Use it or Lose it: The Economic Consequences of Forfeiture Rules under the Prior Appropriations Doctrine

An original element of the prior appropriations (PA) legal doctrine of the western U.S. is that water rights may be forfeit if not used regularly, but recently there has been legislative action to weaken and abolish forfeiture rules. This paper examines the how the economics of a forfeiture rule change as watersheds become fully appropriated by highlighting the dynamic tension between incentives for speculation and incentives for wasteful water use.

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This research highlight is based on work in progress.

In the western United States, water rights are granted by states under the Prior Appropriation (PA) doctrine and can be forfeit if not regularly put to beneficial use. Allowable beneficial uses are stipulated in law and include diversion-based consumptive use categories such as municipal, domestic, and industrial uses as well as non-diversionary uses such as hydropower production, storage, navigation, recreation, and streamflow maintenance for ecosystem services. Each water right explicitly stipulates the beneficial use allowed by the right.

Beneficial use and forfeiture rules of the PA doctrine are often motivated by three purposes: 1) to avoid speculation and monopoly; 2) to maximize the use of water; and 3) to provide flexibility in use to the water rights holder. Each purpose suggests economic consequences of imposing, or not imposing, a relinquishment threat upon those not beneficially using the water granted by their water right.

We focus on the consequences of speculation as a motivation for forfeiture because it provides the clearest foundation for our focus. A system of appropriation for water diversions without a use requirement would provide appropriators an incentive and ability to claim more water than they could use, for the sole purpose of selling it later to other settlers interested in pursuing irrigated agriculture. This incentive has driven concerns over monopoly and speculation, generally with an explicit focus on equity and market power.

We are currently developing a model to examine the economic consequences of a water rights forfeiture rule. Specifically, the model is applied in the context of the development of water rights from the time of first appropriation through to full appropriation in which virtually all water in a watershed is accounted for even in years where water is relatively

plentiful. We posit that forfeiture as a component of the PA doctrine has different economic and allocative implications today when rights to water resources in most basins are largely appropriated, as compared to when water rights were initially becoming established.

In our model, prospective agricultural irrigators immigrate to a watershed and claim an amount of water for use each year. To initiate this claim, they must invest in irrigation infrastructure to show diligence in development of the claim, such as irrigation ditches for conveyance. And to avoid the risk of forfeiture, they must put the water to use. Any portion of a claim that is not put to use faces a probability of forfeiture.

In our model (and in the PA doctrine generally), the seniority system applies such that earlier claims take priority when water is scarce. In any given year, a relatively senior right faces a lower probability of curtailment (i.e., being prohibited from using the water associated with the right) due to drought than water rights junior it. Later in the appropriation process, junior claimants arriving in the basin have reason to consider purchasing a senior water right rather than filing a new, junior claim with high curtailment risk. As water appropriation in the basin continues, newcomers' willingness to pay for an existing right will increase as available junior claims become increasingly insecure (Figure 1). Senior appropriators expect that water will become scarcer in this sense, and the junior appropriator's willingness to pay for a senior will increase over time.

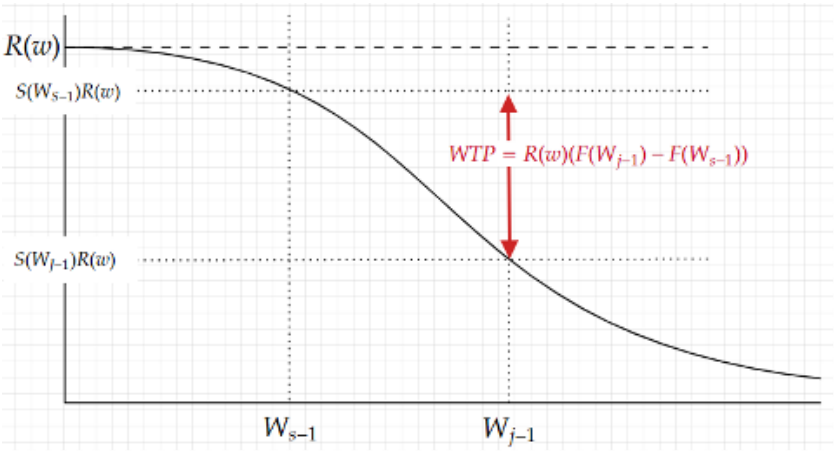

Figure 1. A new agent is willing to pay a maximum price for a water right that is equal to the value of water multiplied by the difference in the likelihood of curtailment between purchasing a right and establishing a new claim.

