes favored one interest (the environment and wildlife for instance) at the expense of another (humans and domestic animals) and vice versa. Deziel used setbacks and buffers as an example. Setbacks aim to protect human health by prohibiting gas and oil drilling within a certain distance of homes, schools and other community domains. However, this approach may encroach on animal habitats, shifting the threat from humans to animals and the natural world. Buffers are similarly implemented, but with a goal of protecting wildlife and sensitive environmental areas. In contrast, limiting drilling altogether would be protective of both people and animals.

"The solutions are not being addressed in an integrative way," said Deziel, whose primary appointment is with the Yale School of Public Health. "It's important to protect vulnerable human populations as we're making solutions, and we should also be mindful of the impacts to the ecosystem and the ecological world for their own intrinsic value."

The authors recommend scientists and practitioners take a more integrated approach that spans both public health and conservation interests and focuses more on regions and populations that are underrepresented, historically marginalized or poorly understood. They cite One Health initiatives as an example of how a wide range of collaborations can work. One Health is a collaborative, multisectoral and transdisciplinary concept that has been primarily applied to address infectious diseases and optimize human health outcomes while recognizing the interconnection among people, animals, plants and their shared environment.

Deziel said she hopes the paper—and its recommendations—will inspire future collaborations across the fields of ecology, social science and public health, and encourage more inclusive decision-making that includes input from people and organizations directly affected.


Provided by Yale School of Public Health