



## PHD DISSERTATION DEFENSE

# THE COMMON POOL, EXTRACTION RESTRICTIONS, AND THE COSTS OF COLLECTIVE ACTION: THREE ESSAYS ON THE ECONOMICS OF GROUNDWATER MANAGEMENT



**ANDREW AYRES**  
PhD Candidate, Bren School

**Tuesday, April 24, 2018 9:30 AM**  
**Bren Hall 1520**

**Faculty Advisor:** Gary Libecap **Committee:** Chris Costello, Kyle Meng, Derek Booth

**ABSTRACT** My dissertation explores the challenges of implementing efficient institutional arrangements for managing commonly held resources. Theory suggests that such institutions (rules, norms, and regulation) produce aggregate economic gains, but nonetheless over-extraction problems persist because reaching agreement among users to adopt these remedies remains difficult and costly when some are made worse off. Groundwater is a prime example of a common-pool resource that is subject to over-extraction when users may access it without constraint, and many basins remain in prolonged overdraft.

I investigate the difficulties in defining property rights for groundwater by assessing California's historical groundwater management institutions. First, using data from the Mojave Desert, I estimate the causal effect of adopting tradable pumping rights on resource value and find that water value approximately doubles. I then explore the determinants of contracting costs that inhibit the formulation of these institutions in basins where gains should be similarly large. These contracting costs are influenced by resource size and the number of pumpers, but also by important types of resource and user heterogeneity, including diverse water use types and differential access to supplemental water sources. These insights suggest that appropriate responses will vary across basins, with different restrictions, spatial extents, and allocation schemes.

**BIO** My main areas of research include environmental and natural resource economics, institutional economics, applied econometrics, and water economics and policy. The primary line of investigation considers how institutions (rules, norms, and regulation) are agreed upon and subsequently influence behavior and resource value in river basins. My current work examines legal and economic institutions for the management of groundwater resources, including the conditions under which property rights are adopted and their impact on land values. The goal of this work is to inform the implementation of California's Sustainable Groundwater Management Act, which entails substantial management changes in critically degraded basins throughout the state. Previously, I was a Fulbright Fellow in Berlin, Germany, and thereafter worked at the national and European levels on projects related to climate change, energy, river restoration, and water pricing, among others. [Read more](#)

- To join the "bren-alerts" mailing list and receive announcements about Bren School news and events, go to [bren.ucsb.edu/services/computing/bren-alerts.htm](http://bren.ucsb.edu/services/computing/bren-alerts.htm)
- To see a list of currently scheduled Bren events, visit [bren.ucsb.edu/news/all\\_events.htm](http://bren.ucsb.edu/news/all_events.htm)
- For more information or for assistance in accommodating a disability, please contact [Aleah Van Woert](#)
- To find out how to support the Bren School, please contact [Lotus Vermeer](#)