

Energy Water Nexus: The Need for Water Rights and Markets

Gary D. Libecap
University of California, Santa Barbara
NBER
Hoover Institution

Overview

- ▶ Growing demand; more uncertain supplies.
 - ▶ Interface between water and energy.
 - ▶ Water rights less secure and defined and water markets limited.
 - ▶ Misallocation, incentives, lack of information on value.
 - ▶ Current nature of water markets.
 - ▶ Nature of water rights.
 - ▶ Resource.
 - ▶ Path dependency fixed quantities not shares.
 - ▶ Imbedded in institutions.
 - ▶ Regulatory constraints—vague concepts, many agencies, public trust.
 - ▶ Way forward.
- 

Current State of Water Markets

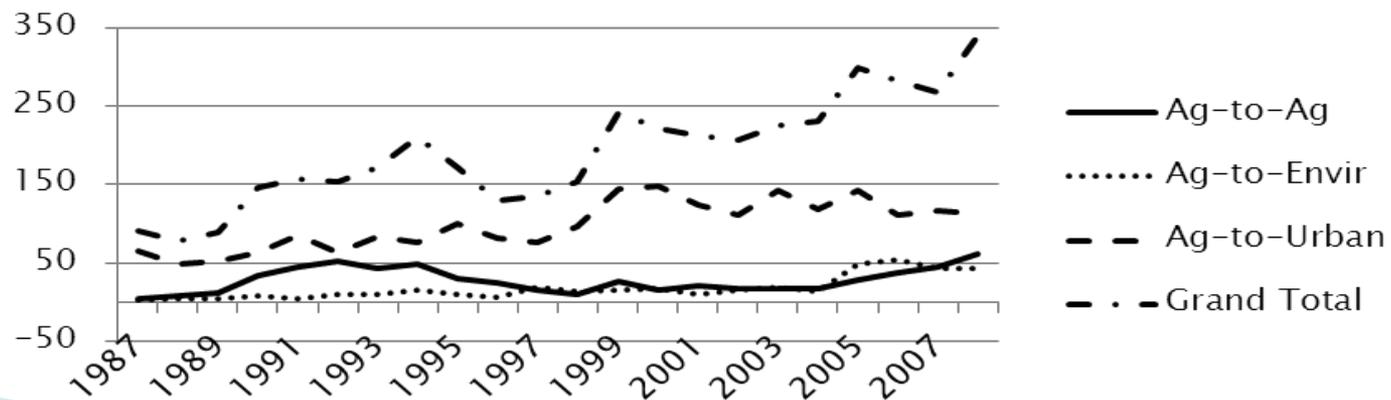
- ▶ Very local, limited reported trades—few observations.
 - Sharp price differentials—Truckee Basin \$17,685/AF ag to urban, \$1,500/AF ag to ag sales; South Platte \$6,519/AF for ag to urban; \$5,309 ag to ag sales.
 - 1987–2008 time series.

	Agriculture-to-Urban Leases	Agriculture-to-Agriculture Leases	Agriculture-to-Urban Sales	Agriculture-to-Agriculture Sales
Median Price	\$74	\$19	\$295	\$144
Mean Price	\$190	\$56	\$437	\$246
Number of Observations	204	207	1,140	215

Current State of Water Markets

- ▶ Welfare gains from shifting water from agriculture to urban: 1% or 3% of current irrigation water and move it to urban, given the existing price difference results in annual welfare gains of about 24% of the current value of the water market.
- ▶ Water transfers in western states:

