



# RESEARCH BRIEF

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## Environmental Water Markets: Addressing Shortages With or Without Legal Reform

*Informal environmental water transactions have decoupled market activity from water law across Colorado River basin states, sidestepping formal legal processes to conserve water and restore freshwater ecosystems.*

### Background

Environmental water markets have emerged as a tool for reallocating agricultural and urban water usage to conserve water and restore ecosystems worldwide. Proponents argue that water markets can offer conservation and reallocation incentives that are more efficient than direct government regulation and are well-suited for adapting water use in an era of climate change. With significant anticipated increases in the use of environmental water markets for climate adaptation, it is important to understand what drives these markets in practice.

Given the heavily legalized nature of water rights and water transfers, it has often been assumed that specific legal conditions are necessary for environmental water markets to function. To test this theory, researchers at Stanford and the University of Virginia systematically evaluated the favorability of Colorado River basin states' laws and policies for environmental water transfers, since the basin is greatly overallocated and markets have been utilized

### POINTS FOR POLICYMAKERS

► **Government regulatory and conservation programs, not private-sector investment, have driven most environmental water market activity.** Government funding and regulatory programs such as the Endangered Species Act have driven most environmental water market activity in Colorado River basin states — and these programs help explain the divergence between state-level transaction activity and the favorability of state law and policy.

► **Current market activity would be insufficient to address the Colorado River's growing water shortage.** At least \$86–89 million annually in new investment is required to significantly delay or stave off future curtailment of critical water users in the Upper Colorado River basin under the Colorado River Compact. Colorado's market would require the most expansion, followed by Utah, New Mexico, and then Wyoming. This market expansion would likely require unprecedented participation from water users.

► **New government conservation programs and investments can provide immediate impact without waiting for legal reforms.** Informal transactions like those in Colorado River basin states could theoretically occur anywhere without waiting for policy reform: buyers can simply pay water users to leave water in rivers. However, as informal transactions may not protect conserved water from being withdrawn by other water users, legal reforms that enable formal transactions have the potential to improve outcomes. Governments have played a significant role in stimulating demand for environmental water transactions through the Endangered Species Act, interstate compacts, and other programs, funding more than 90 percent of spending.

► **Environmental water markets can serve as a solution even in the absence of legal reforms.** Less formal water transactions — those that circumvent states' legal processes for formally transferring water rights to instream use — have dominated the environmental water market in Colorado River basin states, while very few transactions — just five percent — involved formal water rights transfers.

to transfer water between users for decades. The researchers then compared each state’s laws and policies to environmental water transactions that occurred within the state’s borders from 2014-2020.

The team found that for the 446 water transactions examined across five Colorado River basin states (Arizona, Colorado, New Mexico, Utah, and Wyoming), total environmental water market activity measured by spending, volume of water, and number of transactions showed little relation to states’ legal favorability. This was possible because 95 percent of the transactions studied did not complete their respective state’s formal legal process to change water rights to environmental use. Instead, less formal transactions were the norm and typically involved buyers simply paying water users to leave water in the river or acquiring water from reservoir storage. Even in Colorado and other states with well-developed legal frameworks for environmental water transfers, buyers still conducted far more informal than formal transactions due to lower costs and fewer legal restrictions. These findings illustrate that market-based flow restoration is possible even where legal regimes for environmental water markets do not already exist.

Government spending was the dominant funding source of market activity with 90 percent of the \$53 million spent originating from governments and 68 percent from the U.S. federal government alone. The credible threat of supply cuts is another critical element that has drawn stakeholders to the table to engage in transactions that can conserve water while providing environmental benefits. This study also sheds light on what might be required to conserve water more generally in the Colorado River basin. Most of the informal transactions studied involved paying irrigators in some way to use less water — a strategy that is poised to expand as the Colorado River basin and other basins struggle to adapt to hotter and drier conditions.

## ABOUT THE AUTHORS



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This brief is based on “**Decoupling environmental water markets from water law**” published in the journal *Environmental Research Letters*.

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## FOR MORE INFORMATION

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