

The Downstream Consequences of Depleting Groundwater

ScienceDaily (June 11, 2012) — Hard lessons from around the American West and Australia could help improve groundwater management and protect ecosystems in California, Stanford researchers find.

The Water in the West program at Stanford Woods Institute for the Environment is focusing attention on how groundwater pumping can threaten rivers and ecosystems and, conversely, how creative groundwater management can be a savior during drought. The program recently released a report exploring ways that various American and Australian states and water districts manage and regulate connections between groundwater and surface waters and ecosystems such as rivers, streams, springs and wetlands.

"In many places, over-pumping of groundwater reduces surface-water flows," said report author Rebecca Nelson. "Failing to recognize and address these fundamental connections can place other water users like farmers and cities at risk and can harm fisheries or wetland habitats of migratory waterfowl."

Many jurisdictions manage and regulate surface-water and groundwater without any recognition of the connections. For instance, California has no legal framework for comprehensively managing the impacts of groundwater pumping. Across most of California, well owners can pump as much as they like with little accountability for the impacts on rivers, other water users and ecosystems. In contrast, other states around the West have developed laws and policies for controlling the impacts of wells on rivers. Australia has gone even further, considering how ecosystems of all kinds are affected by groundwater pumping.

"We have only recently developed the science necessary to understand the extent of this problem," Nelson said. "Now we need to move on to thinking about the law and policy tools we need to deal with this issue. On that score, California is at the rear of the pack."

Stanford researchers have been learning from states throughout the western U.S. and Australia that are dealing with common issues of water scarcity, increasing competition for water, greater reliance on groundwater and fragile ecosystems. Hard lessons have produced a range of creative policy tools to ensure that wells do not inadvertently deplete stream-flow, or damage connected ecosystems, while minimizing economic disruption to those who often rely on groundwater during droughts.

Some western states, which face stressed basins and drying rivers, cap groundwater pumping in high-use areas. New wells are permitted when well owners are able to offset their pumping by conserving water or buying and retiring other water rights. Across the Pacific, a decade-long drought ravaged many river ecosystems in Australia but until recently, little attention was paid to the importance of groundwater to those systems. Now, Australian scientists are preparing to release the country's first national map of groundwater-dependent ecosystems. The map will help decision makers when they consider applications for new wells and formulate new water plans

designed to protect these ecosystems into the future.

The Stanford Woods Institute's Water in the West program is collaborating with the University of Sydney's United States Studies Centre to gather groundwater experts from around the western United States and Australia for a workshop later this month focused on promising groundwater policy solutions to common challenges and the wisdom of hard groundwater management lessons.

Report. http://www.stanford.edu/group/waterinthewest/cgi-bin/web/sites/default/files/PolicyMakersBrief&WorkingPaper_RNelson.pdf

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