

## **Peak Water Meets Peak Oil: Moving Towards Unitization of Shared Groundwater**

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Excessive access and drawdown in petroleum “reservoirs” has led to premature depletion and, in some cases, irreversible damage to the storage characteristics of reservoirs. In the case of oil and gas reservoirs, government-mandated “unitization”, or the single ownership and management, of the oil and gas reservoirs is one solution to the problem of access and related drawdown to the common pool resources. Economists and legal scholars in property rights suggest unitizing some situations associated with groundwater development as one means to mitigate the inefficiency of a possession or use-based system of groundwater along with the inefficiencies associated with joint access to groundwater. With climate change modeling predicting little to no recharge to aquifers in arid regions, it is possible that much of the western United States is facing a “non-renewable” groundwater scenario. “Non-renewable groundwater” is controversial because it refers to groundwater resources where present-day replenishment is limited but aquifer storage is large, where replenishment is very long (100’s to 1000’s of years) relative to the time-frame of human use, or where the use of groundwater storage is at a rate much greater than the renewal rate, essentially “mining” the groundwater, or where groundwater resources are essentially “decoupled” from the hydrologic cycle due to changes in the climatic conditions in the watershed or compartmentalization by faulting and folding. Declining water levels on the order of 10’s to 100’s of meters are the usual metrics designating excessive access to groundwater resources that are “non-renewable”. One approach to mitigating conflict and potential damage to the storage characteristics of transboundary western United States aquifers is to designate a single “unit operator” who could extract from and develop the reservoir with other parties tapping the non-renewable groundwater resource share in the net returns as share holders. This arrangement eliminates the “race to the pump” and directs extraction toward maximization of the economic value of the entire reservoir or aquifer, rather than trying to meet the unreachable star of maintaining the “sustainable” water rights held by individual parties and jurisdictions sharing non-renewable groundwater.

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