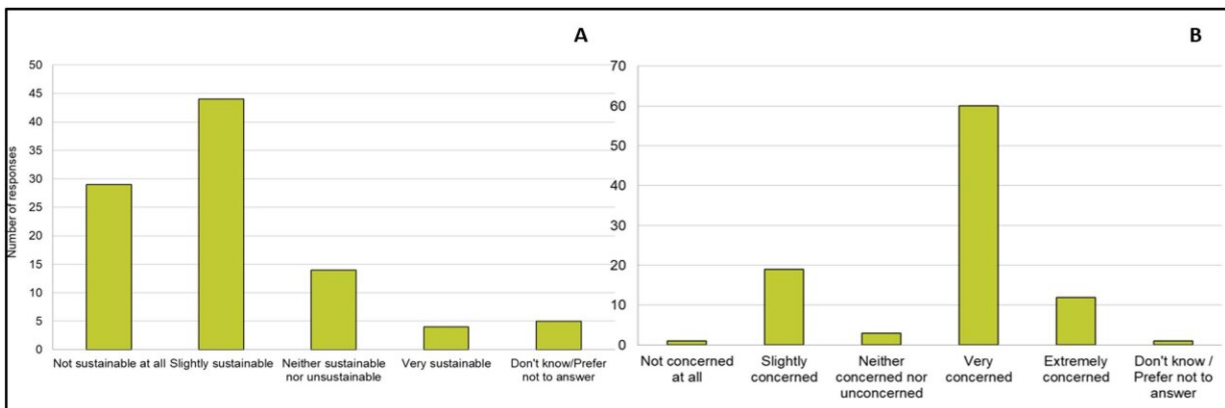


Is our phosphorus use sustainable? Most stakeholders doubt it

July 5 2023, by Matt Shipman



Stakeholder participant views of P sustainability (A) and perceived level of concern (B). Responses to A “How sustainable are current phosphorus management systems?” and B “How concerned or unconcerned are you about the current ability to manage phosphorus sustainably?”. Credit: *Environment Systems and Decisions* (2023). DOI: 10.1007/s10669-023-09917-y

A new study finds that most phosphorus stakeholders—representing a wide swath of industry, agriculture, environmental and policy interests—have significant doubts about the long-term sustainability of existing phosphorus management systems. The study underscores the complex challenges facing policymakers and other decision-makers as they attempt to ensure our continued access to a critical resource that is finite and largely non-renewable.

Phosphorus is a naturally occurring element which is used in a wide variety of industrial sectors.

For example, [phosphorus](#) is a key ingredient in agricultural fertilizers, contributing to food production on a global scale. However, [phosphorus runoff](#) also contributes to major water quality issues, such as the formation of oxygen-free "dead zones."

"From an industry standpoint, the fertilizer, agriculture, mining, food processing and chemical manufacturing sectors all have a stake in phosphorus—it's an incredibly important resource," says Khara Grieger, corresponding author of the study and an assistant professor of environmental health and risk assessment at North Carolina State University. "Phosphorus stakeholders also include policymakers, wastewater treatment facilities and [environmental groups](#) who are concerned about the adverse impacts that mismanaged phosphorus has on our water quality.

"If we want to develop systems and policies that ensure long-term sustainability of phosphorus resources, we have to understand the needs, wants and concerns of relevant stakeholders," Grieger says. "However, to date, very little has been done to understand and document how phosphorus stakeholders view phosphorus sustainability or what challenges they perceive related to ensuring sustainable phosphorus systems more broadly."

To address this lack of information, the researchers collected [survey data](#) from 96 stakeholders involved in various aspects of phosphorus management. These study participants represent a wide variety of industry, environmental, agricultural and policy interests and have expertise in many different aspects of phosphorus management. The paper, "What are stakeholder views and needs for achieving phosphorus sustainability?" is published open access in the journal *Environment*

Systems and Decisions.

The researchers found that 30.2% of study participants felt that current practices regarding "the mining, use, transport, recovery, recycling or disposal of phosphorus and materials containing phosphorus" was completely unsustainable. Another 45.8% of study participants felt these practices were only slightly sustainable—which was one step up from unsustainable. Meanwhile, 14.6% felt that the practices were neither sustainable nor unsustainable, and only 4.2% of respondents felt the practices were "very sustainable."

"If there are two key takeaway messages here, one of them is that there is very real concern among the majority of phosphorus stakeholders about the sustainability of this essential resource," says Grieger, who is also a co-director of knowledge transfer of the National Science Foundation's Science and Technologies for Phosphorus Sustainability (STEPS) Center headquartered at NC State. "The other takeaway is that there is no silver bullet for addressing this challenge—the needs and concerns across [stakeholder](#) groups are too varied and tend to be context and site-specific."

However, when researchers asked study participants about what is needed to advance phosphorus [sustainability](#), three items stood out.

"More than 50% of respondents reported that new, improved or different regulations are needed; improved management practices and procedures are needed; and new or improved technologies are needed," Grieger says. "And the respondents who highlighted those three areas of need ran the gamut across interest groups."

"While the challenges here are thorny ones, we found this aspect of the study encouraging—because the STEPS Center is focused on addressing needs related to both technologies and management practices. And these

results suggest there is support for our work in both areas."

More information: Khara Grieger et al, What are stakeholder views and needs for achieving phosphorus sustainability?, *Environment Systems and Decisions* (2023). [DOI: 10.1007/s10669-023-09917-y](https://doi.org/10.1007/s10669-023-09917-y)

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