

Watershed groups have a positive impact on local water quality, study finds

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Alsea River in the Oregon Coast Range. Credit: Sarah Beldin, USGS

Economists have found that in the United States, watershed groups have

had a positive impact on their local water quality.

The study is published in the journal *Proceedings of the National Academy of Sciences*. This is the first empirical evidence that nonprofit organizations can provide public goods, said Christian Langpap, an Oregon State University economist and study co-author with Laura Grant, an assistant professor of economics at Claremont McKenna College.

In economics, a public good is a commodity or service that individuals cannot be effectively excluded from using, and where use by one individual does not reduce availability to others. For these reasons, public goods can't be provided for profit and nonprofits can play an important role.

"Environmental nonprofit groups are assumed to provide public goods," said Langpap, an associate professor in OSU's College of Agricultural Sciences. "But until now that assumption has never been tested empirically. We determined that the presence of water groups in a [watershed](#) resulted in improved [water quality](#) and higher proportions of swimmable and fishable water bodies."

The presence and activity of watershed groups can impact water quality in various ways, including oversight and monitoring, direct actions such as organizing volunteers for cleanups or restoration, and indirect actions like advocacy and education.

The researchers' analysis combined data on water quality and watershed groups for 2,150 watersheds in the continental United States from 1996 to 2008. The number of watershed groups across the lower 48 tripled during this period, from 500 to 1,500.

Grant and Langpap constructed a model that considered dissolved

[oxygen](#) deficiency as the measurement of water quality. Dissolved oxygen deficiency is the most common and overarching measure of water quality because dissolved oxygen is critical for many forms of aquatic life that use oxygen in respiration, including fish, invertebrates, bacteria and plants. It was also the water quality measure that had the most data available during the study period.

The researchers used three measures of group activity in a watershed in a given year: total number of active groups, total donations to all groups in the watershed and total expenditures by groups in the watershed.

The model produced some significant results. For example, a nonprofit in a watershed was associated with reduced dissolved oxygen deficiency relative to a watershed in which there were no groups.

Additionally, a \$100,000 increase in total donations to nonprofits in a watershed, equivalent to a 10 percent increase to the average, also was associated with reduced dissolved [oxygen deficiency](#). And a \$100,000 increase in nonprofit expenditures, a 7 percent increase, was also associated with improved water quality.

They controlled for additional factors that impact water quality at the watershed level: violations of the U.S. Clean Water Act, spending via federal water [quality](#) programs, land use, precipitation, election outcomes, population density, per capita income, educational attainment, ethnicity, home ownership and unemployment.

"This is a unique data set that allowed this question to be answered empirically," Langpap said. "We painstakingly gathered this list of watershed groups. Once we had their location, we could match them to their watershed. Using their tax records, we knew how much they received in donations and how much they spent."

More information: Laura Grant et al. Private provision of public goods by environmental groups, *Proceedings of the National Academy of Sciences* (2018). [DOI: 10.1073/pnas.1805336115](https://doi.org/10.1073/pnas.1805336115)

Provided by Oregon State University

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