If no forfeiture rule is enforced or if it were enforced poorly, senior appropriators would have the incentive and opportunity to claim more water than they would otherwise use and hold it for later sale, extracting the value of the water resource in the form of a speculative price from later claimants. How long a senior right holder waits to sell the inchoate (i.e. unused) portion of the water associated with the right depends in part on the relative curtailment risk for senior compared to junior rights holders (Figure 2).

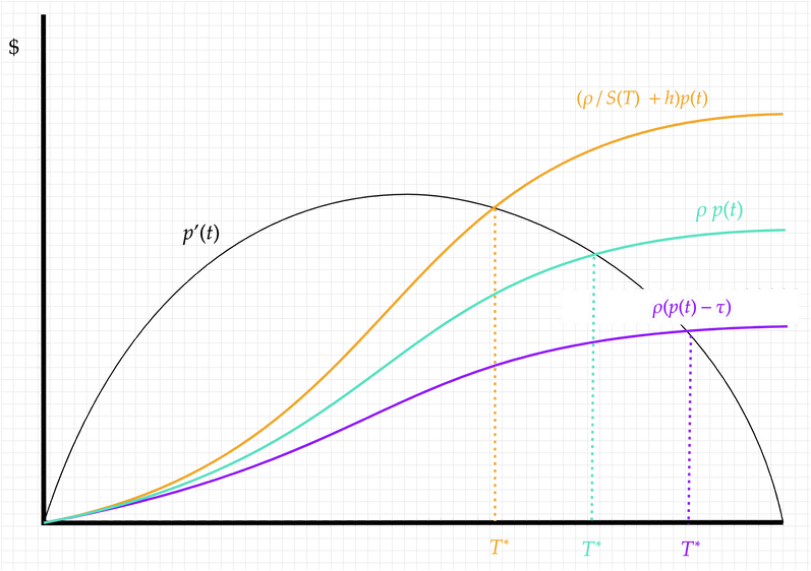

Figure 2. The value of a given water right evolves over time depending on the likelihood of forfeiture, the likelihood of curtailment of a new right relative to the right for sale, and the discount rate of the seller.

A forfeiture rule imposes economic efficiency tradeoffs and impacts the distribution of economic benefits of water. If no forfeiture rule is imposed or if it is enforced poorly, senior speculators will over-invest in irrigation infrastructure to initiate their speculative holdings. This incentive diminishes with the stringency of enforcement. With stricter enforcement of a forfeiture rule, senior users will have an incentive to over-apply water to their crops to avoid forfeiture risk. Conditional on claim size, this incentive to over-use water will be higher if forfeiture risk is higher.

Because the relative value of a given senior water right increases as more juniors enter the basin and face prospective claims with increasingly high curtailment risk, early claimants have a strong incentive to invest in large claims. This incentive diminishes with each successive claim. At some point in watershed development, claimants switch from becoming potential sellers to buyers, and at that point, the most senior water right holder sells their inchoate water first, then the second most senior, etc. until all speculative claims have been sold. This time path suggests that the economic losses of not enforcing forfeiture come from early overinvestment, and these losses diminish as appropriation progresses. The distributional impacts of speculation also diminish as watersheds develop. Early senior speculators claim and reap the benefits of "more-senior water;" later seniors claim and reap less from speculation; and eventually when junior claims are not secure enough to fetch a sufficiently high price, no one claims extra water for speculation at all. To put it another way, a forfeiture rule is most valuable early on in watershed development, when it best avoids economic efficiency losses and the distributional impacts of speculation.

These model implications are consistent with the history of water rights forfeiture rules. Early on when the western U.S. was thinly settled and the Prior Appropriations doctrine was developed, the forfeiture rule was universally adopted. Today, exceptions to forfeiture are being broadened, and bills intended to revoke forfeiture rules altogether are relatively common, often motivated by concerns over wasteful use solely to avoid forfeiture. While these basic implications and their historical counterparts are broadly stated here, the model provides the foundation for a broad set of testable hypotheses to understand how water law affects water use as water demand increases and water becomes increasingly economically scarce.

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