Number of Transfers 12 Western States



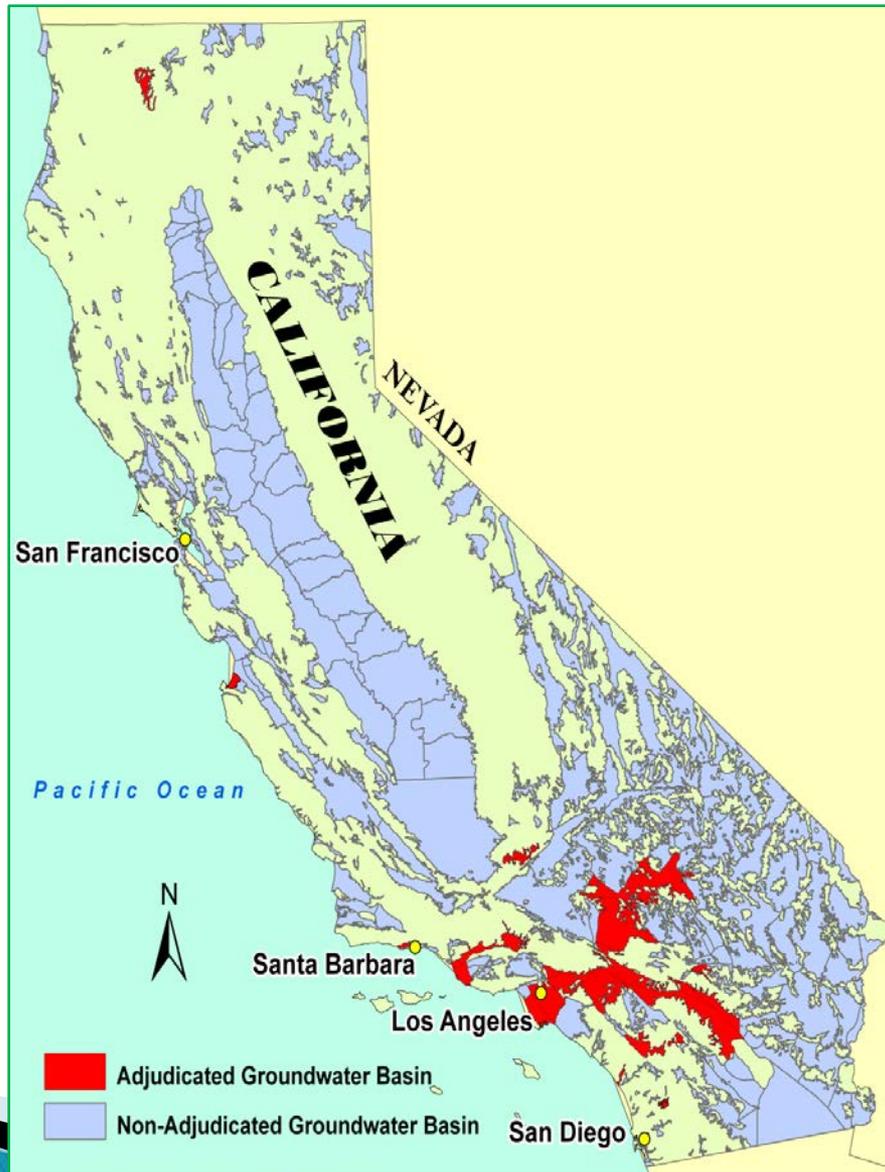
Current State of Water Markets

- ▶ Trading varies sharply by state—Colorado, Arizona, Texas, California.
 - ▶ California—mostly annual leases.
 - ▶ Colorado—active market in the Colorado Big Thompson Project.
 - ▶ Differences lie in the institutional structure of the state—water rights, water supply institutions, as well as urbanization and aridity.
- 

Water Rights

- ▶ Appropriative surface water rights—first possession. Priority.
 - ▶ Unequal sharing of risk across priority rights holders.
 - ▶ Give fixed diversion quantities to a highly variable stock. This exacerbates return flow externalities.
 - ▶ Opposition to trades by low priority parties.
 - ▶ Wide range of standing to object to trades.
 - ▶ Groundwater—varies across the states. Mostly open access.
 - ▶ Most effective—shares versus stocks. Colorado Big Thompson.
 - ▶ Imbedded in institutions—Irrigation Districts and BOR.
- 

Ground Water Rights Unmeasured



Regulatory Constraints

- ▶ Beneficial use, preferential uses—political decisions.
 - ▶ No injury rule—downstream parties, but also pecuniary injury.
 - ▶ Multiple agencies, irrigation districts—public irrigation districts—water is a common, not private resource with many heterogeneous interests—land owners, tenants, school district officials, agricultural implement sellers, real estate agents.
 - ▶ Public interest, public trust—shift toward more central management, just as other resources—fisheries, air quality are shifting more toward RBM.
- 

Concluding Remarks

- ▶ Efficiency goals—increasingly valuable resource. Water rights.
- ▶ Equity goals—private and public goods provided. Tension.
- ▶ Improved allocation; information on alternative uses; incentives for wise use and investment.
- ▶ Way forward:
 - Clarify water rights within water institutions—irrigation districts, Bureau of Reclamation.
 - Clarify rights within constraints of actual water quantities.
 - Streamline trading options within water basins.
 - Define water rights to groundwater and provide for exchange.
 - Support trades across basins. Streamline approval process.
 - Promote long-term trades and sales.